



The City of Canton

Invitation to Bid

City of Canton, Ohio
Purchasing Department
218 Cleveland Ave. SW, 4th floor
Canton, Ohio 44702

Water Department Service Shop Addition and Renovation

Item/Project

Water Department

Responsible Department

2:00 PM, 4/4/2024

Bids Due

Bid Proposal Submitted By:

Company Name

Street Address

City

State

Zip

Contact Person

Phone No.

Email Address

****This project is contingent upon the City receiving funds
from OEPA WSRLA****



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Bidder's Checklist: The completed Bid Form shall be accompanied by the following completed documents:

_____ Pre-Bid Substitution, if any proposed substitutes have been pre-approved.

_____ Bid Guaranty and, if applicable Contract Bond

_____ Contractor's Qualification Statement

_____ Contractor's List of Subcontracted Work Categories

_____ A list identifying its DBE subcontractors and participation rates as a percentage of the Contract Price, and if the DBE participation goal has not been met, certification of good faith efforts to meet the DBE participation goal.

_____ The Project Labor Agreement (PLA) Letter of Assent (See Appendix A).

_____ If this project is funded in whole or part by the Ohio Public Works Commission, then certification of agreement and compliance with certain statements and covenants regarding Bidder's subscription to the State's Equal Employment Opportunity Requirements for State-assisted Construction Contracts.

****Ohio Public Works Commission Funding does not apply to the project. However, Water Supply Revolving Loan Account (WSRLA) administered by the Ohio Water Development Authority (OWDA) does and therefore Appendix C provides guidance concerning the requirements thereof.**

_____ Manufacturers of Material and Equipment to be Furnished

_____ Bid Schedule Proposal Pages and Signature Pages at end of bid packet



Legal Notice

Sealed bids will be received by the City of Canton (the "City"), as provided in this notice for the Water Department Service Shop Addition and Renovation Project (the "Project"), Ordinances 221/2023 & 4/2024. Contract documents, which include additional details of the Project, are on file and available from the City of Canton's web site (<https://cantonohio.gov/448/Purchasing-Procurement>).

Bids shall be enclosed in a sealed envelope addressed to the City of Canton, 218 Cleveland Ave. SW, Purchasing Dept/Fourth Floor, Canton, Ohio 44702 and plainly marked on the outside "Water Department Service Shop Addition and Renovation PROJECT BID." Bids will be received on or before 2:00 PM, local time, 4/4/2024 and opened shortly thereafter.

Questions regarding plans and specifications should be addressed in writing to Purchasing Department, at purchasing@cantonohio.gov.

All bids must include a Bid Guaranty, as described in the Instructions to Bidders. Prevailing wage rates apply. All bidders will be required to comply with the City Contract Compliance Program regarding equal employment opportunity. After submission and opening, no bidder may withdraw its bid within 60 days after the opening; the City reserves the right to waive irregularities, reject any or all bids, and conduct necessary investigations to determine bidder responsibility.

This procurement is subject to the EPA policy of encouraging the participation of small business in rural areas (SBRAs).

The successful bidder must comply with all Davis-Bacon Prevailing Wage Rates.

All companies must submit their Federal ID Number.

A Project Labor Agreement (PLA) is required for this project.

The Engineer's Estimate for the base bid is \$10,150,000.00. This project is contingent upon the City receiving funding.

The bidder is responsible for monitoring the City's website for any official addenda.

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A. BIDDER'S PLEDGE AND AGREEMENT

1. Each Bidder acknowledges that this is a public project involving public funds and that the Owner expects and requires that each successful Bidder adhere to the highest ethical and performance standards. Each Bidder by submitting a bid pledges and agrees that (a) it will act at all times with absolute integrity and truthfulness in its dealings with the Owner and the Engineer, (b) it will use its best efforts to cooperate with the Owner and the Engineer and all other Contractors on the Project and at all times will act with professionalism and dignity in its dealings with the Owner, Engineer, and other Contractors, (c) it will assign only competent supervisors and workers to the Project, each of whom is fully qualified to perform the tasks that are assigned to him/her, and (d) it has read, understands and will comply with the terms of the Contract Documents.

B. EXAMINATION OF CONTRACT DOCUMENTS AND SITE CONDITIONS AND RELIANCE UPON TECHNICAL DATA

1. Each Bidder shall have a competent person carefully and diligently review each part of the Contract Documents, including the Divisions of the Specifications and parts of the Drawings that are not directly applicable to the Work on which the Bidder is submitting its bid. By submitting its bid, each Bidder represents and agrees, based upon its careful and diligent review of the Contract Documents, that it is not aware of any conflicts, inconsistencies, errors, or omissions in the Contract Documents for which it has not notified the Owner in writing at least ten (10) days prior to the bid opening. If there are any such conflicts, inconsistencies, errors, or omissions in the Contract Documents, the Bidder (i) will provide the labor, equipment, or materials of the better quality or greater quantity of Work and/or (ii) will comply with the more stringent requirements. The Bidder will not be entitled to any Change Order, additional compensation, or additional time on account of such conditions for any conflicts, inconsistencies, errors, or omissions that would have been discovered by such careful and diligent review, unless it has given prior written notice to the Owner.
2. Each Bidder shall have a competent person carefully and diligently inspect and examine the entire site and the surrounding area, including all parts of the site applicable to the Work for which it is submitting its bid, including location, condition, and layout of the site and the location of utilities, and carefully correlate the results of the inspection with the requirements of the Contract Documents. The Bidder's bid shall include all costs attributable to site and surrounding area conditions that would have been discovered by such careful and diligent inspection and examination of the site and the surrounding area, and the Bidder shall not be entitled to any Change Order, additional compensation, or additional time on account of such conditions.
3. The Bidder may rely upon the general accuracy of any technical data identified in the Owner-Contractor Agreement (e.g., any soils exploration reports, soil boring logs, site survey, or abatement reports) in preparing its bid, but such technical data are not part of the Contract Documents. Except for the limited reliance described in the preceding sentence, Bidder may not, if awarded a contract for the Work, rely upon or make any Claim against the Owner or Engineer, or any of their agents or employees, with respect to any of the following:
 - a. the completeness of such reports and drawings for Bidder's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by the successful Bidder and safety precautions and programs incident thereto; or
 - b. any interpretation by the successful Bidder of or conclusion drawn from any technical data or any such other data, interpretations, opinions, or information.



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For example, all interpolations and extrapolations of data performed by the Bidder to estimate locations or quantities of subsurface strata are independent factual assumptions, which Owner does not warrant.

4. Each Bidder will be deemed to have actual knowledge of all information provided or discussed at the pre-bid meeting.

C. OWNER & ENGINEER

1. The Owner is:

The City of Canton
218 Cleveland Avenue SW
Canton, OH 44702
Telephone: 330.489.3245
Fax: 330.489.3499

The Owner's Representative is:

Brent Burrier

2. The Design Engineer for the Project is:

Motter & Meadows
600 Market Avenue North
Canton, Ohio 44702

D. PROJECT

1. The Project and Work for the Project consists of all labor, materials, equipment, and services necessary for construction of the project identified as **Water Department Service Shop Addition and Renovation Project** ("the Project"), all in accordance with the Drawings and Specifications prepared by the Engineer and/or Owner. The Project must be substantially complete by the Date for Substantial Completion set forth in Section Q below.
2. The Mayor **has** determined that a Project Labor Agreement ("PLA") will advance the City's procurement interest in cost, efficiency, and quality while promoting labor-management stability as well as compliance with applicable legal requirements governing safety and health, equal employment opportunity, labor and employment standards, and other related matters. Any such PLA shall be negotiated by the Mayor of the Owner with the East Central Ohio Building and Construction Trades Council and its affiliated local unions, or said Council's successor. The successful Bidder shall comply with and adhere to all of the provisions of any PLA for the Project.
3. A pre-bid conference will be held at **1:00 PM on March 14, 2024 at the City of Canton Water Department conference room (address is 2664 Harrisburg Road NE, Canton, OH)**.

DI. WORK

1. This Project includes **Site work, asphalt, concrete, new building, waterwork, HVAC, plumbing, electrical, mechanical, roofing**, and the like as set forth in the Contract Documents.



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2. Alternate No. 1 for this Project is **Additional time for Owner to execute Owner-Contractor Agreement.**
3. Alternate No. 2 for this Project is .
4. Only one contract will be issued by the Owner for constructing the Project, the General Contract, which will cover all scopes of work necessary to construct the Project.
5. The Contractor awarded the General Contract (General Contractor) will be responsible for the performance and coordination of any and all subcontractors and suppliers either directly or indirectly contracted with the General Contractor.
6. Owner will provide Bidders access to the Project site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes, clean up, and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable laws, regulations and Owner's policies relative to excavation and utility locates. Bidders may contact **Brent Burrier**, The City of Canton, at **brent.burrier@cantonohio.gov** or **330-438-6569** if they have any interest in accessing the Project site, independent of any pre-bid meeting.

F. ESTIMATE OF COST

1. The total estimated construction cost for the Base Bid Work for the Project for which bids are being solicited at this time is **\$10,150,000.00.**
The estimated cost for Alternate 1 - **Additional time for Owner to execute Owner-Contractor Agreement** is: **\$50,000.00.**
2. The estimated cost for Alternate 2 - is: .

G. CONTRACT DOCUMENTS

The Contract Documents consist of the documents listed in Section 1 of the Owner-Contractor Agreement.

Bidders may view and download copies of the Contract Documents from The City of Canton Purchasing web site at <https://cantonohio.gov/448/Purchasing-Procurement>, which is the only authorized source of the Contract Documents. The City of Canton's sourcing tool, Vendor Registry, will maintain the Bidder's list and will provide notice and copies of Addenda as issued. It is the responsibility of any person or organization interested in a hard copy of the Contract Documents to pay all costs associated with printing.

Bidders shall use complete sets of Contract Documents in preparing bids. Neither the Owner nor the Design Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents.

The Owner, in making the Contract Documents available on the above terms, does so only for the purpose of obtaining bids on the Work and does not confer a license or grant for any other use.

H. PREPARATION OF BIDS

1. All bids must be submitted on the "Bid Form" furnished with the Contract Documents.
2. All blank spaces shall be filled in, in ink or typewritten, in words and figures, and in figures only where no space is provided for words, and signed by the Bidder. The wording on the Bid Form shall be used without change, alteration, or addition. Any change in the wording or omission of specified accompanying documents may cause the bid to be



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rejected. If there is an inconsistency or conflict in the Bid, the lowest amount shall control, whether expressed in numbers or words.

3. Bidders shall note receipt of Addenda on the Bid Form. If the Bidder fails to acknowledge receipt of each Addendum, the Bid shall be deemed non-responsive, unless the Bid amount clearly and unambiguously reflects receipt of the Addendum or the Addendum involves only a matter of form and does not materially affect the price, quantity or quality of the Work to be performed.
4. Each Bidder shall submit **an original** of its bid to the Owner. The Bid Form shall be signed with the name typed or printed below the signature. A Bid shall not be submitted by facsimile transmission or any other electronic means. A Bidder that is a corporation shall sign its bid with the legal name of the corporation followed by the name of the state of incorporation and the legal signature of an officer authorized to bind the corporation to a contract.
5. Each Bid shall be enclosed in a sealed opaque envelope with the Bidder's name and the title of the Project printed in the upper left hand corner and addressed as follows:

The City of Canton
ATTN: Purchasing/Bids
218 Cleveland Avenue SW
Canton, OH 44702

Bids must be received at the designated location for the bid opening before 2:00 PM, local time, on 4/4/2024.

6. The completed Bid Form shall be accompanied by the following completed documents:
 - a. Pre-Bid Substitution, if any proposed substitutes have been pre-approved. (See Section K, below.)
 - b. Bid Guaranty and, if applicable Contract Bond (See Paragraph H.8, below.)
 - c. Contractor's Qualification Statement (See Paragraph I.4, below.)
 - d. Contractor's List of Subcontracted Work Categories (See Paragraph I.5, below.)
 - e. A list identifying its DBE subcontractors and participation rates as a percentage of the Contract Price, and if the DBE participation goal has not been met, certification of good faith efforts to meet the DBE participation goal. (See Section W, below.)
 - f. The Project Labor Agreement (PLA) Letter of Assent (See Appendix A).
 - g. If this project is funded in whole or part by the Ohio Public Works Commission, then certification of agreement and compliance with certain statements and covenants regarding Bidder's subscription to the State's Equal Employment Opportunity Requirements for State-assisted Construction Contracts (See Section Y, below.)
7. The Bidder shall take the following precautions in preparing its bid:
 - a. Sign the bid and check to ensure all blank spaces have been filled in with requested information and that the specified accompanying documents



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(listed in Paragraph H.6 above) have been included in a sealed opaque envelope addressed as described in Paragraph H.5 above.

- b. When the Bid Form provides for quoting either an addition or deduction for an Alternate item, indicate whether the sum named is an addition or deduction. If it is not indicated, it will be conclusively presumed that the amount is a deduction.
- c. When the Bid Form provides for quoting a unit price, the Bidder should quote the unit price as set forth in the Contract Documents as described in Paragraph M.1 below.
- d. When applicable, make sure that the Bid Guaranty is properly executed and signed by:
 - 1) The Bidder
 - 2) The Surety or Sureties
- e. Make sure that the amount of the Bid Guaranty (if the Bid Guaranty is in the form of a certified check, letter of credit, or cashier's check) is for a specific sum in an amount as instructed in Paragraph H.8.a below. If the Bid Guaranty is in the form of the Bid Guaranty and Contract Bond, the amount may be left blank; if an amount is inserted, it must equal the total of the base bid and all add alternates included. If inserted, then the failure to state an amount equal to the total of the base bid and all add alternates shall make the bid non-responsive if the Owner selects alternates not included in the amount.
- f. Make sure that the appropriate bid package and scope of work is inserted in the correct space on the Bid Guaranty and Contract Bond Form. Failure to include work covered by the bid submitted may make the bid non-responsive.

8. Bonds and Guarantees

- a. Bid Guaranty: Bidder shall furnish a Bid Guaranty, as prescribed in Sections 153.54, 153.57, and 153.571 of the Ohio Revised Code, in the form of either: (1) a bond for the full amount of the bid in the form of the Bid Guaranty and Contract Bond included in the Contract Documents; or (2) a certified check, cashier's check, or irrevocable letter of credit in a form satisfactory to the Owner in an amount equal to 10% of the bid. Bid amount shall be the total of all sums bid, including all add alternatives, but excluding all deduct alternatives. **NOTE: AIA or EJCDC Bid Bond forms are not acceptable.**
- b. Contract Bond: The successful Bidder, who, as a Bid Guaranty, submits a certified check, cashier's check, or irrevocable letter of credit in an amount equal to 10% of the bid, shall furnish a Contract Bond in the form included in the Contract Documents in an amount equal to 100% of the Contract Sum. **NOTE: AIA or EJCDC Bond forms are not acceptable.**
- c. The bond must be issued by a surety company authorized by the Ohio Department of Insurance to transact business in the State of Ohio and acceptable to the Owner. The bond must be issued by a surety capable of demonstrating a record of competent underwriting, efficient



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management, adequate reserves, and sound investments. These criteria will be deemed to be met if the surety currently has an A.M. Best Company Policyholders Rating of "A-" or better and has or exceeds the Best Financial Size Category of Class VI. Other sureties may be acceptable to the Owner, in its sole discretion.

- d. All bonds shall be signed by an authorized agent of an acceptable surety and by the Bidder.
- e. Surety bonds shall be supported by credentials showing the Power of Attorney of the agent, a certificate showing the legal right of the Surety Company to do business in the State of Ohio, and a financial statement of the Surety.
- f. The Bid Guaranty, as applicable, shall be in the name of or payable to the order of the Owner.
- g. The name and address of the Surety and the name and address of the Surety's Agent must be typed or printed on each bond.

9. Permits

- a. Owner has obtained, or will obtain the following permits for the Project, as applicable:

City Building Permits

- b. Contractor shall secure and pay for all other permits necessary to complete the Project. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.
- c. If Contractor intends to work with any pesticides or herbicides to perform the contracted work, the City of Canton requires that Contractor be in possession of an up-to-date and valid Commercial Pesticide Applicator's License from the Ohio Department of Agriculture.

I. METHOD OF AWARD

- 1. All bids shall remain open for acceptance for sixty (60) days following the day of the bid opening, but the Owner may, in its sole discretion, release any bid and return the Bid Guaranty prior to that date. The Bid Guaranty shall be subject to forfeiture, as provided in the Ohio Revised Code, if a bid is withdrawn during the period when bids are being held.
- 2. The Owner reserves the right to reject any, part of any, or all bids and to waive any informalities and irregularities. The Bidder expressly acknowledges this right of the Owner to reject any or all bids or to reject any incomplete or irregular bid. Bidders must furnish all information requested on the Bid Form. Failure to do so may result in disqualification of the bid.
- 3. Determination of the Lowest and Best Bid. Subject to the right of the Owner to reject any or all bids, pursuant to the Codified Ordinances of Canton Chapters 105, 182, and 507, the Owner will award the Contract for the Work to the bidder submitting the lowest and best bid, taking into consideration accepted alternates. In evaluating bids, the Owner will consider the qualifications of the Bidders, whether or not the bids comply with the prescribed requirements, and alternates and unit prices, if requested, on the Bid Form. The Owner may also consider the qualifications and experience of subcontractors and



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suppliers. The Owner may conduct such investigations as are deemed necessary to establish the qualifications and financial ability of the Bidder and its subcontractors and suppliers. The factors the Owner may consider in determining which bid is the lowest and best include the factors set forth below, including the Additional Criteria. Depending upon the type of work, the Owner, in its discretion, may also consider other essential factors, as the Owner may determine and as are included in the Specifications. The Owner, in its discretion, may consider and give such weight to these criteria as it deems appropriate. The Owner, in its discretion, reserves the right to request additional information and documentation relating to these criteria from Bidders after the bid opening.

- a. Work to be subcontracted. The Bidder must identify all work to be subcontracted. See paragraph I.5 below. All subcontractors are subject to the approval of the Owner based on the criteria set forth in this Section I.
- b. The Bidder's work history. The Bidder should have a record of consistent customer satisfaction and of consistent completion of projects, including projects that are comparable to or larger and more complex than the Owner's Project, on time and in accordance with the applicable Contract Documents, and based upon the Bidder's claims history. If the Bidder's management operates or has operated another construction company, the Owner may consider the work history of that company in determining whether the Bidder submitted the lowest and best bid.

The Owner will consider the Bidder's prior experience on other projects of similar scope and/or complexity including prior projects with the Owner and/or Design Professional, including the Bidder's demonstrated ability to complete its work on these projects in accordance with the Contract Documents and on time, and will also consider its ability and capacity to perform a substantial portion of the project with its own forces and its ability to work with the Owner and Engineer as a willing, cooperative, and successful team member. Bringing overstated claims, an excessive number of claims, acting uncooperatively, and filing lawsuits against project owners and/or their design professionals on prior projects of similar scope and/or complexity will be deemed evidence of a Bidder's inability to work with the Owner and Engineer as a willing, cooperative, and successful team member.

The Bidder authorizes the Owner and its representatives to contact the owners and design professionals (and construction managers, if applicable) on projects on which the Bidder has worked and authorizes and requests such owners and design professionals (and construction managers) to provide the Owner with a candid evaluation of the Bidder's performance. By submitting its bid, the Bidder agrees that if it or any person, directly or indirectly, on its behalf or for its benefit brings an action against any of such owners or design professionals (or construction managers) or the employees of any of them as a result of or related to such candid evaluation, the Bidder will indemnify and hold harmless such owners, design professionals (and construction managers) and the employees of any of them from any claims, whether or not proven, that are part of or are related to such action and from all legal fees and expenses incurred by any of them arising out of or related to such legal action. This obligation is expressly intended for the benefit of such owners, design professionals (and construction managers), and the employees of each of them.

- c. The Bidder's prior history regarding timeliness of performance, quality of work, the Bidder's history of filing claims and having claims filed against it, extension



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- requests, fines and penalties imposed and payments thereof, and contract defaults, with explanations.
- d. The Bidder's compliance with federal, state, and local laws, rules, and regulations, including but not limited to the Occupational Safety and Health Act, Ohio Prevailing Wage laws, Davis Bacon, and Ohio ethics laws.
 - e. The Bidder's prior experience with similar work on comparable or more complex projects.
 - f. The number of years the Bidder has been actively engaged as a contractor in the construction industry.
 - g. The Bidder's recent experience record in the construction industry, including the original contract price for each construction job undertaken by the bidder, the amount of any change orders or cost overruns on each job, the reasons for the change orders or cost overruns, and the bidder's record for complying with and meeting completion deadlines on construction projects.
 - h. A public entities' determination, within the previous five years, that the Bidder was not a responsible bidder, the reasons given by the public entity, and the Bidder's explanation thereof.
 - i. The Bidder's financial ability to complete the Contract successfully and on time without resort to its Surety.
 - j. Financial responsibility demonstrated by the Bidder and whether Bidder possesses adequate resources and availability of credit, the means and ability to procure insurance and acceptable performance bonds required for the Project and whether any claims have been made against performance bonds secured by the bidder on other construction projects.
 - k. Any suspension or revocations of any professional license of any director, officer, owner, or managerial employees of the Bidder, to the extent that any work to be performed on this Project is within the field of such licensed profession.
 - l. The Bidder's equipment and facilities.
 - m. The size and experience of the Bidder's work force and the Bidder's ability to complete the Contract successfully and on time.
 - n. The experience and the continuity of the Bidder's work force including the project manager and project superintendent's tenure with the Bidder.
 - o. The Bidder's participation in a drug-free workplace program acceptable to the Owner, and the Bidder's record for both resolved and unresolved findings of the Auditor of State for recovery as defined in Section 9.24 of the Ohio Revised Code.
 - p. The Owner's prior experience with the Bidder's surety.
 - q. The Bidder's interest in the Project as evidenced by its attendance at any pre-bid meetings or conferences for bidders.
 - r. The adequacy, in numbers and experience, of the Bidders' work force to complete the Contract successfully and on time.



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- s. The foregoing information with respect to each of the Subcontractors and Suppliers that the Bidder intends to use on the Project.
4. Qualifications Statement. Each Bidder will submit with its bid a completed Contractor Qualifications Statement, which is included with the Contract Documents, and thereafter provide the Owner promptly with such additional information as the Owner may request regarding the Bidder's qualifications. A Bidder shall submit any requested additional information within three (3) business days of the date on the request.
5. List of Subcontracted Work Categories. Each Bidder will submit with its bid a completed list of Subcontracted Work Categories, which is included with the Contract Documents, and thereafter provide the Owner promptly with such additional information as the Owner may request regarding the Bidder's qualifications. A Bidder shall submit any requested information within three (3) business days of the date on the request.
6. Additional Criteria for Determining Lowest and Best Bid. Pursuant to the Codified Ordinances of the City of Canton, Chapter 105, the Owner, in its discretion, may consider any or all of the Additional Criteria below in determining which bid is lowest and best.
 - a. Any OSHA violations within the previous three years, as well as all notices of OSHA citations filed against the Bidder in the same three year period, together with a description and explanation of remediation or other steps taken regarding such violations and notices of violation.
 - b. Any violations within the previous five years pertaining to unlawful intimidation or discrimination against any employee by reason of race, creed, color, disability, gender, or national origin, and/or violation of any employee's civil or labor rights or equal employment opportunities.
 - c. Any litigation in which the Bidder has been named as a defendant or third party defendant in an action involving a claim for personal injury or wrongful death arising from performance of work related to any project in which it has been engaged within the previous five years. Bidders shall provide copies of pleadings.
 - d. Allegations of violations of the prevailing wage law and any other state or federal labor law, including, but not limited to, child labor violations, failure to pay wages, or unemployment insurance tax delinquencies or unfair labor practices within the past five years.
 - e. Violations of the workers compensation law.
 - f. Any criminal convictions or criminal indictments, involving the Bidder, its officers, directors, owners, and/or managers within the past five years.
 - g. Any violation within the past five years or pending charges concerning federal, state, or municipal environmental and/or health laws, codes, rules, and/or regulations.
 - h. Documentation that the Bidder provides health insurance and pension benefits to its employees.
 - i. Whether the Bidder participates in a bona fide apprenticeship program that is approved by the Ohio State Apprenticeship Council and the United States Department of Labor.
 - j. Whether the Bidder has adopted and implemented a comprehensive drug and alcohol testing program for its employees.



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- k. Whether the Bidder's employees are OSHA-10 and/or OSHA-30 certified.
 - l. The Bidder's commitment to comply with the Owner's Contract Compliance Program regarding equal employment opportunity. Each Bidder shall file contract employment reports with the Owner's contracting agency or as may be directed by the Owner or its representative. Such contract employment reports shall include such information as to the employment practices, policies, programs, and statistics of the Bidder and shall be in such form as the Owner may prescribe.
 - m. The foregoing information with respect to each of the Subcontractors and Suppliers that the Bidder intends to use on the Project.
7. The failure to submit information that Owner has the right to receive under these Instructions to Bidders on a timely basis may result in the determination that the Bidder has not submitted the lowest and best bid.
8. By submitting its bid, the Bidder agrees that the Owner's determination of which bidder is the lowest and best bidder shall be final and conclusive, and that if the Bidder or any person on its behalf challenges such determination in any legal proceeding, the Bidder will indemnify and hold the Owner and its employees and agents harmless from any claims included or related to such legal proceeding, and from legal fees and expenses incurred by the Owner, its employees, or agents that arise out of or are related to such challenge.
9. After bid opening, within three (3) business days of a request made by the Owner, the apparent low Bidder and any other Bidder so requested by the Owner must submit the following:

For all subcontracts with an estimated value of at least \$50,000, a list of all Subcontractors that the Bidder will use to construct the Project, as well as an indication of whether or not the Bidder has ever worked with a proposed Subcontractor before, including the following information for the three most recent projects on which the Bidder and each Subcontractor have worked together:

- i. Project Owner
- ii. Project Name
- iii. Subcontract Scope
- iv. Subcontract Value
- v. Owner's contact name and phone number.

If Bidder and a proposed Subcontractor have not worked together on at least three projects in the past five years, Bidder must submit the information set forth above for the three most recent similar projects to the Project that a proposed Subcontractor has worked on.

The above Subcontractor information, as well as the criteria set forth in Paragraph I.3 herein, as it pertains to each Subcontractor may be used in the Owner's determination of the lowest and best bid.

Once a Bidder identifies its proposed Subcontractors as set forth in this Paragraph I.9, the list shall not be changed unless written approval or direction for the change is made by Owner.

10. Additional Post-Bid Submittals



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- a) Affidavit as to Personal Property Taxes. The successful Bidder shall submit, prior to the time of the entry into the Contract, an affidavit in the form required by Section 5719.042, Ohio Revised Code, regarding the status of the Bidder's personal property taxes. A copy of the affidavit form is included with the Contract Documents.
11. The Owner reserves the right to disqualify bids, before or after opening, upon evidence of collusion with intent to defraud or other illegal practices on the part of the Bidder.
12. Award of Contract. The award of the Contract will only be made pursuant to approval of the City's Board of Control.

J. EXECUTION OF CONTRACT

1. Within the time designated by the Owner after award of the Contract, the successful Bidder shall execute and deliver to the Owner the required number of copies of the Owner-Contractor Agreement, in the form included in the Contract Documents, and all accompanying documents requested, including, but not limited to, a Contract Bond (if applicable), insurance certificates, and a valid Workers' Compensation Certificate. The successful Bidder shall have no property interest or rights under the Owner-Contractor Agreement until the Agreement is executed by the Owner.

K. SUBSTITUTIONS/NON-SPECIFIED PRODUCTS

1. Certain brands of material or apparatus may be specified. Should this be the case, each bid will be based on these brands, which may be referred to in the Contract Documents as Standards. The use of another brand (referred to as a substitution or proposed equal in the Contract Documents, when a bidder or the contractor seeks to have a different brand of material or apparatus than that specified approved by the Owner of use in the Project) may be requested as provided herein. Substitutions, however, will not be considered in determining the lowest and best bid.
2. The products specified in the Contract Documents establish a standard of required function, dimension, appearance, and quality.
3. Bidders wishing to obtain approval to bid non-specified products shall submit written requests to the Owner a minimum of seven (7) working days before the bid date and hour. To facilitate the submission of requests, a Substitution Form is included in the Contract Documents. The Bidder shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution, including the name of the proposed manufacturer and/or product and a complete description of the product including the manufacturer's name and model number or system proposed, drawings, product literature, performance and test data, color selections or limitations, and any other information necessary for evaluation. Include a statement including any changes in other materials, equipment, or other work that would be required if the proposed product is incorporated in the work. The burden of proof of the merit of the proposed product is on the proposer. The Owner's decision on approval of a proposed product will be final.

The following will be cause for rejection of a proposed substitution:

- a. Requests submitted by subcontractors, material suppliers, and individuals other than Bidders;
- b. Requests submitted without adequate documentation;
- c. Requests received after the specified cut-off date;



The City of Canton

- d. Requests, which in the sole discretion of the Owner, do not offer a sufficient benefit to the Project.
4. When the Owner approves a product submission before receipt of bids, the approval will be included in an Addendum, and Bidders may include the pricing of this product in their bid. Bidders shall not rely on approvals made in any other manner.
5. In proposing a non-specified product or a substitution, the Bidder represents and warrants that each proposed product will not result in any changes to the Project, including changes to the Work or other contractors, or any decrease in the performance of any equipment or systems to be installed in the Project and agrees to pay any additional costs incurred by the Owner and the Owner's consultants as a result of a non-specified or substitute product that is accepted.
6. If an addendum is issued approving a substitution for a specified Standard, any Bidder proposed to use said substitution must indicate so with its Bid, using the form provided.
7. Following the award of the Contract, there shall be no substitution for specified products, except pursuant to a Change Order. The Owner in its sole discretion may decline to consider a substitution for a Change Order.
8. The Owner reserves the right to value engineer any item within the specifications if it is deemed to be in the best interest of the Owner.

L. ALTERNATES

1. The Owner may request bids on alternates. At the time of awarding the Contract, the Owner will select or reject alternates as it determines is in its best interest. A Bidder's failure to include on its Bid Form the cost of an alternate selected by the Owner and applicable to the Bidder's work shall render the bid non-responsive and be grounds for the rejection of the bid. Otherwise, the failure to include the cost of an alternate will not be deemed material.
2. The Bidder acknowledges that although there is an estimate for the cost of the Project, the market conditions may and frequently do result in the estimate being different from the sum of the bids received, either higher or lower. The Bidder understands that the Owner may include alternates, which may include deduct alternates as well as add alternates, to give it flexibility to build the Project with the funds available. The Bidder further understands and acknowledges that use of add and deduct alternates is a long held customary practice in the construction industry in the State of Ohio. The Bidder also acknowledges that the Owner will not make a decision about the alternates on which to base the award of contracts until the bids are received, and the Owner can compare its available funds with the base bids and the cost or savings from selecting different alternates. The Bidder understands that the award to the Bidder submitting the lowest and best bid will be based on the base bid plus selected alternates, and may result in an award to a Bidder other than the Bidder that submitted the lowest base bid.

M. UNIT PRICES

1. Where unit prices are requested in the Bid Form the Bidder should quote a unit price. Unless otherwise expressly provided in the Contract Documents, such unit prices shall include all labor, materials, and services necessary for the timely and proper installation of the item for which the unit prices are requested. The unit prices quoted in the bid shall be the basis for any Change Orders entered into under the Owner-Contractor Agreement, unless the Owner determines that the use of such unit prices will cause substantial inequity to either the Contractor or the Owner.



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N. ADDENDA

1. All questions should be submitted in writing at least five (5) business days prior to the bid opening. **This is 3/28/2024, 2:00 PM.** The Owner reserves the right to issue Addenda changing, altering, or supplementing the Contract Documents prior to the time set for receiving bids. The Owner will issue the Addenda to clarify bidders' questions and/or to change, alter, or supplement the Contract Documents.
2. Any explanation, interpretation, correction, or modification of the Contract Documents will be issued in writing in the form of an Addendum, which shall be the only means considered binding; explanations, interpretations, etc., made by any other means shall **NOT** be legally binding. All Addenda shall become a part of the Contract Documents.
3. All Addenda will be issued, except as hereafter provided, via the current City bid tool at least seventy-two (72) hours prior to the published time for the opening of bids, excluding Saturdays, Sundays, and legal holidays. If any Addendum is issued within such seventy-two (72) hour period, then the time for opening of bids shall be extended one (1) week with no further advertising of bids required.
4. Copies of each Addendum will be posted via the Owner's current bid tool and it is the responsibility of the bidder or any other interested party to check the bid tool for any updates or addenda. Receipt of Addenda shall be indicated by Bidders in the space provided on the Bid Form. Bidders are responsible for acquiring issued Addenda in time to incorporate them into their bid. Bidders should check the Owner's bid tool prior to the bid opening to verify the number of Addenda issued.
5. Each Bidder shall carefully read and review the Contract Documents and immediately bring to the attention of the Owner any error, omission, inconsistency, or ambiguity therein.
6. If a Bidder fails to indicate receipt of all Addenda through the last Addendum issued by the Owner on its Bid Form, the bid of such Bidder will be deemed to be responsive only if:
 - a. The bid received clearly indicates that the Bidder received the Addendum, such as where the Addendum added another item to be bid upon and the Bidder submitted a bid on that item; or
 - b. The Addendum involves only a matter of form or is one which has either no effect or has merely a trivial or negligible effect on price, quantity, quality, or delivery of the item bid upon.

O. INTERPRETATION

1. If a Bidder contemplating submitting a bid for the proposed Project is in doubt as to the true meaning of any part of the Contract Documents, it may submit a written request for an interpretation thereof to the Owner at purchasing@cantonohio.gov. Requests received fewer than 5 days prior to bid opening may not be answered. Any interpretation of the proposed documents will be made by Addendum only and will be made available by the City's web tool. The Owner will not be responsible for any other explanation or interpretation of the proposed documents.
2. In interpreting the Contract Documents, words describing materials that have a well-known technical or trade meaning, unless otherwise specifically defined in the Contract Documents, shall be construed in accordance with the well-known meaning recognized by the trade.



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3. Bidders are responsible for notifying the Owner in a timely manner of any ambiguities, inconsistencies, errors, or omissions in the Contract Documents. The Bidder shall not, at any time after the execution of the Contract, be compensated for a claim alleging insufficient data, incomplete Contract Documents, or incorrectly assumed conditions regarding the nature or character of the Work, if no request was made by the Bidder prior to the bid opening.

P. STATE SALES AND USE TAXES

1. The Owner is a political subdivision of the State of Ohio and is exempt from taxation under the Ohio Sales Tax and Use Tax Laws. Building materials that the successful Bidder purchases for incorporation into the Project will be exempt from state sales and use taxes if the successful Bidder provides a properly completed Ohio Department of Taxation Construction Contract Exemption Certificate to the vendors or suppliers when the materials are acquired. The Owner will execute properly completed certificates on request.

Q. DATE FOR SUBSTANTIAL COMPLETION/DATE FOR FINAL COMPLETION/LIQUIDATED DAMAGES

1. Dates for Substantial Completion. The Contract Time shall run from the date of the Notice to Proceed or if there is no Notice to Proceed from the Effective Date of the Owner-Contractor Agreement. The Date for Substantial Completion and the Contract Time may be extended only by Change Order. **By submitting its Bid, each Bidder agrees that the period for performing its Work is reasonable.**

- a. Date for Overall Project Substantial Completion. The successful Bidder shall have all of its Work on the Project Substantially Complete (as Substantial Completion is defined in the Contract Documents) by the following date as applicable to the Bidder's scope of work.

Date for Substantial Completion (aka Contract Time) expressed as calendar days from Notice to Proceed:

609 calendar days

2. Liquidated Damages.

- a. Overall Project Substantial Completion. If the successful Bidder does not have its Work Substantially Complete by its Date for Substantial Completion or Finally Complete within thirty (30) calendar days of achieving Substantial Completion, whichever may be applicable, the successful Bidder shall pay the Owner and the Owner may set off from amounts otherwise due the successful Bidder Liquidated Damages. The daily amounts of Liquidated Damages for Overall Project Substantial Completion are set forth in the tables included in the Owner-Contractor Agreement. The total amount of Liquidated Damages will be calculated based on the total number of calendar days beyond the Date for Substantial Completion that the Bidder's Work is not Substantially Complete or to the extent that its Work is not Finally Complete more than thirty (30) calendar days after the Substantial Completion of its Work, i.e., number of late days times the per diem rate(s) for Liquidated Damages in the tables.

3. The Bidder acknowledges and agrees, by submitting its bid for the Work and entering into a Contract with the Owner, that such amounts of Liquidated Damages represent a reasonable estimate of the actual damages for loss of or interference with the intended use of the Project that the Owner would incur if the Bidder's Work is not Substantially Complete by its Date for Substantial Completion and/or not Finally Complete by thirty



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(30) days of the Date of Substantial Completion. The Bidder further acknowledges, agrees and understands that it may seek an extension of the Contract Time (and its Date for Substantial Completion) to avoid or reduce Liquidated Damages by properly following the Claim procedures in the Contract Documents.

R. OWNER'S RIGHT TO WAIVE DEFECTS AND IRREGULARITIES

1. The Owner reserves the right to waive any and all irregularities provided that the defects and irregularities do not affect the amount of the bid in any material respect or otherwise give the Bidder a competitive advantage.

S. MODIFICATION/WITHDRAWAL OF BIDS

1. Modification. A Bidder may modify its bid by written communication to the Owner at any time prior to the scheduled closing time for receipt of bids, provided such written communication is received by Owner prior to the bid deadline. The written communication shall not reveal the bid price, but should provide the addition or subtraction or other modification so that the final prices or terms will not be known until the sealed bid is opened. If the Bidder's written instructions with the change in bid reveal the bid amount in any way prior to the bid opening, the bid may be rejected as non-responsive.
2. Withdrawal Prior to Bid Deadline. A Bidder may withdraw its bid at any time for any reason prior to the bid deadline for the opening of bids established in the Legal Notice. The request to withdraw shall be made in writing to and received by the Owner prior to the time of the bid opening.
3. Withdrawal after Bid Deadline.
 - a. All bids shall remain valid and open for acceptance for a period of at least 60 days after the bid opening; provided, however, that a Bidder may withdraw its bid from consideration after the bid deadline when all of the following apply:
 - (1) the price bid was substantially lower than the other bids;
 - (2) the reason for the bid being substantially lower was a clerical mistake, rather than a mistake in judgment, and was due to an unintentional and substantial error in arithmetic or an unintentional omission of a substantial quantity of work, labor, or material;
 - (3) the bid was submitted in good faith; and
 - (4) the Bidder provides written notice to the Owner within two (2) business days after the bid opening for which the right to withdraw is claimed.
 - b. No bid may be withdrawn under this provision if the result would be the awarding of the contract on another bid for the bid package from which the Bidder is withdrawing its bid to the same Bidder.
 - c. If a bid is withdrawn under this provision, the Owner may award the Contract to another Bidder determined by the Owner to be the lowest and best bidder or the Owner may reject all bids and advertise for other bids. In the event the Owner advertises for other bids, the withdrawing Bidder shall pay the costs incurred in connection with the rebidding by the Owner, including the cost of printing new Contract Documents, required advertising, and printing and mailing notices to prospective bidders, if the Owner finds that such costs would not have been incurred but for such withdrawal.



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T. COMPLIANCE WITH APPLICABLE LAWS- Please find Equal Employment Opportunity Certification requirements and form within Appendix C – Construction Contract Guidance document (form must be submitted with bid).

1. By submitting a bid for Work on the Project, the Bidder acknowledges that it is in compliance with applicable federal, state, and local laws and regulations, including, but not limited to, the following:
 - a. Equal Employment Opportunity/Nondiscrimination. The Bidder agrees that if it is awarded a contract that in the hiring of employees for performance of work under the contract or any subcontract, neither it nor any subcontractor, or any person acting on its behalf or its subcontractor's behalf, by reason of race, creed, sex, disability as defined in Section 4112.01 of the Ohio Revised Code, or color, shall discriminate against any citizen of the state in the employment of labor or workers who are qualified and available to perform work to which the employment relates. The Bidder further agrees that neither it nor any subcontractor or any person on its behalf or on behalf of any subcontractor, in any manner, shall discriminate against or intimidate any employees hired for the performance of the work under the contract on account of race, creed, sex, disability as defined in Section 4112.01 of the Ohio Revised Code, or color.
 - b. Ethics Laws. The Bidder represents that it is familiar with all applicable ethics law requirements, including without limitation Sections 102.04 and 3517.13 of the Ohio Revised Code, and certifies that it is in compliance with such requirements.

U. FINDINGS FOR RECOVERY- Please find Debarment requirements within Appendix C – Construction Contract Guidance document (form must be submitted with bid).

1. By submitting its bid, each Bidder certifies for reliance of the Owner that it has no unresolved finding for recovery against it issued by the Auditor of the State of Ohio on or after January 1, 2001, except as permitted by Section 9.24 (F) of the Ohio Revised Code.

V. PREVAILING WAGES- Davis Bacon Wages and Requirements apply to this bid/project/contract. Please find requirements within Appendix C – Constructino Contract Guidance document.

1. ~~The Project is a "Construction" project as defined in Section 4115.03 of the Ohio Revised Code. If the Project is defined as such as "Construction" project, the successful Bidder and all of its subcontractors, regardless of tier, will strictly comply with its obligation to pay a rate of wages on the Project not less than the rate of wages fixed for this Project under Section 4115.04 of the Ohio Revised Code. Additionally, the successful Bidder will comply with all other provisions of Chapter 4115 of the Ohio Revised Code.~~

W. DBE PARTICIPATION GOALS- Disadvantaged Business Enterprises (DBE) Utilization Requiremnts apply to this bid/project/contract. Please find requirements within Appendix C – Construction Contract Guidance document.

1. Owner has established the following Disadvantaged Business Enterprise ("DBE") participation goal for the Project as a percentage of the Contract Price:

10%

2. Any Minority Business Enterprise ("MBE") or Woman-Owned Business Enterprise ("WBE") proposed to count towards the DBE participation goal must first be certified at bid time as an MBE or WBE under the Ohio Department of Administrative Services MBE



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Cross Certification Program (which includes MBEs and WBEs certified by the City of Canton), or certified as a DBE under Ohio's Unified Certification Program administered by the Ohio Department of Transportation.

3. **Documentation of DBE Participation.** Each Bidder must submit with its bid a list identifying its DBE subcontractors and participation rates as a percentage of the Contract Price.
4. **Certification of Good Faith Efforts.** If a Bidder has not met the DBE participation goal, it must attach to its bid, a narrative (which may include exhibits) demonstrating the good faith efforts made by the Bidder to secure DBE participation in the Project. Good faith efforts include:
 - Conducting outreach and recruiting activities;
 - Informing DBEs of the opportunity to participate in the Project at least 30 calendar days before the bid closes;
 - Considering subcontracting with a consortium of DBEs; and
 - Using the services and assistance of the Small Business Administration and Minority Development Agency of the U.S. Department of Commerce.

Owner, in its sole discretion, will be the sole evaluator of whether any particular Bidders' efforts sufficiently demonstrate good faith efforts for securing DBE participation.

5. **Challenges to Owner's Discretion.** If any Bidder directly challenges, or indirectly challenges through contribution of money or other resources to a third party, Owner's discretion in determining any Bidder's compliance with the DBE goal stated in these Instructions to Bidders, or good faith efforts pertaining to same, that Bidder agrees to indemnify Owner for all claims, costs, losses and damages, including attorney and consultant fees, arising out of such challenge, should there be an adjudication by a court of competent jurisdiction that the Owner did not abuse its discretion in making its determination.
6. **Failure to Comply.** If a Bidder is awarded a contract for the Project, and later fails to fulfill its stated DBE participation goals, that Bidder agrees to indemnify Owner for all claims, costs, losses and damages, including attorney and consultant fees, arising out of such failure. That Bidder also agrees to cooperate with all reasonable requests to determine actual DBE participation, including but not limited to certifying actual participation and providing documentation in support of same.

X. OTHER LOCAL ORDINANCE REQUIREMENTS

1. Each Bidder, by the act of submitting its bid agrees to withhold all City income taxes due or payable under Chapter 182 of the Codified Ordinances of the City of Canton for wages, salaries, fees, and commissions paid to its employees and further agrees that any of its subcontractors shall be required to agree to withhold any such City income taxes due for services performed under this Agreement. Bidder agrees with the Owner regarding the manner of withholding of City income taxes as provided in Section 718.011(F) of the Ohio Revised Code. Municipal income tax withholding provisions of Section 718.011(B)(1) and 718.011(D) of the Ohio Revised Code shall not apply to qualifying wages paid to employees for work done or services performed or rendered inside the City or on City property. Each Bidder agrees to withhold income tax for the City from employees' qualifying wages earned inside the City or on City property, beginning with the first day of work done or services performed or rendered inside the City.
2. Each Bidder, by the act of submitting its bid agrees that all steel necessary in the construction of the Work performed under the Agreement shall be steel that is produced



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in the United States unless a specific product which is required is not produced by manufacturers in the United States in which event this prohibition does not apply.

Please find additional information, requirements and an acknowledgement form in Appendix C Construction Contract Guidance.

3. Each Bidder, by the act of submitting its bid agrees that all materials used in the construction covered by the Agreement shall be purchased in the Canton area except such materials which are unavailable in the Canton area.
4. Chapter 105.12 – Local Bidder Preference.
 - a. The Board of Control, in determining the lowest and best bidder in the award of contracts to which this section is applicable, is authorized to award contracts to local bidders as hereinafter defined, whose bid is not more than five percent (5%) higher, subject to a maximum amount of twenty thousand dollars (\$20,000.00), than the lowest dollar bid submitted by non-local bidders. The Board of Control's decision in making such an award shall be final.
 - b. For purposes of this section, "local bidder" means an individual or business entity which at the time of the award of the contract has a headquarters, division, sales office, sales outlet, manufacturing facility, or similar significant business-related location in Stark County, Ohio.
 - c. All contract specifications and/or bid documents that are distributed by Canton for the purpose of soliciting bids for goods and/or services shall contain the following notice:

Prospective bidders will take notice that the City of Canton, in determining the lowest and best bidder in the award of this contract, may award a local bidder preference to any qualified bidder pursuant to Section 105.12 of the Codified Ordinances of the City of Canton. The determination of whether a bidder qualifies for the local preference shall be made by Board of Control. The Board's decision shall be final. A copy of Section 105.12 is attached.
 - d. This section shall be applicable to all contracts for equipment, goods, machinery, materials, supplies, vehicles and/or services, which are purchased, leased and/or constructed and which require bidding pursuant to Ohio R.C. 735.05 through 735.09 and Ohio R.C. 737.03. (Ord. 137-2023. Passed 9-25-23.)
5. Each Bidder, by the act of submitting its bid agrees as follows during the performance of the Agreement:
 - a. The Contractor shall not discriminate against any employee or applicant for employment because of race, age, handicap, religion, color, sex, national origin, sexual orientation, or gender identity. The Contractor shall take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to race, religion, color, sex, national origin, military status, sexual orientation, or gender identity. As used herein, the word "treated" shall mean and include without limitation the following: recruited, whether by advertising or other means; compensation, whether in the form of rates or pay or other forms of compensation; selected for training, including apprenticeship; promoted; demoted; upgraded; downgraded; transferred; laid off; and terminated. The Contractor agrees to and shall post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting officers setting forth the provisions of this nondiscrimination clause.



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- b. The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, age, handicap, religion, color, sex, national origin, military status, sexual orientation, or gender identity.
- c. The Contractor shall send to each labor union or representative of workers, with which he has a collective bargaining agreement or other contract or understanding, a notice advising the labor union or workers' representative of the Contractor's commitments under the equal opportunity clause of the Owner; and it shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- d. The Contractor shall submit in writing to the Owner its affirmative action plan, and each subcontractor and supplier of equipment or supplies shall submit to the Contractor its affirmative action plan. The responsibility for securing these affirmative action plans falls upon the Contractor and shall be on file at the office of the Contractor. The Contractor shall furnish all information and reports required by the Owner or its representative pursuant to the Contract Documents, and shall permit access to its books, records, and accounts by the contracting agency of the Owner and by the Executive Secretary of the Owner for purposes of investigation to ascertain compliance with the program.
- e. The Contractor shall take such action with respect to any subcontractor as the Owner may direct as a means of enforcing the provisions of this equal opportunity clause, including penalties and sanctions for noncompliance; provided, however, that in the event the Contractor becomes involved in or is threatened with litigation as is necessary to protect the interests of the Owner and to effectuate the Owner's equal opportunity program and, in the case of contracts receiving Federal assistance, the Contractor or the Owner may request the United States to enter into such litigation to protect the interests of the United States.
- f. The Contractor shall file and shall cause its subcontractors, if any, to file compliance reports with the Owner in the form and to the extent prescribed by the Owner or its representative. Compliance reports filed at such times as directed shall contain information as to the employment practices, policies, programs, and statistics of the Contractor and its subcontractors.
- g. The Contractor shall include the provisions of this equal employment opportunity clause in every subcontract or purchase order, so that such provisions will be binding upon each subcontractor or vendor.
- h. Refusal by the Contractor or subcontractor to comply with any portion of this program as herein stated and described will subject the offending party to any or all of the following penalties:
 - (1) Withholding of all future payments under the involved public contract to the Contractor in violation, until it is determined that the Contractor or subcontractor is in compliance with the provisions of the Agreement.
 - (2) Refusal of all future bids for any public contract with the Owner or any of its departments or divisions, until such time as the Contractor or subcontractor demonstrates that it has established and shall carry out the policies of the program as herein outlined.



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- (3) Cancellation of the public contract and declaration of forfeiture of the performance bond.
 - (4) In cases in which there is substantial or material violation or the threat of substantial or material violation of the compliance procedure or as may be provided by contract, appropriate proceedings may be brought to enforce these provisions, including enjoining within applicable laws of contractors, subcontractors, or other organizations, individuals, or groups who prevent, directly or indirectly, or seek to prevent, directly or indirectly, compliance with the policy as herein outlined.
2. A Project Labor Agreement (PLA) has been required for this project (See Appendix A if applicable). Prevailing Wages are required for this Project (See Appendix B).

Y. OHIO PUBLIC WORKS COMMISSION FUNDING

1. **No** When this line is checked by the Owner, e.g. with an "X" or other mark, the Project is being funded in whole or part by the Ohio Public Works Commission ("OPWC"), and the requirements of the OPWC, attached to these Instructions to Bidders, apply.
2. The OPWC requirements include that the Bidder include with its bid certification of agreement and compliance with certain statements and covenants regarding its subscription to the State's Equal Employment Opportunity Requirements for State-assisted Construction Contracts.

END OF INSTRUCTIONS TO BIDDERS



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OWNER-CONTRACTOR AGREEMENT

*[Where Engineer is a Third Party Hired by Owner and
Engineer Has Construction Administration Duties]*

Owner:

The City of Canton
218 Cleveland Avenue SW
Canton, OH 44702
Telephone: 330.489.3283

Contract: _____
Ordinance: TBD
Alternates: _____

Contractor:

_____, _____ 0
Telephone: _____
Fax: _____

**Project: Water Department Service Shop Addition
and Renovation**

This document is an agreement between the Owner and the Contractor for the Work described in the Contract Documents related to the Contract identified above for the Project defined above and is effective as of the date the Agreement is signed by the Owner (the "Effective Date").

The Owner and the Contractor agree as set forth in the following sections:

1. CONTRACT DOCUMENTS. The Contract Documents consist of the following documents:

- A. Legal Notice;
- B. Instructions to Bidders;
- C. Bid Form;
- D. Owner-Contractor Agreement;
- E. General Conditions of the Contract for Construction (EJCDC C-700), as modified;
- F. Supplementary Conditions (when applicable);
- G. Drawings;
- H. Specifications;
- I. Project Labor Agreement (if applicable)
- J. Addenda issued;
- K. Contractor's Personal Property Tax Affidavit (O.R.C. 5719.042);
- L. Statement of Claim Form; and
- M. Modifications issued after the execution of the contract, including:
 - i. A Change Order;
 - ii. A Work Change Directive; or,
 - iii. A written order for a minor change of the Work issued by the Owner or Engineer in accordance with the General Conditions.
- N. ☒ When this line is checked by the Owner, e.g. with an "X" or other mark, the State of Ohio Department of Transportation, Construction and Material Specifications, effective as of January 1, 2023, will be a Contract Document, but only as modified by the document titled *ODOT Manual Supplement*, prepared by Owner.
- O. Project Labor Agreement (if applicable)

1.1 Notwithstanding anything in the Contract Documents to the contrary, in the event of any inconsistency, the provisions of this Agreement shall control over any other Contract Document, proposal, document, or other attachment. In the event inconsistencies, conflicts, or ambiguities between or among the Contract Documents



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are discovered after execution of the Agreement, Contractor shall provide the better quality or greater quantity of Work or comply with the more stringent requirements.

Note: Non-Contract Documents. The following are the reports and tests of subsurface conditions at or contiguous to the Site, if any, that the Engineer has used in preparing the Contract Documents. These are not Contract Documents. Geotechnical data is not a warranty of subsurface conditions and is not to be relied upon as a complete representation of all possible soil conditions. It is possible that there may be other reports, and/or tests of subsurface conditions at or contiguous to the Site not prepared by or on behalf of Owner. The Owner makes no representation about such reports and/or tests, assuming they exist. Additional information, if needed by Contractor for geotechnical data or site survey, shall be obtained by the Contractor at no additional cost to Owner. The General Conditions, as modified, contain additional terms related to these reports and tests.

Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings listed below, and except for such reliance on "technical data," Contractor shall not rely upon or make any claim against Owner or Engineer with respect to: (1) the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or (2) other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or (3) any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information. For example, all interpolations and extrapolations of data performed by Contractor to estimate locations or quantities of subsurface strata are independent factual assumptions which Owner does not warrant. (Not applicable, if none are listed).

Note: Non-Contract Documents. The following are those reports and drawings related to any Hazardous Conditions at the Site, if any. These are not Contract Documents. The General Conditions, as modified, contain additional terms related to these reports and drawings. (None if none are listed).

2. ENGINEER RELATIONSHIP. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Engineer and the Contractor or any Subcontractor or Material Supplier to the Project. The Engineer, however, shall be entitled to performance of the obligations of the Contractor intended for its benefit and to enforcement of such obligations, but nothing contained herein shall be deemed to give the Contractor or any third party any claim or right of action against the Engineer that does not otherwise exist without regard to this Contract. The Contractor and its Subcontractors shall not be deemed to be beneficiaries of any of the acts or services of the Engineer that are performed for the sole benefit of the Owner. The Contractor shall forward all communications to the Owner through the Engineer and hereby acknowledges and agrees that any instructions, reviews, advice, approvals, orders, or directives that are rendered to it by the Engineer are specifically authorized and directed by the Owner to the Contractor through the Engineer acting on behalf of the Owner.

Engineer will be performing construction administration duties as identified in the General Conditions, including, but not limited to: reviewing Applications for Payment, Change Proposals, Claims, and Shop Drawings; measuring Work quantities; and issuing Work Change Directives.

2.1 The Engineer is:
Motter & Meadows
600 Market Avenue North
Canton, Ohio 44702



3. TIME FOR COMPLETION AND PROJECT COORDINATION.

3.1 DATE OF COMMENCEMENT. The date of commencement of the Work shall be the date identified in the Notice to Proceed issued by the Owner, or by the Owner through the Engineer, to the Contractor, or if there is no Notice to Proceed, the Effective Date of this Agreement.

3.2 DATE OF SUBSTANTIAL COMPLETION. The Project and Work for the Project consists of all labor, materials, equipment, and services necessary for construction of the Project, all in accordance with the Drawings and Specifications prepared by the Owner or Engineer. The Contractor shall achieve Substantial Completion of its Work on the Project, as defined in the General Conditions, within **609 calendar days** of the Date of Commencement ("Date of Substantial Completion"). Substantial Completion is the time at which the Work has progressed to the point where the Work is sufficiently complete, in accordance with the Contract Documents, so that the Work can be utilized for the purposes for which it is intended.

3.2.1 DATE OF FINAL COMPLETION. The Contractor shall achieve Final Completion of its Work on the Project, as defined in the General Conditions, within **30 calendar days** of the Date of Substantial Completion ("Date of Final Completion"). Final Completion shall mean that the Work is complete in accordance with the Contract Documents and the Contractor has submitted to the Owner or Engineer all documents required to be submitted to the Owner or Engineer for final payment.

3.2.2 UTILITIES AND OPERATIONS. Contractor shall not interrupt utilities to facilities or existing operations without prior written notice and approval by Owner.

3.2.3 SHUTDOWN DATES. Due to events scheduled by the Owner and/or other Owner considerations, Contractor will not be able to perform Work on the Project on the following dates (there are no shutdown dates if none are listed):

Contractor's Construction Schedule for performing the Work shall account for Contractor not being able to perform Work on these dates and the contractual dates for Substantial Completion and Final Completion will not be changed due to Contractor not being able to perform Work on these dates.

3.3 CONSTRUCTION SCHEDULE. The Construction Schedule shall be developed by the Contractor as provided in the Contract Documents.

3.4 LIQUIDATED DAMAGES. If the Contractor does not have its Work on the Project Substantially Complete by the specified Date for Substantial Completion or Finally Complete by the Date of Final Completion, the Contractor shall pay the Owner (and the Owner may set off from sums coming due the Contractor) Liquidated Damages in the per diem amounts as set forth in the following tables, whichever may be applicable. "Contract Amount" of the Work will be determined by totaling the cost of all line items of Work.

LIQUIDATED DAMAGES – DATE FOR SUBSTANTIAL COMPLETION OF OVERALL PROJECT

<u>Original Contract Amount</u>	<u>Dollars Per Day</u>
\$1.00 to \$500,000.00	\$ 750.00
\$500,000.01 to \$2,000,000.00	\$ 1,000.00
\$2,000,000.01 to \$10,000,000.00	\$ 1,300.00
\$10,000,000.01 to \$50,000,000.00	\$ 2,000.00
\$50,000,000.01 and greater	\$ 2,500.00



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LIQUIDATED DAMAGES – FINAL COMPLETION

<u>Original Contract Amount</u>	<u>Dollars Per Day</u>
\$1.00 to \$500,000.00	\$ 200.00
\$500,000.01 to \$2,000,000.00	\$ 250.00
\$2,000,000.01 to \$10,000,000.00	\$ 325.00
\$10,000,000.01 to \$50,000,000.00	\$ 500.00
\$50,000,000.01 and greater	\$ 625.00

LIQUIDATED DAMAGES FOR SUBSTANTIAL COMPLETION FOR ANY INTERIM MILESTONE SCOPE WILL BE \$1,000 PER DAY FOR EACH DAY OF UNEXCUSED DELAY BEYOND THE MILESTONE.

The Contractor acknowledges that such amounts of Liquidated Damages represent a reasonable estimate of the actual damages for loss of or interference with the intended use of the Project that the Owner would incur if the Contractor's Work is not Substantially Complete by its Date for Substantial Completion or Finally Complete by the required date for Final Completion.

4. CONTRACT SUM (also called Contract Price). The Contract Sum to be paid by the Owner to the Contractor, as provided herein, for the satisfactory performance and completion of the Work and all of the duties, obligations, and responsibilities of the Contractor under this Agreement and the other Contract Documents is **\$0.00**, subject to adjustment as set forth in the Contract Documents. The Contract Sum includes Allowances, Accepted Alternates, and all federal, state, county, municipal, and other taxes imposed by law, including but not limited to any sales, use, commercial activity, and personal property taxes payable by or levied against the Contractor on account of the Work or the materials incorporated into the Work. The Contractor will pay any such taxes. The Contract Sum includes the following:

4.1 Base Bid Amount: **\$0.00** (Lump Sum Bid); and

4.2 Accepted Alternates, included in the Contract Sum:

Alternate No.	Description	Amount
1	Additional time for Owner to execute Owner-Contractor Agreement	_____
2		_____

4.3 Allowances included in the Contract Sum:

Allowance Description	Amount
Allowance #1: General contractor to include General Purpose Construction Allowance	\$80,000
Allowance #2:	_____

4.4 If after Substantial Completion of its Work, the Contractor fails to submit its final payment application with all the documents required to be submitted with such application within ninety (90) days after written notice to do so from the Owner and without prejudice to any other rights and remedies the Owner may have available to it, the balance of the Contract Sum shall become the Owner's sole and exclusive property, and the Contractor shall have no further interest in or right to such balance.

5. RETAINAGE. Retainage applicable to the Contract by Ohio Revised Code Sections 153.12, .13, and .14 will be withheld as defined in the Modified General Conditions. The Contractor agrees that the financial institution selected by the Owner for deposit of retained funds is acceptable to the Contractor and will sign any documents requested related to said account.



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6. GENERAL.

6.1 MODIFICATION. No modification or waiver of any of the terms of this Agreement or of any other Contract Documents will be effective against a party unless set forth in writing and signed by or on behalf of a party. In the case of the Owner, the person executing the modification or waiver must have express authority to execute the Modification on behalf of the Owner pursuant to a resolution that is duly adopted by the Owner. Under no circumstances will forbearance, including the failure or repeated failure to insist upon compliance with the terms of the Contract Documents, constitute the waiver or modification of any such terms. The parties acknowledge that no person has authority to modify this Agreement or the other Contract Documents or to waive any of its or their terms, except as expressly provided in this section.

6.2 ASSIGNMENT. The Contractor may not assign this Agreement without the written consent of the Owner, which the Owner may withhold in its sole discretion.

6.3 LAW AND JURISDICTION. All questions regarding the validity, intention, or meaning of this Agreement or any modifications of it relating to the rights and obligation of the parties will be construed and resolved under the laws of the State of Ohio. Any suit, which may be brought to enforce any provision of this Agreement or any remedy with respect hereto, shall be brought in the Common Pleas Court of the county in which the Project is located and each party hereby expressly consents to the exclusive jurisdiction of such court to the exclusion of any other court, including any U.S. District Court or any other federal court.

6.4 CONSTRUCTION. The parties acknowledge that each party has reviewed this Agreement and the other Contract Documents and entered into this Agreement as a free and voluntary act. Accordingly, the normal rule of construction to the effect that any ambiguities are to be resolved against the drafting party will not be employed in the interpretation of this Agreement, the other Contract Documents, or any amendments or exhibits to it or them.

6.5 APPROVALS. Except as expressly provided herein, the approvals and determinations of the Owner and Engineer will be subject to the sole discretion of the respective party and be valid and binding on the Contractor, provided only that they be made in good faith, i.e., honestly. If the Contractor challenges any such approval or determination, the Contractor has the burden of proving that it was not made in good faith by clear and convincing evidence.

6.6 PARTIAL INVALIDITY. If any term or provision of this Agreement is found to be illegal, unenforceable, or in violation of any laws, statutes, ordinances, or regulations of any public authority having jurisdiction, then, notwithstanding such term or provision, this Agreement will remain in full force and effect and such term will be deemed stricken; provided this Agreement will be interpreted, when possible, so as to reflect the intentions of the parties as indicated by any such stricken term or provision.

6.7 COMPLIANCE WITH LAWS AND REGULATIONS. The Contractor, at its expense, will comply with all applicable federal, state, and local laws, rules, and regulations applicable to the Work, including but not limited to Chapter 4115 of the Ohio Revised Code and Sections 153.59 and 153.60 of the Ohio Revised Code, which prohibit discrimination in the hiring and treatment of employees, with respect to which the Contractor agrees to comply and to require its subcontractors to comply.

6.7.1 NON-DISCRIMINATION. Contractor agrees:

- .1 That in the hiring of employees for the performance of Work under this Agreement or in any subcontract, neither the Contractor, subcontractor, or any person acting on behalf of either of them, shall by reason of race, creed, sex, disability as defined in Section 4112.01 of the Ohio Revised Code, or color discriminate against any citizen of the state in the employment of labor or workers who are qualified and available to perform the Work to which the employment relates.
- .2 That neither the Contractor, subcontractor, nor any person acting on behalf of either of them shall, in any manner, discriminate against or intimidate any employee hired for the performance of Work under this Agreement on account of race, creed, sex, disability as defined in Section 4112.01 of the Ohio Revised Code, or color.



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.3 That there shall be deducted from the amount payable to the Contractor by the Owner under this Agreement a forfeiture of twenty-five dollars (\$25.00) as required by Ohio Revised Code Section 153.60 for each person who is discriminated against or intimidated in violation of this Agreement.

.4 That this Agreement may be canceled or terminated by the Owner and all money to become due hereunder may be forfeited for a second or subsequent violation of the terms of this section of this Agreement.

6.7.2 PREVAILING WAGE RATES. The Contractor and its subcontractors, regardless of tier, shall strictly comply with their obligation, if any, to pay their employees working on the Project site at the applicable prevailing wage rates for the type of work, including any changes thereto, pursuant to Ohio Revised Code Chapter 4115 or Davis Bacon rates and requirements.

6.7.3 ETHICS. By signing and entering into this agreement with the Owner, the Contractor represents that it is familiar with all applicable ethics law requirements, including without limitation Sections 102.04 and 3517.13 of the Ohio Revised Code, and certifies that it is in compliance with such requirements. The Contractor understands that failure to comply with the ethics laws is, in itself, grounds for termination of this contract and may result in the loss of other contracts with the Owner.

6.8 JOB MEETINGS. The Contractor or one of its representatives with authority to bind the Contractor will attend all job meetings. The Owner anticipates that job meetings will be scheduled on a weekly basis during construction or as needed. The Contractor will ensure that its Subcontractors also hold regular job meetings at which safety issues and job matters are discussed as these relate to the Work being performed. Job meetings include, but are not limited to, pre-construction meetings, weekly job meetings, weekly safety tool box meetings, and monthly safety meetings.

6.9 PROPERTY TAX AFFIDAVIT. The Contractor's affidavit given under Section 5719.024, Ohio Revised Code, is incorporated herein.

6.10 WARRANTIES. Notwithstanding anything to the contrary in the Contract Documents, including the Project Manual and Specifications, no warranties by Contractor shall be limited to any time shorter than the statute of limitations for written contracts in Ohio.

6.11 CONTRACTOR ATTESTATIONS.

.1 Contractor attests that it has not scaled these contract documents to determine quantities for bids, as Contractor has field verified and taken its own dimensions to determine the quantities for its bid.

.2 Contractor agrees that all the scales noted on the drawings are correct; so as to give it an "intent" of what is to be bid. Contractor has not relied on any other dimensions than what are noted in text and dimension lines.

.3 Contractor has thoroughly read the Contract Documents and has asked any and all questions it has on the intent of the scope of work, or supposed errors and omissions contained in these drawings, during the bid process and prior to signing this Agreement.

.4 Contractor will not be asserting a claim for additional time or money associated with the three issues listed above.

.5 Contractor believes it has accurately interpreted the Contract Documents and has asked for clarification and received satisfactory response for all items not thoroughly addressed or appeared to be conflicting in the Contract Documents and has found all stipulations and requirements contained in this Agreement are as stated in the bid specifications and are enforceable according to Ohio Law, including but not limited to the Owner's right of offset, and the Owner's right to assess liquidated damages for work not completed according to the milestones listed on the project schedule contained in the Contract Documents.



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6.12 ENTIRE AGREEMENT. This Agreement and the other Contract Documents constitute the entire agreement among the parties with respect to their subject matter and will supersede all prior and contemporaneous, oral or written, agreements, negotiations, communications, representations, and understandings with respect to such subject matter, and no person is justified in relying on such agreements, negotiations, communications, representations, or understandings.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed by their properly authorized representatives and agree that this Agreement is effective as of the date first set forth above.

Owner:

The City of Canton

By: _____

Name: _____

Title: _____

Date: _____

Contractor:

By: _____

Name: _____

Title: _____

Date: _____



The City of Canton

CERTIFICATE
(Section 5705.41, R.C.)

The undersigned, fiscal officer of the Owner, certifies that the moneys required to pay that part of the Contract Sum coming due during the current fiscal year, under the Agreement to which this Certificate is attached have been lawfully appropriated for such purpose and are in the appropriate account of the Owner, or in the process of collection to the credit of the appropriate account or fund, free from any previous encumbrances. Moneys due in excess of the Contract Sum shall require an additional and separate Fiscal Officer's Certificate.

DATED: _____

Fiscal Officer



The City of Canton

BID GUARANTY AND CONTRACT BOND

(O.R.C. § 153.571)

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned _____
_____ ("Contractor") as principal and _____
_____ as surety are hereby held and firmly bound unto the **City of Canton** as
obligee in the penal sum of the dollar amount of the bid submitted by the principal to the obligee on _____
_____, 20____, to undertake the construction of the **Water Department Service Shop Addition
and Renovation Project** ("Project"). The penal sum referred to herein shall be the dollar amount of the
principal's bid to the obligee, incorporating any additive or deductive Alternates made by the principal on
the date referred to above to the obligee, which are accepted by the obligee. In no case shall the penal
sum exceed the amount of _____ Dollars (\$_____). (If
the foregoing blank is not filled in, the penal sum will be the full amount of the principal's bid, including
add Alternates. Alternatively, if the blank is filled in the amount stated must not be less than the full
amount of the bid including add Alternates, in dollars and cents. A percentage is not acceptable.) For the
payment of the penal sum well and truly to be made, we hereby jointly and severally bind ourselves, our
heirs, executors, administrators, successors, and assigns.

Signed this _____ day of _____, 20____.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH that whereas the above named principal has
submitted a bid for work on the Project.

Now, therefore, if the obligee accepts the bid of the principal and the principal fails to enter into a
proper contract in accordance with the bid, plans, details, specifications, and bills of material; and in the
event the principal pays to the obligee the difference not to exceed ten percent (10%) of the penalty
hereof between the amount specified in the bid and such larger amount for which the obligee may in good
faith contract with the next lowest bidder to perform the work covered by the bid; or in the event the
obligee does not award the contract to the next lowest bidder and resubmits the project for bidding, the
principal pays to the obligee the difference not-to-exceed ten percent (10%) of the penalty hereof
between the amount specified in the bid, or the costs, in connection with the resubmission, of printing new
contract documents, required advertising, and printing and mailing notices to prospective bidders,
whichever is less, then this obligation shall be null and void, otherwise to remain in full force and effect; if
the obligee accepts the bid of the principal and the principal within ten (10) days after the awarding of the
contract enters into a proper contract in accordance with the bid, plans, details, specifications, and bills of
material, which said contract is made a part of this bond the same as though set forth herein.

Now also, if the said principal shall well and faithfully do and perform the things agreed by said
principal to be done and performed according to the terms of said contract; and shall pay all lawful claims
of subcontractors, materialmen, and laborers, for labor performed and materials furnished in the carrying
forward, performing, or completing of said contract; we agreeing and assenting that this undertaking shall
be for the benefit of any materialman or laborer having a just claim, as well as for the obligee herein; then
this obligation shall be void; otherwise the same shall remain in full force and effect; and surety shall
indemnify the obligee against all damage suffered by failure of the principal to perform the contract
according to its provisions and in accordance with the plans, details, specifications, and bills of material
therefor and to pay all lawful claims of subcontractors, materialmen, and laborers for labor performed or
material furnished in carrying forward, performing, or completing the contract and surety further agrees
and assents that this undertaking is for the benefit of any subcontractor, materialman, or laborer having a
just claim, as well as for the obligee; it being expressly understood and agreed that the liability of the
surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as
herein stated.

The said surety hereby stipulates and agrees that no modifications, omissions, or additions in or
to the terms of the said contract or in or to the plans or specifications therefore shall in any wise affect the



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obligations of said surety on its bond, and does hereby waive notice of any such modifications, omissions or additions to the terms of the contract or to the work or to the specifications.

Signed and sealed this _____ day of _____, 20__.

PRINCIPAL

By: _____

Printed Name & Title: _____

SURETY

By: _____

Printed Name & Title: _____

Surety's Address: _____

Surety's Telephone Number: _____

Surety's Fax Number: _____

SURETY'S AGENT

Surety's Agent's Address: _____

Surety's Agent's Telephone Number: _____

Surety's Agent's Fax Number: _____



NOTE: The Contract Bond form that follows is to be used ONLY by a bidder that is awarded a contract and submits a form of bid guaranty other than the combined Bid Guaranty and Contract Bond with its bid. If a bidder submits a combined Bid Guaranty and Contract Bond, then the bid guaranty becomes the contract bond when the contract is awarded.

AIA and EJCDC Bid Bond or Payment and Performance Bond forms are not acceptable for this Project.



The City of Canton

CONTRACT BOND
(O.R.C. § 153.57)

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned ("Contractor"), as principal, and _____, as surety, are hereby held and firmly bound unto the **City of Canton** ("Owner") as obligee, in the penal sum of _____ Dollars (\$ _____), for the payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH that whereas, the above-named principal did on the _____ day of _____, 20____, enter into a contract with the Owner for construction of the **Water Department Service Shop Addition and Renovation Project** ("Project"), which said contract is made a part of this bond the same as though set forth herein:

Now, if the said Contractor shall well and faithfully do and perform the things agreed by the Contractor to be done and performed according to the terms of said contract; and shall pay all lawful claims of subcontractors, materialmen, and laborers, for labor performed and materials furnished in the carrying forward, performing, or completing of said contract; we agreeing and assenting that this undertaking shall be for the benefit of any materialman or laborer having a just claim, as well as for the obligee herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The said surety hereby stipulates and agrees that no modifications, omissions, or additions in or to the terms of the said contract or in or to the plans or specifications therefore shall in any wise affect the obligations of said surety on its bond, and does hereby waive notice of any such modifications, omissions or additions to the terms of the contract or to the work or to the specifications.

Signed and sealed this _____ day of _____, 20____.

(PRINCIPAL)

(SURETY)

By: _____

By: _____

Printed Name & Title: _____

Printed Name & Title: _____

Surety's Address: _____

Surety's Telephone Number: _____

Surety's Fax Number: _____

NAME OF SURETY'S AGENT

Surety's Agent's Address: _____

Surety's Agent's Telephone Number: _____

Surety's Agent's Fax Number: _____



The City of Canton

BID FORM

1.01 BID SUBMITTED BY:

(Contractor)

Date bid submitted: _____

1.02 DELIVER TO:

The City of Canton
ATTN: **Purchasing/Bids**
218 Cleveland Avenue SW
Canton, OH 44702

1.03 Having carefully reviewed the Instructions to Bidders, Drawings, Specifications and other Contract Documents for the Project titled **Water Department Service Shop Addition and Renovation Project** including having also received, read, and taken into account the following Addenda:

Addendum No.	Dated
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

and likewise having inspected the site and the conditions affecting and governing the Project, the undersigned hereby proposes to furnish all materials and to perform all labor, as specified and described in the said Specifications and/or as shown on the said Drawings for all Work necessary to complete the Project on a timely basis and in accordance with the Contract Documents regardless of whether expressly provided for in such Specifications and Drawings.

1.04 Before completing the Bid Form, the undersigned represents that it has carefully reviewed the Legal Notice to Bidders, Instructions to Bidders, this Bid Form, Form of Bid Guaranty and Contract Bond, Contractor's Affidavit (O.R.C. 5719.042), Owner-Contractor Agreement, General Conditions of the Contract (EJCDC C-700) (as modified for the Project), Drawings, Project Specifications, and other Contract Documents. Failure to comply with provisions of the Contract Documents may be cause for disqualification of the bid.

1.05 BONDS AND CONTRACT: If the undersigned is notified of bid acceptance, it agrees to furnish required bonds as indicated in the Instructions to Bidders.

1.06 COMPLETION OF WORK: In submitting a bid, the undersigned agrees to execute the Owner-Contractor Agreement in the form included in the Contract Documents and to complete its Work as required by the Contract Documents.

NOTE A: The wording of the Bid Form shall be used throughout, without change, alteration, or addition. Any change may cause it to be rejected.

NOTE B: Bidder is cautioned to bid only on the Brands or Standards specified.

NOTE C: If there is an inconsistency or conflict in the Bid amount, the lowest amount shall control, whether expressed in numbers or words.



The City of Canton

2.01 BID:

Include the cost of all labor and material for the contract listed below. Bidder is to fill in all blanks related to the Bid Package for which a bid is being submitted. If no bid is submitted for an item, leave the item blank or insert "NO BID" in the blank. For alternate items, indicate whether the amount stated is in addition to or a deduction from the base bid amount (if there is no indication whether the amount for an alternate is an addition or a deduction, the amount shall be a deduction).

2.02 Bidder will complete the Work in accordance with the Contract Documents for the prices set forth in the attached Bid Schedule.

3.01 INSTRUCTIONS FOR SIGNING

- A. The person signing for a sole proprietorship must be the sole proprietor or his authorized representative. The name of the sole proprietor must be shown below.
- B. The person signing for a partnership must be a partner or his authorized representative.
- C. The person signing for a corporation must be the president, vice president or other authorized representative; or he must show authority, by affidavit, to bind the corporation.
- D. The person signing for some other legal entity must show his authority, by affidavit, to bind the legal entity.

4.01 BIDDER CERTIFICATIONS. The Bidder hereby acknowledges that the following representations in this bid are material and not mere recitals:

1. **The Bidder acknowledges that this is a public project involving public funds, and that the Owner expects and requires that each successful Bidder adhere to the highest ethical and performance standards. The Bidder by submitting its bid pledges and agrees that (a) it will act at all times with absolute integrity and truthfulness in its dealings with the Owner and the Design Professional, (b) it will use its best efforts to cooperate with the Owner and the Design Professional and all other Contractors on the Project and at all times will act with professionalism and dignity in its dealings with the Owner, Design Professional and other Contractors, (c) it will assign only competent supervisors and workers to the Project, each of whom is fully qualified to perform the tasks that are assigned to him/her, and (d) it has read, understands and will comply with the terms of the Contract Documents.**
2. The Bidder represents that it has had a competent person carefully and diligently review each part of the Contract Documents, including any Divisions of the Specifications and parts of the Drawings that are not directly applicable to the Work on which the Bidder is submitting its bid. By submitting its bid, each Bidder represents and agrees, based upon its careful and diligent review of the Contract Documents, that it is not aware of any conflicts, inconsistencies, errors or omissions in the Contract Documents for which it has not notified the Owner in writing at least ten (10) days prior to the bid opening. If there are any such conflicts, inconsistencies, errors or omissions in the Contract Documents, the Bidder (i) will provide the labor, equipment or materials of the better quality or greater quantity of Work; and/or (ii) will comply with the more stringent requirements. The Bidder will not be entitled to any additional compensation for any conflicts, inconsistencies, errors or omissions that would have been discovered by such careful and diligent review, unless it has given such prior written notice to Owner.
3. The Bidder represents that it has had a competent person carefully and diligently inspect and examine the entire site for the Project and the surrounding area, including all parts of the site applicable to the Work for which it is submitting its bid, and carefully correlate the results of the inspection with the requirements of the Contract Documents. The Bidder agrees that its bid shall include all costs attributable to site and surrounding area conditions that would have been



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discovered by such careful and diligent inspection and examination of the site and the surrounding area, and the Bidder shall not be entitled to any Change Order, additional compensation, or additional time on account of conditions that could have been discovered by such an investigation.

4. The Bidder represents, understands and agrees that a) the Claim procedures in the General Conditions as modified for the Project are material terms of the Contract Documents, b) if it has a Claim, it will have its personnel provide complete and accurate information to complete and submit the Statement of Claim form on a timely basis, c) the proper completion and timely submission of a Statement of Claim form is a condition precedent to any change in the Contract Sum or the Contract Time(s), and d) the proper and timely submission of the Statement of Claim form provides the Owner with necessary information so that the Owner may investigate the Claim and mitigate its damages.
5. The Bidder represents that the bid contains the name of every person interested therein and is based upon the Standards specified by the Contract Documents.
6. The Bidder and each person signing on behalf of the Bidder certifies, and in the case of a bid by joint venture, each member thereof certifies as to such member's entity, under penalty of perjury, that to the best of the undersigned's knowledge and belief: (a) the Base Bid, any Unit Prices and any Alternate bid in the bid have been arrived at independently without collusion, consultation, communication or agreement, or for the purpose of restricting competition as to any matter relating to such Base Bid, Unit Prices or Alternate bid with any other Bidder; (b) unless otherwise required by law, the Base Bid, any Unit Prices and any Alternate bid in the bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to the bid opening, directly or indirectly, to any other Bidder who would have any interest in the Base Bid, Unit Prices or Alternate bid; (c) no attempt has been made or will be made by the Bidder to induce any other Person to submit or not to submit a bid for the purpose of restricting competition; and (d) the statements made in this Bid Form are true and correct.
7. The Bidder will execute the form of Owner/Contractor Agreement in the form included with the Contract Documents, if a Contract is awarded on the basis of this bid, and if the Bidder does not execute the Contract Form for any reason, other than as authorized by law, the Bidder and the Bidder's Surety are liable to the Owner.
8. The Bidder certifies that the upon the award of a Contract, the Contractor will ensure that all of the Contractor's employees, while working on the Project site, will not purchase, transfer, use or possess illegal drugs or alcohol or abuse prescription drugs in any way.
9. The Bidder agrees to furnish any information requested by the Owner's authorized representative to evaluate that the Bidder has submitted the lowest and best bid and that the bid is responsive to the specifications.
10. The Bidder certifies that it has no unresolved findings for recovery issued by the Auditor of State.
11. The Bidder certifies that it is aware of and in compliance with the requirements of Ohio Revised Code Section 3517.13 regarding campaign contributions.

LEGAL NAME OF BIDDER: _____

BIDDER IS (check one): ☐ sole proprietor ☐ partnership ☐ corporation ☐ other legal entity



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NAME & TITLE OF PERSON LEGALLY AUTHORIZED TO BIND BIDDER TO A CONTRACT:

Name	Title
DATE SIGNED: _____	SIGNATURE: _____
	ADDRESS: _____

	TELEPHONE: _____
	FAX: _____
	FEDERAL TAX I.D. # _____

When the Bidder is a partnership or a joint venture, state name and address of each partner in the partnership or participant in the joint venture below:

_____	_____
Name	_____
	Address
_____	_____
Name	_____
	Address
_____	_____
Name	_____
	Address
_____	_____
Name	_____
	Address
_____	_____
Name	_____
	Address

END OF SECTION



The City of Canton

CONTRACTOR'S QUALIFICATION STATEMENT

Water Department Service Shop Addition and Renovation Project

SUBMITTED TO: The City of Canton
ATTN: **Purchasing/Bids**
218 Cleveland Avenue SW
Canton, OH 44702

SUBMITTED BY: _____

NAME: _____

ADDRESS: _____

PRINCIPAL OFFICE: _____

- ☐ Corporation
- ☐ Partnership
- ☐ Individual
- ☐ Joint Venture
- ☐ Other

NAME OF PROJECT: Water Department Service Shop Addition and Renovation Project

1. ORGANIZATION

- 1.1 How many years has your organization been in business as a Contractor in the construction industry?
- 1.2 How many years has your organization been in business under its present business name?
- 1.2.1 Under what other or former names has your organization operated?
- 1.3 If your organization is a corporation, answer the following:
- 1.3.1 Date of incorporation:
- 1.3.2 State of incorporation:
- 1.3.3 President's name:
- 1.3.4 Vice President's name(s):
- 1.3.5 Secretary's name:
- 1.3.6 Treasurer's name:
- 1.4 If your organization is a partnership, answer the following:



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- 1.4.1 Date of organization:
- 1.4.2 Type of partnership (if applicable):
- 1.4.3 Name(s) of general partner(s):
- 1.5 If your organization is individually owned, answer the following:
 - 1.5.1 Date of organization:
 - 1.5.2 Name of owner:
- 1.6 If the form of your organization is other than those listed above, describe it and name the principals:

2. LICENSING

- 2.1. List jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable.
- 2.2. List jurisdictions in which your organization's partnership or trade name is filed.
- 2.3. List any suspension or revocations of any professional license of any director, officer, owner, or managerial employees of the Contractor, to the extent that any work to be performed on this Project is within the field of such licensed profession.

3. EXPERIENCE

- 3.1. List the categories of work that your organization normally performs with its own forces.
- 3.2. Claims and Lawsuits (If the answer to any of the questions below is yes, please attach details.)
 - 3.2.1. Has your organization ever failed to complete any work?
 - 3.2.2. Has your organization ever failed to complete any work by the substantial completion date, final completion date, or in a timely manner?
 - 3.2.3. Within the last five (5) years has your organization or any of its officers prosecuted any Claims, had any Claims prosecuted against it or them, or been involved in or is currently involved in any mediation or arbitration proceedings or lawsuits related to any construction project, or has any judgments or awards outstanding against it or them? Has your organization had any extension requests, fines and penalties imposed, or contract defaults? If the answer is yes, please attach the details for each Claim, including the names and telephone numbers of the persons who are parties, the amount of the Claim, the type of Claim and the basis for the Claim, and the outcome.

Note: As used in this document "Claim" means a Claim initiated under the Contract Documents for a project or relating to the Work for a project, including Claims made against performance bonds secured by the Contractor on other construction projects.
- 3.3. Has your organization ever failed to comply with federal, state, and local laws, rules, and regulations, including but not limited to the Occupational Safety and Health Act, the Ohio Prevailing Wage laws, and Ohio ethics laws? If the answer is yes, please attach details and reason(s) for each instance and the outcome including any fines or penalties imposed.
- 3.4. Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? If the answer is yes, please attach details for each instance, including the names and telephone numbers of the persons who are parties to the contract, and the reason(s) the contract was not completed.



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- 3.5. On a separate sheet, list construction projects your organization has in progress with an original Contract Sum of more than \$10,000,000, giving the name of project, owner and its telephone number, design professional and its telephone number, contract amount, percent complete and scheduled completion date.

3.5.1. State total amount of work in progress and under contract:

- 3.6. Provide the following information for each contract your organization has had during the last five (5) years, including current contracts, where the Contract Sum is fifty percent (50%) or more of the bid amount for this Project, including add alternates. Include details regarding timeliness of performance and quality of work. List the original contract price for each project, the amount of any change orders or cost overruns on each, the reasons for the change orders or cost overruns, and your organization's record for complying with and meeting completion deadlines on construction projects. If there are more than ten (10) of these contracts, only provide information on the most recent ten (10) contracts, including current contracts.

Project And Work	Contract Sum	Owner's Representative & Telephone Number	Engineer's Or Architect's Representative Name & Telephone Number	Additional Comments



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- 3.7. Provide the following information for each project your organization has had during the last five (5) years, which your organization believes is of comparable or greater size and complexity than the Owner's project. Include details regarding how such projects demonstrate your organization's ability and capacity to perform a substantial portion of the Project with its own work force. If there are more than five (5) of these projects, only provide information on the most recent five (5) projects, including current projects.

Project And Work	Contract Sum	Owner's Representative & Telephone Number	Engineer's Or Architect's Representative Name & Telephone Number	Additional Comments

- 3.7.1. State average annual amount of construction work your organization has performed during the last five years.
- 3.7.2. If any of the following members of your organization's management -- president, chairman of the board, or any director -- operates or has operated another construction company during the last five (5) years, identify the member of management and the name of the construction company.
- 3.7.3. If your organization is operating under a trade name registration with the Secretary of State for the State of Ohio, identify the entity for which the trade name is registered. If none, state "none."
- 3.7.4. If your organization is a division or wholly-owned subsidiary of another entity or has another relationship with another entity, identify the entity of which it is a division or wholly-owned subsidiary or with which it has another relationship and also identify the nature of the relationship. If none, state "not applicable."
- 3.8. On a separate sheet, list the construction education, training, construction experience, and tenure with your organization for each person who will fill a management role on the Project, including without limitation the Project Executive, Project Engineer, Project Manager, and Project Superintendent. For each person listed, include with the other information the last three projects on which the person worked and the name and telephone number of the Design Professional and the Owner.
- 3.9. Describe the size and experience of your organization's work force and your equipment and facilities, in relation to your organization's ability to complete the Project successfully and on time.

4. REFERENCES

- 4.1. Trade References:
- 4.2. Bank References:
- 4.3. Surety:
- 4.3.1. Name of bonding company:
- 4.3.2. Name and address of agent:



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5. FINANCING

5.1 Financial Statement (May be required, but only post-bid. Not a requirement to provide with bid.)

- 5.1.1 Attach a financial statement, preferably audited, including your organization's latest balance sheet and income statement showing the following items:

Current Assets (e.g., cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses);

Net Fixed Assets;

Other Assets;

Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries and accrued payroll taxes); and

Other Liabilities (e.g., capital, capital stock, authorized and outstanding shares par values, earned surplus and retained earnings).

- 5.1.2 Name and address of firm preparing attached financial statement, and date thereof.

- 5.1.3 Is the attached financial statement for the identical organization named on page one?

- 5.1.4 If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g., parent-subsidary).

- 5.2 Will the organization whose financial statement is attached act as guarantor of the contract for construction?

- 5.3 Attach additional documentation or explanations demonstrating your organization's financial responsibility, adequate resources and availability of credit, its means and ability to procure insurance and acceptable performance bonds required for the Project.

6. Does your organization participate in a drug-free workplace program? Provide your organization's record for both resolved and unresolved findings of the Auditor of the State of Ohio for recovery as defined in Section 9.24 of the Ohio Revised Code.
7. List any projects within the previous five years where a public entity determined that your organization was not a responsible bidder, including the name of the public entity, the reasons given by the public entity, and an explanation thereof.
8. Additional Criteria. Pursuant to the Codified Ordinance of the City of Canton, Chapter 105, the Owner, in its discretion, reserves the right to request additional information and documentation relating to the foregoing and related to any of the criteria listed in Paragraph I.6 of the Instructions to Bidders from Bidders after the bid opening. The Owner may consider such information and documentation in determining which bid is lowest and best. The Owner, in its discretion, may consider and give such weight to any and all criteria as it deems appropriate.

[left intentionally blank]



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Certification. The undersigned certifies for the reliance of the Owner that after diligent investigation, to the best of the undersigned's belief, the information provided with this Contractor's Qualification Statement is true, accurate and not misleading.

SIGNATURE:

Dated this ____ day of _____ 20__.

Name of
Organization: _____

By: _____
[print name]

Signature: _____

Title: _____

State of _____

County of _____

_____, being duly sworn, deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

Subscribed and sworn before me this ____ day of _____ 20__.

Notary Public

My Commission Expires: _____

SEAL



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Modified General Conditions (EJCDC)

Please go to this [link](#) for the document or enter the following link information into a web browser:

<https://cantonohio.gov/DocumentCenter/View/596/Modified-Standard-General-Conditions-of-the-Construction-Contract---3rd-Party-Engineer>



ODOT MANUAL SUPPLEMENT

This Supplement shall apply where and to the extent that the State of Ohio Department of Transportation Construction and Material Specifications, in the current version as of January 1, 2019, is expressly incorporated into the Contract Documents via the Owner-Contractor Agreement, or when designated as a Contract Document in the list of Contract Documents in the Owner-Contractor Agreement, or is referenced anywhere else in the Contract Documents as one of the Contract Documents.

1. **Regardless of any terms to the contrary in Division 100 or elsewhere, any directions or orders of the Engineer that will result in an adjustment of the Contract Price or the Contract Time shall require the prior written approval of the Owner. It is expressly understood and agreed that the Engineer does not have authority to authorize changes or modifications in the Contract Price or Contract Time.**
2. The Contractor's obligations under this ODOT Supplement are in addition to and not in limitation of its other obligations under the Contract Documents.
3. **Delays.** Regardless of the terms in this ODOT Supplement, including Item 109.05, all time adjustments shall be subject to a) filing a Change Proposal and / or Claim in accordance with Articles 11 and 12 of the Modified Standard General Conditions **of the Contract for Construction (EJCDC C-700, 2013 edition) ("Modified Standard General Conditions")**, b) substantiating the Contractor's entitlement to a time adjustment in accordance with the Modified Standard General Conditions and c) Item 109.05. The Contractor will be entitled to additional compensation for delays but only for those delays described in the Modified Standard General Conditions. As part of the Claims process and as a condition precedent to receiving any additional compensation, the Contractor shall prepare a cost analysis as allowed by Item 109.05.D substantiating its entitlement to additional compensation.
4. **Division 100, General Provisions.** The following Division 100 General Provisions of the State of Ohio Department of Transportation, Construction Specifications Manual in the current version as of January 31, 2019, are incorporated in this ODOT Supplement, subject to any changes or limitations herein.
 - a. **Item 101.01, General.**
 - b. Item 101.02, Abbreviations, provided that references to DCA, DDD, DET, DGE shall mean the Owner.
 - c. Item 101.03, Definitions, provided where terms that are defined in the other Contract Documents, the definition in the other Contract Documents shall control, and further provided that the following definitions are deleted, modified and/or added:
 - i. Claims is deleted
 - ii. Contract Bond is deleted.
 - iii. Contract Documents is deleted.
 - iv. Contract Price is deleted.
 - v. Contract Time is deleted.
 - vi. Contractor is deleted.
 - vii. Department shall mean the Owner.
 - viii. Director shall mean the Owner's representative.
 - ix. Disputes is deleted.
 - x. Engineer is deleted.



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- xi. Extra Work Contract is deleted.
- xii. Final Acceptance shall mean Final Completion as defined in the Owner Contractor Agreement.
- xiii. Final Inspector shall mean the Owner.
- xiv. Laboratory is deleted.
- xv. Prebid Question is deleted.
- xvi. Proposal Guaranty is deleted.
- xvii. Questionnaire is deleted.
- xviii. Shop Drawings is deleted.
- xix. Signatures on Contract Documents is deleted.
- xx. State or state shall mean the Owner.
- xxi. Subcontractor is deleted.
- xxii. Work is deleted.
- d. **Item 101.04, Interpretations.**
- e. Item 103.03, Cancellation of Award.
- f. Item 104.02.D.2, Significant Changes in the Character of the Work (including Tables 104.02-1 and 104.02-2 following this Item), provided that all references to Item 108 and 109.12 are deleted and that all time adjustments shall be subject to filing a Change Proposal and / or Claim in accordance with the Modified Standard General Conditions and substantiating the entitlement to an extension of time as provided in the Modified Standard General Conditions (EJCDC Document C-700, 2013 edition) ("Modified Standard General Conditions").
- g. Item 104.03, Rights in and Use of Materials Found on the Work.
- h. Item 104.04, Cleaning Up.
- i. Item 105.02, Plans and Working Drawings, provided that the review of submittals may be by the Owner or the Engineer in the Owner's discretion.
- j. Item 105.06, Superintendent.
- k. Item 105.10, Inspection of Work.
- l. Item 105.11, Removal of Defective and Unauthorized Work.
- m. Item 105.12, Load Restrictions.
- n. Item 105.13, Haul Roads, provided that the second paragraph in this Item is deleted. The Contractor shall be responsible for any damage to the roads referred to in the second paragraph.
- o. Item 105.14, Maintenance During Construction, except substitute "Final Completion" for "Final Inspector accepts the work under 109.12" and delete the remainder of the first sentence. Additionally, delete the second to last sentence in this Item.
- p. Item 105.15, Failure to Maintain Roadway or Structure.
- q. Item 105.16, Borrow and Waste Areas.
- r. Item 105.17, Construction and Demolition Debris.
- s. Item 106.01, Source of Supply and Quality Requirements.
- t. Item 106.02, Samples, Tests and Cited Specifications, provided that this Item will be optional at the discretion of the Owner. If the Owner elects to proceed under this Item, a) the Contractor



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without additional cost will provide material samples as required by the Owner, and b) the Owner may conduct such tests as it determines proper.

- u. **Item 106.03, Small Quantities and Materials for Temporary Application.**
- v. **Item 106.04, Plant Sampling and Testing Plan.**
- w. **Item 106.05, Storage of Materials.**
- x. **Item 106.06, Handling Materials.**
- y. **Item 106.07, Unacceptable Materials, except substitute the word “unacceptance” in the third sentence with the word “unacceptable.”**
- z. **Item 106.08, Department-Furnished Material.**
- aa. **Item 106.09, Steel and Iron Products Made in the United States.**
- bb. **Item 107.01, Laws to be Observed.**
- cc. **Item 107.02, Permits, Licenses, and Taxes.**
- dd. **Item 107.03, Patented Devices, Materials, and Processes.**
- ee. **Item 107.05, Federal-Aid Provisions.**
- ff. **Item 107.06, Sanitary Provisions.**
- gg. **Item 107.07, Public Convenience and Safety.**
- hh. **Item 107.08, Bridges Over Navigable Waters.**
- ii. **Item 107.09, Use of Explosives, provided that both bringing explosives onto the site and any use of explosives shall require the prior written approval of the Owner.**
- jj. **Item 107.10, Protection and Restoration of Property, provided that the Contractor shall remain responsible for all damage and injury to property until the Project is Finally Complete, and all references to Items 109.11 and 109.12 are deleted.**
- kk. **Item 107.11, Contractor’s Use of the Project Right-of-Way or Other Department-Owned Property, provided the reference to Item 109.12 is deleted.**
- ll. **Item 107.12, Responsibility for Damage Claims and Liability Insurance, provided that all notices and certificates shall be delivered to the Owner’s representative and, if there is no Owner’s representative, to the Engineer. Reference to the “State of Ohio, Department of Transportation” shall mean the Owner.**
- mm. **Item 107.13, Reporting, Investigating, and Resolving Motorist Damage Claims, provided that this item is modified to read, “When a motorist reports damage to its vehicle either verbally or in writing to the Contractor, the Contractor shall within 3 days make and file a written report to the Owner and the Engineer and also file a report with its insurance carrier”.**
- nn. **Item 107.14 Opening Sections of Project to Traffic, provided that the reference to Item 108.06 is deleted.**
- oo. **Item 107.15, Contractor’s Responsibility for Work, provided that reference to “Final Inspection according to 109.12.A” shall mean “Final Completion.” and all references to Item 108 are deleted.**
- pp. **Item 107.17, Furnishing Right-of-Way.**
- qq. **Item 107.19, Environmental Protection, provided that the Owner makes no representation as to having acquired any permits unless expressly provided in the Contract Documents. The Contractor will comply with any permits obtained by the Owner.**
- rr. **Item 107.20, Civil Rights.**



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- ss. Item **107.21, Prompt Payment.**
- tt. **with information or reports on DBE participation unless the Contract Documents otherwise require such reports or information. Additionally, unless otherwise provided in the Contract Documents, the 50% self-contracting requirement in the first sentence is waived.**
- uu. Item **108.04, Limitation of Operations.**
- vv. Item **108.05, Character of Workers, Methods, and Equipment.**
- ww. Item **108.10, Payroll Records.**
- xx. Item 109.01, Measurement of Quantities, provided that this item will apply only where payment is to be based on the measurement of quantities.
- yy. Item 109.02, Measurement Units.
- zz. Item 109.03, Scope of Payment.
- aaa. Item **108.01, Subletting of the Contract, provided that the Contractor need not provide the Owner (Reserved.)**
- bbb. Item 109.05, Extra Work as modified in this Supplement, provided that a) the references to Items 105.07, 105.10 and 108 are deleted, b) all negotiated prices shall require the Owner's written approval, c) the Owner must approve in writing any directions or orders by the Engineer to proceed with force account work, d) in Item 109.05.B.2 the reference to Department shall mean the Ohio Department of Transportation, e) the compensation provided in 109.05.B through 109.05.D constitutes payment in full for all the items referred to in Items 109.05.C.1-10, except for any additional compensation for delays, f) the mark-ups provided in Items 109.05.D.2.b and 109.05.D.2.d are deleted, and g) Item 109.05.D.2.f regarding home office overhead is deleted. The Contractor's entitlement to home office overhead, if any, shall be subject to current Ohio law.
- ccc. **109.06, Directed Acceleration.**
- ddd. **(Reserved.)**
- eee. **109.08, Unrecoverable Costs.**
5. Divisions 200 through 700. Divisions 200 through 700 of the State of Ohio Department of Transportation, Construction Specifications Manual in the current version as of January 31, 2019 are incorporated in this ODOT Supplement.
- a. All references to Division 100 Items in Divisions 200 through 700 shall be to the Division 100 Items as modified in this Supplement.
- b. Where Division 100 Items are referred to in Divisions 200 through 700 but are not included in this Supplement, the deleted references will be governed by this Paragraph 5.
- c. In Item 203.04, the reference to Item 108.06 shall be governed by Paragraph 3, Delays, in this Supplement.
- d. In Item 514.24, the reference to Item 109.10 shall be governed by the payment provisions in the Modified Standard General Conditions.
- e. In Item 624.04, the reference to item 109.09 shall be governed by the payment provisions in the Modified Standard General Conditions, i.e., the Owner will process and make payments in accordance with the provisions in the Modified Standard General Conditions. In this regard, the basis for payment of mobilization costs will be as provided in Item 624.04.
- f. General to Divisions 200 through 700. The basis for payment provided in the Basis for Payment items in these Divisions shall be the basis for payment to the Contractor when applicable.



City of Canton Codified Ordinances

Bidders shall take notice that they are to comply with the Codified Ordinances of the City of Canton, including but not limited to, the following:

1. Chapter 105.02 – Public Paving Time Restrictions.

All City public paving contracts shall include a provision for liquidated damages in order to provide the City reasonable compensation for actual damages due to a failure to ensure that asphalt paving take place on the City's road surfaces from May 1st to October 1st; and/or during optimal climatic conditions that are conducive to the best mix compacting and long term durability of the pavement, according to the highest and best practices of the asphalt paving industry.

(Ord. 270-2014. Passed 12-29-14.)

2. Chapter 105.03 – U.S. Steel Usage Required; Exception.

All City contracts shall stipulate or provide that all steel necessary in the construction of any work performed under such contracts shall be steel that is produced in the United States unless a specific product which is required is not produced by manufacturers in the United States in which event this prohibition does not apply. This section shall apply to only contracts awarded by the Board of Control of the City.

(Ord. 224-77. Passed 6-27-77.)

3. Chapter 105.05 – Materials to be Purchased Locally.

In all future contracts for the construction of buildings, structures, or other improvements under the Capital Improvement Budget, the following clause shall be printed or typewritten on each contract:

It is the desire of the City of Canton that all materials used in the construction covered by this contract shall be purchased in the Canton area except such materials which are unavailable in the Canton area.

(Res. 49-77. Passed 2-7-77.)

4. Chapter 105.06 – Minority Contract Provision.

a. All contracts with the City shall include the following clause:

The bidder agrees to expend at least \$_____ of the Contract in the event the contract is awarded to such bidder for minority/women's business enterprises. For purposes of this pledge, the term "minority/women's business enterprise" means a bona fide business established as a sole proprietorship, partnership or corporation owned, operated and controlled by one or more minority persons or women who have at least fifty-one percent (51%) ownership. "Minority" includes African Americans, Asian/Pacific Islanders, Hispanic/Latino Americans and Native American Indians. The minority or woman must have operational and managerial control, interest in capital, and earnings commensurate with the percentage of ownership. Minority/women's business enterprises may be employed as construction contractors, subcontractors, vendors or suppliers.

(Ord. 185-2011. Passed 10-31-11.)

5. Chapter 105.12 – Local Bidder Preference.

a. The Board of Control, in determining the lowest and best bidder in the award of contracts to which this section is applicable, is authorized to award contracts to local bidders as hereinafter defined, whose bid is not more than five percent (5%) higher, subject to a maximum amount of twenty thousand dollars (\$20,000.00), than the lowest dollar bid submitted by non-local bidders. The Board of Control's decision in making such an award shall be final.



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- b. For purposes of this section, "local bidder" means an individual or business entity which at the time of the award of the contract has a headquarters, division, sales office, sales outlet, manufacturing facility, or similar significant business-related location in Stark County, Ohio.
- c. All contract specifications and/or bid documents that are distributed by Canton for the purpose of soliciting bids for goods and/or services shall contain the following notice:
Prospective bidders will take notice that the City of Canton, in determining the lowest and best bidder in the award of this contract, may award a local bidder preference to any qualified bidder pursuant to Section 105.12 of the Codified Ordinances of the City of Canton. The determination of whether a bidder qualifies for the local preference shall be made by Board of Control. The Board's decision shall be final. A copy of Section 105.12 is attached.
- d. This section shall be applicable to all contracts for equipment, goods, machinery, materials, supplies, vehicles and/or services, which are purchased, leased and/or and which require bidding pursuant to Ohio R.C. 735.05 through 735.09 and Ohio R.C. 737.03.
(Ord. 137/2023. Passed 9-25-2023.)

6. Chapter 105.15 – City Income Tax

- a. No person, partnership, corporation or unincorporated association may be awarded a contract with the City under Sections 105.09 or 105.10, unless the bidder is paid in full or is current and not otherwise delinquent in the payment of City income taxes, including any obligation to pay taxes withheld from employees under Section 182.05 and any payment on net profits under Section 182.06.
- b. Falsification of any information related to or any post-contractual violation of the requirement to pay City income taxes set forth in subsection (a) shall constitute cause for the rescission of the balance of the contract at the City's discretion.
- c. No partnership, corporation or unincorporated association which has as one of its partners, shareholders or owners a person who is a twenty percent (20%) or greater equity owner in such partnership, corporation or unincorporated association and who is delinquent in the payment of City income taxes as set forth in subsection (a), may be awarded a contract with the City under Sections 105.09 or 105.10.
- d. A person who is a twenty percent (20%) or greater equity owner in any partnership, corporation or unincorporated association which is delinquent in the payment of City income taxes as set forth in subsection (a) may not be awarded a contract with the City under Sections 105.09 or 105.10.
- e. A contract awarded under Sections 105.09 or 105.10 for a public improvement project, services other than personal or professional services, and personal or professional services shall not be binding or valid unless such contract contains the following provisions:

Said _____ hereby further agrees to withhold all City income taxes due or payable under Chapter 182 of the Codified Ordinances for wages, salaries, fees and commissions paid to its employees and further agrees that any of its subcontractors shall be required to agree to withhold any such City income taxes due for services performed under this contract. Furthermore, any person, firm or agency that has



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a contract or agreement with the City shall be subject to City income tax whether a resident or nonresident in the City, and whether the work being done is in the City or out of the City. In addition to the tax withheld for employees, the net profits on the contract shall be subject to City income tax.

(Ord. 238-2015. Passed 11-30-15.)

7. Chapter 182.30 – Contract Provisions

- a. No contract on behalf of the City under Sections 105.09 or 105.10 of the Codified Ordinances of Canton for a public improvement project, services other than personal or professional services, and personal or professional services shall be binding or valid unless such contract contains the following provisions:

Said _____ hereby further agrees to withhold all City income taxes due or payable under Chapter 182 of the Codified Ordinances for wages, salaries, fees and commissions paid to its employees and further agrees that any of its subcontractors shall be required to agree to withhold any such City income taxes due for services performed under this contract. Furthermore, any person, firm or agency that has a contract or agreement with the City shall be subject to City income tax whether a resident or nonresident in the City, and whether the work being done is in the City or out of the City. In addition to the tax withheld for employees, the net profits on the contract shall be subject to City income tax.

- b. By entering into contract with the City of Canton _____ agrees with the City regarding the manner of withholding of City income taxes as provided in Section 718.011(F) of the Ohio Revised Code.
- i. Municipal income tax withholding provisions of Sections 718.011(B)(1) and 718.011(D) ORC shall not apply to qualifying wages paid to employees for work done or services performed or rendered inside the City or on City property.
- ii. _____ agrees to withhold income tax for the City from employees' qualifying wages earned inside the City or on City property, beginning with the first day of work done or services performed or rendered inside the City.

(Ord. 238-2015. Passed 11-30-15.)

8. Chapter 507.03 – Equal Employment Opportunity Clause.

- b. During the performance of this contract, the contractor agrees as follows:
1. The contractor shall not discriminate against any employee or applicant for employment because of race, age, handicap, religion, color, sex, national origin, sexual orientation or gender identity. The contractor shall take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to race, religion, color, sex, national origin, military status, sexual orientation or gender identity. As used herein, the word "treated" shall mean and include without limitation the following: recruited, whether by advertising or other means; compensation, whether in the form of rates or pay or other forms of compensation; selected for training, including apprenticeship; promoted; demoted; upgraded; downgraded; transferred; laid off; and terminated. The contractor agrees to and shall post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting officers setting forth the provisions of this nondiscrimination clause.
 2. The contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, age, handicap, religion, color, sex, national origin, military status, sexual orientation or gender identity.

(Ord. 153-2012. Passed 9-24-12.)



The City of Canton

3. The contractor shall send to each labor union or representative of workers, with which he has a collective bargaining agreement or other contract or understanding, a notice advising the labor union or workers' representative of the contractor's commitments under the equal opportunity clause of the City; and he shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. The contractor shall submit in writing to the City his affirmative action plan, and each subcontractor and supplier of equipment or supplies shall submit to the general contractor his affirmative action plan. The responsibility for securing these affirmative action plans falls upon the general contractor and shall be on file at the office of the general contractor. The contractor shall furnish all information and reports required by the City or its representative pursuant to this chapter, and shall permit access to his books, records, and accounts by the contracting agency and by the Executive Secretary for purposes of investigation to ascertain compliance with the program.
5. The contractor shall take such action with respect to any subcontractor as the City may direct as a means of enforcing the provisions of this equal opportunity clause, including penalties and sanctions for noncompliance; provided, however, that in the event the contractor becomes involved in or is threatened with litigation as the result of such direction by the City, the City will enter into such litigation as is necessary to protect the interests of the City and to effectuate the City's equal opportunity program and, in the case of contracts receiving Federal assistance, the contractor or the City may request the United States to enter into such litigation to protect the interests of the United States.
6. The contractor shall file and shall cause his subcontractors, if any, to file compliance reports with the City in the form and to the extent prescribed by the City or its representative. Compliance reports filed at such times as directed shall contain information as to the employment practices, policies, programs and statistics of the contractor and his subcontractors.
7. The contractor shall include the provisions of this equal employment opportunity clause in every subcontract or purchase order, so that such provisions will be binding upon each subcontractor or vendor.
8. Refusal by the contractor or subcontractor to comply with any portion of this program as herein stated and described will subject the offending party to any or all of the following penalties:
 - A. Withholding of all future payments under the involved public contract to the contractor in violation, until it is determined that the contractor or subcontractor is in compliance with the provisions of this contract.
 - B. Refusal of all future bids for any public contract with the City or any of its departments or divisions, until such time as the contractor or subcontractor demonstrates that he has established and shall carry out the policies of the program as herein outlined.
 - C. Cancellation of the public contract and declaration of forfeiture of the performance bond.
 - D. In cases in which there is substantial or material violation or the threat of substantial or material violation of the compliance procedure or as may be provided by contract, appropriate proceedings may be brought to enforce these provisions, including the enjoining within applicable laws of contractors, subcontractors or other organizations, individuals or groups who prevent, directly or indirectly, or seek to prevent, directly or indirectly, compliance with the policy as herein outlined.

(Ord. 179-74. Passed 6-17-74.)



The City of Canton

STATEMENT OF CLAIM FORM

Claim No. ____ for Contractor

1. Name of Contractor: _____
2. Date written claim given:_____.
3. Contractor's representative to contact regarding the claim:
Name:_____ Title: _____
Telephone No. _____ (office) FAX No. _____
E-mail: _____
4. General description of claim:

5. Contract Documents. If the claim is based upon any part or provision in the Contract Documents, including but not limited to pages in the Drawings and/or paragraphs in the Specifications, Owner-Contractor Agreement, General Conditions or Supplementary General Conditions, state upon which parts or provisions the claim is based:

6. Delay claims:
6.1 Date delay commenced: _____
6.2 Duration of the delay: _____
6.3 Apparent cause of the delay and part of critical path affected:

6.4 Impact of the delay and recommendations for minimizing such impact:

7. Additional compensation. Set forth in detail all additional compensation to which the Contractor believes it is entitled with respect to this claim:

8. Instructions for Completing the Statement of Claim Form ("Instructions"). The Instructions are incorporated in this Form.



The City of Canton

9. Truth of Claim. By submitting this claim, the Contractor and its representative certify that after conscientious and thorough review and to the best of his or her knowledge and belief a) the Contractor has complied fully with the Instructions, b) the information in this State of Claim is accurate, c) the Contractor is entitled to recover the compensation in paragraph 7, and d) the Contractor has not knowingly presented a false or fraudulent claim. The Contractor by its authorized representative must acknowledge this Statement of Claim before a notary public.

CONTRACTOR: _____

By: _____

Name and Title: _____

Date: _____

CONTRACTOR'S ACKNOWLEDGMENT

State of _____,

County of _____, ss:

_____ first being sworn, states that after conscientious and thorough review, the statements made in attached Statement of Claim Form are complete and true to the best of his or her knowledge and belief.

Sworn to before me a notary public by _____ on _____, 20__.

Notary Public

WHEN COMPLETED, FORWARD A COPY OF THIS NOTICE AND STATEMENT OF CLAIM FORM TO THE OWNER AND ENGINEER.



INSTRUCTIONS FOR COMPLETING THE STATEMENT OF CLAIM FORM

1. Completing the Statement of Claim Form ("Claim Form") is a material term of the Contract. The Claim Form tells the Owner and Design Professional that the Contractor is making a Claim and that they need to act promptly to mitigate the effects of the occurrence giving rise to the Claim. The Claim Form also provides them with information so that they can mitigate such effects. The Contractor acknowledges that constructive knowledge of the conditions giving rise to the Claim through job meetings, correspondence, site observations, etc. is inadequate notice, because knowledge of these conditions does not tell the Owner and Engineer that the Contractor will be making a Claim and most often is incomplete.
2. If the space provided in the Claim Form is insufficient, the Contractor, as necessary to provide complete and detailed information, must attach pages to the Claim Form with the required information.
3. Paragraph 4. The Contractor must state what it wants, *i.e.*, time and/or compensation, and the reason why it is entitled to time and/or compensation.
4. Paragraph 5. The Contractor must identify the exact provisions of the Contract Documents it is relying on in making its Claim. For example, if the Claim is for a change in the scope of the Contractor's Work, the Contractor must identify the specific provisions of the Specifications, and the Plan sheets and details that provide the basis for the scope change.
5. Paragraph 6. This paragraph applies to delay claims, including delays that the Contractor believes result in constructive acceleration. The Contractor must identify the cause of the delay, party or parties responsible, and what the party did or did not do that caused the delay, *i.e.*, specific work activities. The Contractor acknowledges that general statements are not sufficient, and do not provide the Owner with sufficient information to exercise the remedies available to the Owner or to mitigate the effects of the delay.

For example, if the Contractor claims a slow response time on submittals caused a delay, the Contractor must identify the specific submittals, all relevant dates, and then show on the applicable schedule, by circling or highlighting, the activities immediately affected by the delays. Also for example, if the Contractor claims it was delayed by another Contractor, the Contractor must identify the delaying Contractor, specifically what the delaying Contractor did or did not do that caused the delay, and then show the applicable schedule, by circling or highlighting, the activities immediately affected by the delays. Further by example, if the Contractor seeks an extension of time for unusually severe weather, the Contractor must submit comparative weather data along with a record of the actual weather at the job site and job site conditions.

6. Paragraph 6.4. Time is of the essence under the Contract Documents. If there is a delay, it is important to know what can be done to minimize the impact of the delay. It therefore is important that the Contractor provide specific recommendations on how to do so.
7. Paragraph 7. The Contractor must provide a specific and detailed breakdown of the additional compensation it seeks to recover. For future compensation, the Contractor shall provide its best estimate of such compensation.
8. Paragraph 8 and Acknowledgment. By submitting this Claim, the Contractor and its representative certify that after conscientious and thorough review and to the best of his or her knowledge and belief
a) the Contractor has complied fully with the Instructions, b) the information in this Claim Form is accurate, c) the Contractor is entitled to recover the compensation in paragraph 7, and d) the



The City of Canton

Contractor has not knowingly presented a false or fraudulent claim. The Contractor by its authorized representative must acknowledge this Statement of Claim before a notary public.

End of Instructions



The City of Canton

CONTRACTOR'S PERSONAL PROPERTY TAX AFFIDAVIT
(O.R.C. § 5719.042)

State of Ohio

County of _____, ss:

_____, being first duly sworn, deposes and says that he is the
(Name)

_____ of _____ with offices located at
(Title) (Contractor)

_____, and as its duly
(Address of Contractor)

authorized representative, states that effective this ____ day of _____, 20____,

(Name of Contractor)

- () is charged with delinquent personal property taxes on the general list of personal property as set forth below:

<u>County</u>	<u>Amount</u> (includes total amount due, plus penalties and interest thereon)
Stark	\$ _____

- () is not charged with delinquent personal property taxes on the general list of personal property in Stark County.

(Affiant)

Sworn to and subscribed before me by the above-named affiant this ____ day of _____, 20__.

(Notary Public)

My commission expires

_____, 20__



The City of Canton

**CONTRACTOR'S FINAL WAIVER & RELEASE AFFIDAVIT
("AFFIDAVIT")**

Project: **Water Department Service Shop Addition and Renovation**

In consideration for payment received from the City of Canton (the "City") in the amount requested in Contractor's Final Application for Payment to the City, the receipt of which is hereby acknowledged, the undersigned Contractor hereby waives and releases any rights it has or may have to any and all types of claims relating to the Project, including without limitation claims of payment, Mechanic's Lien, stop notice, equitable lien, labor and material bond, breach of contract or unjust enrichment, or any other claim against the City, for any labor, materials, or equipment the undersigned may have delivered or provided to the Project, except for any Claims the undersigned has made by properly and timely submitting a Statement of Claim form. The undersigned further certifies that this Affidavit covers claims by all contractors, subcontractors, and suppliers who may have provided any labor, material, or equipment to the Project through the undersigned or at the undersigned's request. The undersigned acknowledges that all such contractors, subcontractors, sub-subcontractors and suppliers have signed an affidavit in the form of this Affidavit releasing any and all claims against the City, except for any Claims the undersigned has made by properly and timely submitting a written statement of its Claim. The undersigned hereby represents and warrants that it has paid any and all welfare, pension, vacation or other contributions required to be paid on account of the employment by the undersigned of any laborers on the Project.

This Affidavit is for the benefit of, and may be relied upon by the City. The undersigned hereby agrees to indemnify, defend and hold harmless each of the foregoing, the Project, work of improvement, and real property from any and all claims, or liens that are or should have been released in accordance with this Affidavit.

_____	State of: _____ County of _____
Company Name	
_____	Subscribed and sworn to before me this _____
Authorized Signature (Company Officer)	
_____	day of _____
Title	
_____	Notary Public: _____
_____	My Commission Expires: _____
Date	

Appendix A

PROJECT LABOR AGREEMENT

FOR THE

WATER DEPARTMENT SERVICE SHOP ADDITION AND RENOVATIONS

BETWEEN

CITY OF CANTON

AND

EAST CENTRAL OHIO BUILDING AND CONSTRUCTION

TRADES COUNCIL AFL-CIO

AND

SIGNATORY LOCAL UNIONS

Effective _____

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ARTICLE I

INTENT AND DURATION

Section 1. Intent And Duration. This Project Labor Agreement (the "Agreement" or "PLA") is entered into between the City of Canton (the "Owner"); the East Central Ohio Building and Construction Trades Council, AFL-CIO ("ECOB & CTC" or "Council"); and the Signatory Unions (the "Unions") and applies exclusively to the construction work within the scope of this Agreement to be performed on the Water Department Service Shop Addition and Renovations (hereinafter "the Project"). The purpose of this Agreement is to promote efficiency and cost-savings in the construction and refurbishment that is a part of the Project and to provide for the peaceful settlement of any and all labor disputes and grievances without strikes or lockouts, thereby promoting the public interest in assuring the timely and economical completion of the Project. This Agreement shall expire and be of no further force or effect upon the completion of the Project.

Upon execution of this Agreement by all parties, all construction, reconstruction, repair, and renovation work covered by this Agreement on the Project shall be contracted exclusively to Contractors, of whatever tier, who agree to execute and be bound by the terms of this Agreement. Prior to performing any work on the Project, all Contractors of whatever tier shall execute the Letter of Assent (attached as Appendix 1) and participate in a Pre-Job Conference as required by Article VIII, Section 4 of this Agreement. The Owner (or its permitted designee) shall monitor compliance with this Agreement by all contractors and subcontractors. For purposes of the Agreement, the term "Contractor" shall be deemed to include all construction contractors and subcontractors of whatever tier engaged in any on-site construction, reconstruction, repair, and renovation work required to complete the Project, unless such work is specifically excluded by Article IV, Section 2 of this Agreement. The Owner, the Unions and all signatory Contractors agree to abide by the terms and conditions contained in the Agreement. This Agreement represents the complete understanding of all parties, and no Contractor is or will be required to sign any other agreement with a signatory union as a condition of performing work coming within the scope of this Agreement. No

practice, understanding or agreement between a Contractor and a Union, which conflicts with any provisions in this Agreement, will be binding on any other party unless endorsed in writing by the Owner.

Section 2. Limitation Of Agreement To Project. The Unions agree that this Agreement will be made available to, and will fully apply to, any successful bidder for work on the Project, without regard to whether that successful bidder performs work at other sites on either a union or a non-union basis, and without regard to whether employees of such bidder are or are not members of any union. The Unions further agree that this Agreement applies only to this Project. Nothing in this agreement is intended to, or shall, interfere with, or negate, any existing contractual relationship or collective bargaining agreement between the Union and any contractor or subcontractor that may execute this Agreement.

ARTICLE II

PURPOSE

Section 1. Purpose. This Agreement is necessary to secure and preserve the health and safety of Canton residents and to protect the integrity of the City's water distribution and maintenance system. This Project is an additional phase of the Canton Water Department's construction of service facilities and improvements to its existing service shop facilities located at 2664 Harrisburg Road NE, Canton, Ohio 44705.

The Project directs the construction of a new 25,440 square foot service garage, and renovations to its existing garage and service shop. It requires the specialized skills of the Council's affiliated craft Unions in all phases and components of work covered by Article IV of this Agreement, including but not limited to electrical, plumbing, HVAC, carpentry, painting, roofing, masonry, structural and site work.

The approximate cost of the Project is \$10,000,000 and is to be let out for bid on or around February 1, 2024.

Section 2. Time Is Of The Essence. The parties to this Agreement understand and agree that time is of the essence for this Project. The parties understand and agree that timely completion of the Project will require the use of substantial numbers of employees from construction and supporting crafts possessing skills and qualifications that are essential to the Project. The Unions pledge that they have members who are competent, skilled, and qualified to perform the required construction work. The parties also understand that on-budget completion of the Project is most critical; it is therefore essential that construction work on the Project be done in an efficient, economical manner with optimum productivity and with no delays. In recognition of those special needs of the Project, the Unions signatory hereto and their members agree not to initiate, authorize, sanction, participate in or condone, or permit their members to engage in any strike, sympathy strike, jurisdictional strike, recognition strike, slowdown, sabotage, work to rule, sickout, sit down, picketing of any type (including informational picketing), handbilling, boycott, interruption of work or any disruptive activity that interferes with or interrupts in any way work on the Project or other operations of the City of Canton. Contractors agree not to engage in any lockouts.

ARTICLE III

BENEFITS OF THE AGREEMENT

Section 1. Benefits Of The Agreement. This Agreement is intended to foster the achievement of a timely and on-budget completion of the Project by, among other things:

- (a) reducing and/or eliminating the tension and potential disagreements that might otherwise exist between Union and non-union workers on the Project;
- (b) avoiding the costly delays of strikes, sympathy strikes, jurisdictional strikes, slowdowns, walkouts, picketing, handbilling and any other disruptions or interference with work, and promoting labor harmony and peace for the duration of the Project;
- (c) standardizing terms and conditions governing the employment of labor on

the Project;

- (d) permitting flexibility in work scheduling and shift hours and times;
- (e) achieving negotiated adjustments as to work rules and staffing requirements from those which otherwise might obtain;
- (f) providing comprehensive and standardized mechanisms for the settlement of work disputes;
- (g) ensuring a reliable source of skilled and experienced labor; and
- (h) furthering public policy objectives, to the extent lawful, as to improved employment opportunities for minorities, women and the economically disadvantaged in the construction industry. Mindful of the economic condition and unemployment rate in Stark County, the Owner anticipates and expects that all construction workers and employees on this Project will be residents of Stark County. In view of the very technical and specialized work that is inherent in the construction industry, all parties acknowledge that this expectation by the Owner is a goal, not a mandate. To this end, all Contractors working under this Agreement pledge that they will make a good-faith effort to reach this goal expressed by the Owner.

ARTICLE IV

SCOPE OF AGREEMENT

Section 1. The Work. This Agreement is specifically defined and limited to onsite construction, reconstruction, repair, and renovation work required to complete the Project.

Section 2. Exclusions From Scope. Items specifically excluded from the scope of this Agreement, even if performed in connection with the Project, include the following:

- (a) Work of non-manual employees, including but not limited to, superintendents, supervisors, staff engineers, inspectors, quality control and quality assurance personnel, timekeepers, mail carriers, clerks,

office workers, including messengers, guards, safety personnel, emergency medical and first aid technicians, and other professional, engineering, administrative, supervisory and management employees.

- (b) Equipment and machinery owned or controlled and operated by the Owner.
- (c) All off-site manufacture, fabrication or handling of materials, equipment or machinery (except at dedicated lay-down or storage areas and except as provided in Article IV, Section 9), and all deliveries of any type to and from the Project site (except on-site pouring of concrete).
- (d) All employees of the Owner, the Construction Supervisor, design team or any environmental, engineering or other consultant when such employees do not perform labor coming within the scope of this Agreement.
- (e) Any work performed on or near or leading to or onto the site of work on the Project and undertaken by state, county, city or other governmental bodies, or their contractors; or by public utilities or their contractors.
- (f) Off-site maintenance of leased equipment and on-site supervision of all such maintenance work.
- (g) Work by employees of a manufacturer or vendor necessary to maintain such manufacturer's or vendor's warranty or guarantee, or work performed by supervisors or technicians employed by the manufacturer or vendor to oversee the testing of equipment once installed to insure that the equipment is fully operational.
- (h) Laboratory work for specialty testing or inspections not ordinarily done by the signatory local unions.
- (i) All work done by employees of any State agency, authority or entity or employees of any municipality or other public employer.
- (j) This Agreement does not apply to work covered under a collective bargaining agreement between a contractor and a local union in the outside line branch of the International Brotherhood of Electrical Workers, including, but not limited to, construction of electrical

transmission and distribution lines (including above-ground and below-ground lines), catenary and trolley facilities, switch yards, and substations.

The Unions agree that there shall be no interference with or disruption of work, of those contractors, employers, and employees exempted from coverage of this Agreement by subparagraph (a) through (j) above.

Section 3. Contract Award and Consent to Agreement.

- (a) The Owner, and/or Contractors, as appropriate, have the absolute right to award contracts or subcontracts on the Project notwithstanding the existence or nonexistence of any agreements between such Contractor and any Union party, *provided that* any and all Contractors are willing, ready and able to execute and comply with this Agreement should such Contractor be awarded work covered by this Agreement.
- (b) All Contractors, as a condition to awarding any contract or subcontract for any work covered by this Agreement, shall obtain and deliver to the Council a Letter of Assent (in the form provided by Appendix 1) executed by the awarded Contractor.
- (c) Where any Contractor violates the above Section 3(b), such Contractor and subcontractor shall be jointly and severally liable for damages incurred by any affected Union(s) from such failure of the Contractor to properly bind a subcontractor to the Agreement by Letter of Assent, determined pursuant to the Grievance Procedure set forth in Article VII of this Agreement.
- (d) Notwithstanding the foregoing Section 3(c), compliance with this Agreement is an absolute condition, as determined by the Owner, to performing any work on the Project unless such work is specifically excluded by Article IV, Section 2. Any Contractor performing work on the Project shall be deemed to have accepted this Agreement by such performance and agreed to be bound by all of its terms, without exception.

Section 4. Stand-Alone Agreement. This Agreement is a stand-alone Agreement. While this Agreement expressly does not incorporate any local area collective bargaining agreements, such local area collective bargaining agreements may be referenced for the limited purposes as hereinafter set forth in this Agreement. However, to the extent, if any, that any provisions of this Agreement conflict with any provision of a local area collective bargaining agreement, the provisions of this Agreement shall control, except for all work performed under the NTL Articles of Agreement, the National Stack/Chimney Agreement, the National Cooling Tower Agreement, all instrument calibration work and loop checking shall be performed under the terms of the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians, and the National Agreement of the International Union of Elevator Constructors, with the exception of Articles VII, VIII and X of this Agreement, which shall apply to such work.

Section 5. Craft Jurisdiction. This Agreement shall recognize the traditional craft jurisdictions of the signatory unions. Any and all jurisdictional disputes shall be settled in accordance with Article VIII below. While this Agreement is a stand-alone Agreement, the Agreement will utilize the local area collective bargaining agreements of signatory locals, not state-wide agreements or other special project agreements, as a reference to define the signatory local unions' craft jurisdiction.

Section 6. Subcontracting. The Owner agrees that neither it nor any of its contractors or subcontractors will subcontract any work covered by this Agreement to be done on the Project except to a person, firm or corporation who is or agrees to become party to this Agreement by the procedure set forth in Article IV, Section 3. Contractors who are signatory to local area collective bargaining agreements shall be bound by the terms of their respective local collective bargaining agreements on subcontracting to the extent such terms are consistent with Article IV, Section 2 of this Agreement. Disputes concerning compliance with such local subcontracting provisions for this Project shall be subject to all of the dispute resolution provisions of this

Agreement.

Section 7. Liability. It is understood that the liability of the Contractor and the liability of the separate Unions under this Agreement shall be several and not joint. The Unions agree that this Agreement does not have the effect of creating any joint employer status between or among the Owner, Construction Supervisor and/or any Contractor, and neither the Owner nor Construction Supervisor shall assume any liabilities of the Contractors.

Section 8. Abatement of Agreement. As areas of covered work on the Project are accepted by the Owner, this Agreement shall have no further force or effect on such areas except where the Contractor is directed by the Owner to engage in repairs or punch list modifications.

Section 9. Miscellaneous. Notwithstanding any other provision of this Agreement, this Agreement applies and is limited to the recognized and accepted historical definition of demolition and new construction work under the direction of and performed by the contractor(s), of whatever tier, who have contracts awarded for such work on the project. Such work shall include site preparation work and dedicated off-site work except for the contractors and subcontractors specifically excluded in this Article II. Any off-site prefabrication of any building materials, systems and/or components traditionally performed on site shall be performed by the appropriate craft signatory to this Agreement and approved by the owner.

ARTICLE V
LABOR/MANAGEMENT COOPERATION
JOINT ADMINISTRATIVE COMMITTEE

Section 1. The parties to this Agreement shall establish a Project Joint Administrative Committee ("Committee"). This Committee will be a two-person committee comprised of one member each appointed by the Owner (or its designee) and the Unions,

with an alternate appointee Union member available to replace the regular appointee when a problem or grievance concerns the regular appointee's Union. Each member of the Committee shall designate an alternate who shall serve in the absence of the member for any purpose contemplated by this Agreement.

Section 2. The Committee shall meet at least quarterly, or more often if special circumstances warrant, to discuss the administration of the Agreement, the progress of the Project, labor/management problems that may arise, and any other relevant matters. Any need for interpretation which might arise from the application of the terms and conditions of the Agreement shall be referred directly to the Committee for resolution.

ARTICLE VI

UNION RECOGNITION AND EMPLOYMENT

Section 1. Pre-Hire Recognition. Each Contractor and subcontractor recognizes the Unions as the sole and exclusive bargaining representatives of all craft and trade employees within their respective jurisdictions working on the Project under the Agreement.

Section 2. Contractor's Right of Selection. Each Contractor shall have the right to determine the competency of all employees, the number of employees required and shall have the sole responsibility for selecting employees to be laid off. To the extent any training or vendor education is required to fill any position, said training shall be undertaken at no cost or expense to Owner.

Section 3. Union Referral. For local Unions having a job referral system, each Contractor agrees to comply with such system, and the referral system shall be used exclusively by such Contractor, except as modified by this Article. Such job referral system will be operated in a non-discriminatory manner and in full compliance with Federal, state, and local laws and regulations requiring equal employment

opportunities and nondiscrimination, and referrals shall not be affected in any way by the rules, regulations, bylaws, constitutional provisions or any other aspects or obligations of union membership, policies or requirements. The Union shall indemnify and hold each Contractor harmless with respect to any claim arising out of how the Union operates and administers its referral system. All hiring procedures, including related practices affecting apprenticeship and training, will be operated so as to facilitate the ability of the contractors to meet any and all equal employment opportunity/affirmative action obligations. The Contractor may reject any referral and request another, different referral; provided, however, the Contractor shall furnish, upon request from the Union, a written explanation for the rejection.

Section 4. Lack of Job Referral System. In the event that a signatory Local Union does not have a job referral system as set forth in Section 3 above, the Contractor shall give the Union a forty-eight (48) hour opportunity to refer applicants. The Contractor shall notify the Union of employees hired from any source other than referral by the Union.

Section 5. Unavailability of Union Referrals. In the event that local Unions are unable to fill any requisitions for qualified employees within forty-eight hours (48) after such requisition is made by the Contractor (Saturdays, Sundays, and Holidays excepted), the Contractor may employ applicants from any other available source. The Contractor shall inform the Union of the name, address and telephone number of any applicants hired from other sources and refer the applicant for the Local Union for dispatch to the Project.

Section 6. Union Best Efforts. The Local Unions will exert their utmost efforts to recruit sufficient numbers of skilled craft workers to fulfill the manpower requirements of each Contractor, including calls to local unions in other geographic areas when its referral lists have been exhausted. The parties to this Agreement support the development of increased numbers of skilled construction workers from the residents of the area of the Project. Toward that end, the Unions agree to encourage the referral

and utilization, to the extent permitted by law and the hiring hall procedures, of qualified residents as journeymen, apprentices and trainees on the Project.

ARTICLE VII

GRIEVANCE ARBITRATION PROCEDURE

Section 1. This Agreement is intended to provide close cooperation between management and labor. Each of the Unions will assign a representative to this Project for the purpose of completing the construction of the Project economically, efficiently, continuously, and without interruptions, delays, or work stoppages.

Section 2. The Contractors, Unions, and the employees, collectively and individually, realize the importance to all parties to maintain continuous and uninterrupted performance of the work of the Project, and agree to resolve disputes in accordance with the grievance-arbitration provisions set forth in this Article.

Section 3. Any question or dispute arising out of and during the term of this Agreement (other than trade jurisdictional disputes) shall be considered a grievance and subject to resolution under the following procedures:

Step 1. (a) When any employee subject to the provisions of this Agreement feels he or she is aggrieved by a violation of this Agreement, he or she, through his or her local union business representative or job steward, shall, within five (5) working days after the occurrence of the violation, give notice to the work-site representative of the involved Contractor stating the provision(s) alleged to have been violated. The business representative of the local union or the job steward and the work-site representative of the involved Contractor shall meet and endeavor to adjust the matter within three (3) working days after timely notice has been given. The

representative of the Contractor shall keep the meeting minutes and shall respond to the Union representative in writing at the conclusion of the meeting but not later than twenty-four (24) hours thereafter. If they fail to resolve the matter within the prescribed period, the Local Union may, within forty-eight (48) hours thereafter, pursue Step 2 of the Grievance Procedure, provided the grievance is reduced to writing, setting forth the relevant information concerning the alleged grievance, including a short description hereof, the date on which the grievance occurred, and the provisions of the Agreement alleged to have been violated.

(b) Should the Local Union(s) or the Project Contractor or any Contractor have a dispute with the other party and if, after conferring, a settlement is not reached within three (3) working days, the dispute may be reduced to writing and proceed to Step 2 in the same manner as outlined herein for the adjustment of an employee complaint.

Step 2. The International Union Representative and the involved Contractor shall meet within seven (7) working days of the referral of a dispute to this second step to arrive at a satisfactory settlement thereof. Meeting minutes shall be kept by the Contractor. If the parties fail to reach an agreement, the dispute may be appealed by the Union, in writing, in accordance with the provisions of Step 3.

Step 3. (a) If the grievance has been submitted but not adjusted under Step 2, either party may request in writing, within seven (7) calendar days thereafter, that the grievance be submitted to an Arbitrator mutually agreed upon by them. The Contractor and the involved Union shall attempt mutually to select an arbitrator, but if they are unable to do so, they

shall request the Federal Mediation and Conciliation Services (FMCS) to provide them with a list of arbitrators from which the Arbitrator shall be selected. The rules of FMCS shall govern the conduct of the arbitration hearing. The decision of the Arbitrator shall be final and binding on all parties. The fee and expenses of such Arbitration shall be borne equally by the Contractor and the involved Local Union(s).

Section 4. Failure of the grieving party to adhere to the time limits established herein shall render the grievance null and void. Failure of the Contractor to adhere to the time limits established herein shall result in the grievance being sustained. The time limits established herein may be extended only by written consent of the parties involved at the particular step where the extension is agreed upon. The Arbitrator shall have the authority to make decisions only on issues presented to him or her, and he or she shall not have authority to change, amend, add to or detract from any of the provisions of this Agreement.

Section 5. The Owner shall be notified of all actions at Steps 2 and 3 and shall, upon their request, be permitted to participate in all proceedings at these steps.

ARTICLE VIII

JURISDICTIONAL DISPUTES

Section 1. The assignment of work will be the responsibility of the Contractor performing the work involved and such work assignments will be in accordance with decisions issued under the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry (the "Plan"), or any successor Plan, adopted by the National Building and Construction Trades Department.

Section 2. All jurisdictional disputes on this Project, between or among Building and Construction Trades Unions and employers, parties to this Agreement, shall be

settled and adjusted according to the present Plan established by the Building and Construction Trades Department or any other plan or method of procedure that may be adopted in the future by the Building and Construction Trades Department. Decisions rendered shall be final, binding and conclusive on the Contractors and Unions parties to this Agreement.

Section 3. All jurisdictional disputes shall be resolved without the occurrence of any strike, work stoppage, or slow-down of any nature, and the Contractor's assignment shall be adhered to until the dispute is resolved. Individuals violating this section shall be subject to immediate discharge.

Section 4. Each Contractor will conduct a Pre-Job Conference with the Council prior to commencing work which shall require completion of a Pre-Job Conference Verification Form (attached as Appendix 2). This Pre-Job Conference requirement may be waived only by the Council, in writing, upon request of a Contractor. The Owner will be advised in advance of all such conferences and may participate if they wish.

ARTICLE IX

MANAGEMENT'S RIGHTS

Section 1. Exclusive Owner - Workforce. Except as otherwise provided in this Agreement, the Owner (or its designee) and the Contractors retain the authority to manage their operations and workforces.

Section 2. Materials, Design, Machinery, Equipment. There shall be no limitation or restriction by a signatory Union upon a Contractor's choice of materials or design, nor, regardless of source or location, upon the full use and utilization of equipment, machinery packaging, pre-cast, pre-fabricated, pre-finish, or pre-assembled materials, tools or other labor saving devices. The on-site installation or application of all items shall be performed by the craft having jurisdiction of such work; provided, however, that installation of specialty items may be performed by employees

employed under this Agreement who may be directed by other personnel in a supervisory role, in circumstances requiring special knowledge of the particular items.

Section 3. New Technology, Equipment. The use of new technology, equipment, machinery, tools and/or labor saving devices and methods of performing work may be initiated by any Contractor from time to time during the Project. The Union agrees that it will not in any way restrict the implementation of such new devices or work methods.

Section 4. Disputes. If there is any disagreement between any Contractor and the Union concerning the manner or implementation of such device or method of work, the implementation shall proceed as directed by the Contractor, and the Union shall have the right to grieve and/or arbitrate the dispute as set forth in Article VII of this Agreement.

ARTICLE X

WORK STOPPAGES

Section 1. No Strikes or Work Disruptions. There shall be no strike, sympathy strike, jurisdictional strike, recognitional strike, slowdown, sabotage, work to rule, sickout, sit down, picketing of any type (including informational picketing), handbilling, boycott, interruption of work or any disruptive activity that interferes with or interrupts in any way work on the Project. The applicable local union shall not sanction, aid or abet, encourage or continue any work stoppage, strike, picketing or other disruptive activity which violates this Article and shall undertake all reasonable means to prevent or to terminate any such activity. No employee shall engage in activity which violates this Article. Any employee who participates in or encourages any activity which violates this Article shall be subject to disciplinary action, including discharge, and if justifiably discharged for the above reasons, shall not be eligible for rehire on the same project for a period of not less than ninety (90) days. Further, if

the Local Union is unable to provide qualified replacements for those employees who are in violation of this Article by the beginning of the next shift, the Employer is free to hire from any source.

Section 2. Union Responsibilities. The Local Union shall not be liable for acts of employees for which it has no responsibility. The principal officers of the Local Union will immediately instruct, order and use their best efforts to cause the members of the Local Union they represent to cease any violations of this Article. If it complies with this obligation, the Local Union shall not be responsible for unauthorized acts of employees it represents.

ARTICLE XI

WAGES AND BENEFITS

Section 1. Wages. All employees covered by this Agreement shall be classified in accordance with work performed and paid 100% of the wages and 100% of the fringe benefits as established in the respective Union's Local Area Collective Bargaining Agreement and any subsequent modifications thereto. The Contractor, upon request, shall provide the Unions and Owner with substantiation that wages and benefits are being paid on the Project. The Unions shall provide the Owner, and any Contractor or subcontractor that is party to this Agreement, with wage, fringe benefit and dues reporting forms.

Section 2. Payment of Benefits/Contributions. Each Contractor will also pay all required contributions in the amounts required by Section 1 of this Article to the established employee benefit funds that accrue to the direct benefit of the employees (such as pension and annuity, health and welfare, vacation, apprenticeship, training funds). With respect to contributions required in this Section to Employer-Union jointly trusted funds, the Contractor adopts and agrees to be bound by the written terms of the legally established trust agreement specifying the detailed basis on which payments are to be made into, and benefits paid out of, such Trust Funds. The

Contractor authorizes the parties to such Trust Funds to appoint Trustees and successor Trustees to administer the Trust Funds and hereby ratifies and accepts the Trustees so appointed as if made by Contractor.

Section 3. Non-Affiliated Labor Organizations. The Contractor shall deduct from each employee's wages all uniform dues and working assessments the employee has voluntarily authorized in writing as set forth in the Employee's Local Collective Bargaining Agreement. If a labor organization is not affiliated with the Council, and supplies its members or referrals for work on the Project, such labor organization shall pay to the Council the dues and assessments it would owe the Council if affiliated, for all periods during which the labor organization has members or referrals working on the Project. Any disputes under this paragraph shall be resolved exclusively between the labor organization and the Council by using the grievance procedure appearing in Article VII, as provided herein. All grievances shall be reduced to writing within thirty (30) days of the date on which the aggrieved party discovered the dispute. The grievance shall be initiated at Article VII, Section 3, Step 3.

ARTICLE XII

LOCAL UNION NEGOTIATIONS DURING THE PENDENCY OF THE AGREEMENT

Section 1. All parties to this Agreement understand and acknowledge that some crafts who will be working on the Project are covered by local collective bargaining agreements that will expire prior to the projected completion of the Project. All parties understand and agree that irrespective of whether such local collective bargaining agreement negotiations are successful or unsuccessful, there shall be no strike, sympathy strike, jurisdictional strike, recognition strike, slowdown, sabotage, work to rule, sickout, sit down, picketing of any type (including informational picketing), handbilling, boycott, interruption of work or any disruptive activity that interferes with or interrupts in any way work on the Project by any Union involved in such local negotiations, or by any of its members, nor shall there be any lockout by a Contractor on

the Project affecting such union or its members during the course of such negotiations. Irrespective of the status of any such local collective bargaining agreement negotiations, the affected Union and all of its members will observe and fully comply with the provisions of this Agreement. Should any Local Union fail or refuse to provide and/or refer qualified employees for work on the Project during an economic strike, any affected Contractor shall be permitted to utilize the procedures appearing in Article VI, Section 5 of this Agreement.

Section 2. Wage/Benefit Increases. Should a craft covered by this Agreement negotiate an increase in wages or an increase in benefits with any Contractor to become effective during the term of the Project, those wage and/or benefit increases shall be paid by the affected Contractor, as of the effective date of those increases, to those employees in that craft performing work covered by this Agreement.

ARTICLE XIII

HOURS OF WORK, OVERTIME, SHIFTS AND HOLIDAY

Section 1. Work Day and Work Week. Except as provided in Section 4, the first shift shall consist of eight (8) or ten (10) hours per day between the hours of 6:00 a.m. and 5:30 p.m., plus one-half (1/2) hour unpaid for lunch, approximately mid-way through the shift. Forty (40) hours per week shall constitute a regular week's work, whether consisting of five (5) eight (8) hour days, or four (4) ten (10) hour days. The work week will start on Monday and conclude on Sunday. A uniform starting time will be established for all crafts on each project or segment of the work. Nothing herein shall be construed as guaranteeing any employee eight (8) or ten (10) hours per day or forty (40) hours per week. The Union(s) shall be informed of the work starting time set by the contractor at the pre job conference which may be changed thereafter upon three (3) days' notice to the Union(s) and the employees. A second shift, if used, shall consist of eight hours between 3:00 p.m. and 1:00 a.m.; a third shift, if used, shall begin between 10:00 p.m. and 1:00 a.m. For purposes of Section 3, the third shift shall be considered as part of the prior day's work.

Section 2. Starting Times. Employees shall be at their place of work at the starting time and shall remain at their place of work (as designated by the Contractor) performing their assigned functions until quitting time, which is defined as the scheduled end of the shift. The parties reaffirm their policy of a fair day's work for a fair day's wage. There shall be no pay for time not worked unless the employee is otherwise engaged at the direction of the Contractor.

Section 3. Overtime. Overtime shall be defined as all hours worked in excess of forty (40) hours in a work week or, for 8 hour shifts, in excess of eight (8) hours per day; or for 10 (ten) hour shifts for work in excess of 10 hours per day; such work and work performed on Saturdays shall be paid at one and one-half times the straight time rate of pay. However, in scheduled four (4) day/ten hour shift work weeks, Friday may be scheduled as a "makeup" day at straight time to make up for a day lost (Monday through Thursday) due to inclement weather. In addition, if a "make-up" day is scheduled, all employees directed to work on such day will be guaranteed a minimum of four (4) hours work or pay. In any week in which employees on the Project are scheduled on four/ten hour shifts, an employee whose first day of work on the Project begins on Wednesday or later day of the schedule shall be paid, during the first week of his employment only, time-and-one-half for all hours worked in excess of eight in a day or each day he works during said week. Work on Sundays and holidays shall be at double time. There shall be no restriction on any contractor's scheduling of overtime or the non-discriminatory designation of employees who will work. The contractor shall have the right to schedule work so as to minimize overtime. There shall be no pyramiding of overtime pay under any circumstances.

Section 4. Shifts.

- (a) Shift work may be performed at the option of the Contractor(s) upon three (3) days' prior notice to the Union and shall continue for a period of not less than five (5) working days. Saturdays and Sundays, if worked, may be used for establishing the five (5) day minimum work shift. If two shifts are worked,

each shall consist of eight (8) hours of continuous work exclusive of a one-half (½) hour non-paid lunch period. Any third shift shall consist of seven (7) hours of continuous work exclusive of one-half (½) hour non-paid lunch period for eight (8) hours pay. A premium of \$.25 per hour shall be paid for work on the second shift and \$.50 per hour for work on the third shift.

- (b) The Contractor may establish a work week of four (4) consecutive ten (10) hour work days (exclusive of one-half (½) hour unpaid lunch, approximately midway through the shift) between Monday through Thursday.

Section 5. Minimum Pay. An employee who reports for work at the regular starting time and for whom no work is provided shall receive pay equivalent to two (2) hours at the applicable hourly rate, provided the employee at the employer's discretion remains available for work. Any employee who reports for work and for whom work is provided shall be paid for actual time worked but not less than two (2) hours. It will not be a violation of this agreement when the employer considers it necessary to shut down to avoid the possible loss of human life, because of an emergency situation that could endanger the life and safety of an employee. In such cases, employees will be compensated only for the actual time worked. In the case of a situation described above where the employer requests employees to remain available for work, the employees will be compensation for such time. If a project is shut down because of weather, employees, who report for work, shall be paid actual time worked but not less than two (2) hours. Procedures for prior notification of work cancellation shall be determined at the pre-job conference. The provisions of this section are not applicable where the employee voluntarily quits or lays off.

Section 6. Holidays. Holidays shall be New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, the Day after Thanksgiving Day, and Christmas Day. A holiday falling on Saturday shall be observed on the preceding Friday. A holiday falling on Sunday shall be observed on the following Monday.

Section 7. Meal Period. The Contractor will schedule a meal period of not more than one-half hour duration at the work location at approximately the mid-point of the scheduled work shift (4 hours in a five day work week, 5 hours in a four-day work week), consistent with Section 1; provided, however, that the Contractor may, for efficiency of the operation, establish a schedule which coordinates the meal periods of two or more crafts. If an employee is required to work through his meal period, he shall be compensated for the time worked at the applicable overtime rate and the employee shall, when work permits, eat his lunch "on the fly".

Section 8. No Organized Work Breaks. There will be one (1) break during the first four (4) hours of a shift which shall be taken at the employee's work station. Individual nonalcoholic beverage containers will be permitted at the employee's work station.

Section 9. Helmets to Hardhats.

- (a) The Employers and the Unions recognize a desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in the building and construction industry. The Employers and Unions agree to utilize the services of the Center for Military Recruitment, Assessment and Veterans Employment (hereinafter "Center") and the Center's "Helmets to Hardhats" program to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the parties.
- (b) The Unions and Employers agree to coordinate with the Center to create and maintain an integrated database of veterans interested in working on this Project and of apprenticeship and employment opportunities for this Project. To the extent permitted by law, the Unions will give credit to such veterans for bona fide, provable past experience.

ARTICLE XIV

APPRENTICES

Section 1. Need For. The parties recognize the need to maintain continuing support of programs designed to develop adequate numbers of competent workers in the construction industry. The Contractor(s) will, accordingly, employ apprentices in their respective crafts to perform work on the Project in accordance with Section 2 below.

Section 2. Ratios. The Union agrees to cooperate with the Contractor in furnishing qualified apprentices as requested and if available. Apprentices shall perform the work of their craft in accordance with the ratios and terms in their local area collective bargaining agreements. To the extent requested by Owner, the Contractor(s) may use the maximum number of apprentices permitted by local collective bargaining agreements.

ARTICLE XV

DRUG AND ALCOHOL POLICY

Section 1. Drug and Alcohol Policy. All parties understand and agree that a drug and alcohol policy, approved by the Council, will be in force for all work performed under the Agreement. The drug and alcohol policy will prohibit the use, sale, transfer, purchase and/or possession of a controlled substance, alcohol and/or firearms while on the Project's premises and will require testing of employees. The drug and alcohol policy, attached hereto as Appendix 3, is incorporated into and made part of this Agreement and is implemented for all Contractors and employees working on the Project.

ARTICLE XVI

NON-DISCRIMINATION

Section 1. Policy. It is the continuing policy of the Owner, the Contractors and

the Unions that the provisions of this Agreement shall be applied without discrimination because of age, race, sex, color, religion, creed, national origin, sexual orientation or any other basis prohibited by applicable law.

ARTICLE XVII

SOLE AND COMPLETE AGREEMENT

Section 1. The parties agree that this Agreement constitutes the sole and complete agreement between them governing the rates of pay and working conditions of the construction employees working on the Project. This Agreement settles all demands and issues on the matters subject to collective bargaining and shall not be modified or supplemented in any way except by written agreement executed by the Owner and all parties.

ARTICLE XVIII

SEPARABILITY AND SAVINGS CLAUSE


Section 1. Intent of Parties. If any article or section of this Agreement shall be held invalid by law or by a tribunal of competent jurisdiction, or if compliance with or enforcement of any article should be restrained pending a final determination as to its validity, the remainder of this Agreement shall not be affected and shall remain in full force and effect. In the event that any article or section is held invalid, the parties hereto shall, upon the request of the Unions, enter into collective bargaining negotiations for the purpose of arriving at a mutually satisfactory replacement for such article during the period of invalidity or restraint. If the Owner and the Council cannot agree on a mutually satisfactory replacement, either party shall be permitted to submit its demand to formal interest arbitration under the Rules of Federal Mediation and Conciliation Service.

Section 2. Force of Agreement. The parties recognize the right of the Owner to withdraw, at its absolute discretion, the utilization of this Agreement as part of any bid specification should a court of competent jurisdiction issue any order which could

result, temporarily or permanently, in a delay of the bidding, awarding, and/or construction work on the Project. Notwithstanding such an action by the Owner, or such court order, the parties agree that the Agreement shall remain in full force and effect on the Project, to the maximum extent legally possible. It is hereby agreed that this Agreement covers all of the signatory local unions listed below.


Section 3. Delegation. The Owner, in its sole and absolute discretion has the right to delegate its duties hereunder to a representative and/or designee who may be either an employee of Owner or a third party with whom Owner has contracted for contractor services.

OWNER
CITY OF CANTON



Director of Public Service

EAST CENTRAL OHIO BUILDING &
CONSTRUCTION TRADES COUNCIL,
AFL-CIO




Recording Secretary

APPROVED AS TO FORM



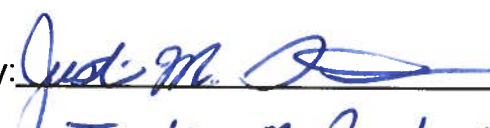
CITY OF CANTON
DIRECTOR OF LAW

BOILERMAKERS LOCAL NO. 744

By: 

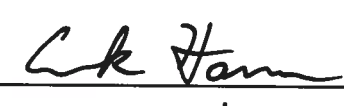
Name: Brian J. Carr
Title: Business Agent
Date: 11-8-23

BRICKLAYERS LOCAL 6

By: 

Name: Justin M. Gantrell
Title: Field Representative
Date: 11-8-23

ELECTRICIANS LOCAL NO. 540

By: 

Name: ERIK HANN
Title: BUS. MGR. / F.S.
Date: 11/9/23

**ELEVATOR CONSTRUCTORS
LOCAL NO. 45**

By: _____

Name: _____

Title: _____

Date: _____

**GENERAL TRUCK DRIVERS &
HELPERS UNION LOCAL NO. 92**

By: Mark M. Her

Name: MARK M. Her

Title: Rec Sec

Date: 11/13/23

GLAZIERS LOCAL NO. 1162

By: Scott Harter

Name: Scott Harter

Title: B.A.

Date: 11-17-23

**HEAT & FROST INSULATORS AND
ALLIED WORKERS LOCAL
NO. 84**

By: Kevin Strobly
Name: Kevin Strobly
Title: ~~HOSE~~ Business Manager
Date: 11-8-23

IRONWORKERS LOCAL NO. 550

By: Theron Hodge
Name: Theron Hodge
Title: Business Agent
Date: 11-8-23

LABORERS LOCAL NO. 1015

By: Jake Croston Jr
Name: Jake Croston Jr
Title: Business Manager
Date: 11/9/23

**OPERATIVE PLASTERERS AND
CEMENT MASONS LOCAL NO. 109**

By: Mark Anderson

Name: Mark Anderson

Title: B.A.

Date: 11/8/2023

PAINTERS LOCAL NO. 841

By: Scott Harter

Name: Scott Harter

Title: B.A.

Date: 11-17-23

**PLUMBERS, PIPEFITTERS AND
REFRIGERATION LOCAL NO. 94**

By: Brett McElfred

Name: Brett McElfred

Title: BM

Date: 11-9-23

ROOFERS LOCAL UNION NO. 88

By: James R. Moyers

Name: James R. Moyers

Title: Business Manager

Date: 11/8/2023

**SHEET METAL WORKERS LOCAL
NO. 33**

By: Kevin Tresch
Name: KEVIN TRESCH
Title: B.A.
Date: 11/9/2023

**SPRINKLER FITTERS LOCAL
NO. 669**

By: Sean Murphy
Name: Sean Murphy
Title: B.A.
Date: 11-9-23

**INDIANA/KENTUCKY/OHIO
REGIONAL COUNCIL OF
CARPENTERS**

By: Kevin M. Ennis II
Name: Kevin M. Ennis II
Title: Senior Representative
Date: 11/9/23

APPENDIX 1

**LETTER OF ASSENT TO THE PROJECT LABOR AGREEMENT
FOR THE
WATER DEPARTMENT SERVICE SHOP ADDITION AND RENOVATIONS**

Pursuant to Article I, Section 1 and Article IV, Section 3 of the Project Labor Agreement (the "Agreement") for the above-referenced Project, the undersigned party hereby agrees that it will comply with and be bound by all of the terms and conditions of the Agreement and agrees to all approved amendments or revisions thereto.

By executing this Letter of Assent, the undersigned also reaffirms, acknowledges, and agrees that it must participate in a Pre-Job Conference with the East Central Ohio Building & Construction Trades Council prior to performing any work on the Project. A Pre-Job Conference shall be valid only where the undersigned Contractor completes the Pre-Job Conference Verification Form provided in Appendix 2.

This Letter of Assent shall ONLY apply to the above-referenced Project and shall remain in effect for the duration of the above-referenced Project, after which this Letter of Assent will automatically terminate without further notice.

For the Contractor (or Subcontractor of whatever tier)

Name of Contractor/Subcontractor: _____

By its Authorized Representative: _____

Print Name: _____

Title: _____

Signature: _____

Date: _____

Phone: _____

Email: _____

APPENDIX 2

Pre-Job Conference Verification Form

Date of Conference	_____
Location of Conference	_____
Project Name	_____
Contractor Name	_____
Address of Contractor	_____

Point of Contact	_____
Phone	_____
Email	_____
Scope of Work	_____

Contractor has provided Council with a list of all proposed trade assignments by craft including scope of work for each assignment.

Y___ N___

Contractor has provided Council with a list of all subcontractors that will perform work on the Project.

Y___ N___

Contractor affirms that it is responsible for subcontracting any work on the Project in strict compliance with Article IV, Section 3 of the Project Labor Agreement.

Y___ N___

The Council has in its possession a Letter of Assent signed by Contractor.

Y___ N___

ACKNOWLEDGED:

BY COUNCIL: (signature)_____ (title)_____

BY CONTRACTOR: (signature)_____ (title)_____

APPENDIX 3
EMPLOYEE DRUG AND ALCOHOL TESTING POLICY
SPECIFICATIONS

The Owner is committed to providing a safe workplace for the workers assigned the Project, promoting high standards of employment health, and fostering productivity that satisfies its quality expectations. Consistent with the intent and spirit of this commitment, the Owner and ECOB & CTC have established a substance abuse testing specification for the Project with the goal of maintaining a work environment that is free from the effects of the use of illegal drugs and alcohol. The Owner will implement the terms of this policy.

This specification is not intended as a substitute for the Contractors' complete written substance abuse policy. Normally, such policies include other important features, including, but not limited to, an employee education and awareness Program, a supervisor training program and an employee assistance program.

The policy for this Project requires that any construction employee entering the project site will comply with the substance abuse testing requirements as outlined in this section. The Owner reserves the right to amend this specification upon written notice to the Contractor and the Unions on the Project. The parties to this agreement shall recognize the Drug Free Work Site Program as implemented through participating Unions and/or Contractors as administered by the contractor, or for contractors who are not signatory to agreements with signatory unions belonging to ECOB & CTC, and their core employees, an equivalent program that meets the specifications, contractual requirements, and testing requirements as set forth in Appendix 3.

CONTRACTUAL REQUIREMENTS

All Contractors must have and enforce a written Substance Abuse Program incorporating the testing requirements, term, and conditions set forth in this specification. This specification is applicable to all employees, current and prospective, in order to be eligible to perform work at the Project. The Contractors must comply with the specification. Supplies, vendors, and visitors are subject to confirmation of their abstinence from the possession or use of substances indicated in this specification. A copy of each contractor's substance abuse program must be

submitted to the Owner for approval prior to commencement of any work on the Project site.

The substance abuse program must apply to all employees working on the Project and subcontractors' of any of tier working on the Project site. This includes workers, new hires, replacement workers, and supervisory personnel. No employee or prospective employee of a Contractor shall be permitted to work on the Project site unless such employee has submitted to testing by this specification and unless the results of such testing are negative as hereinafter defined. The Contractor must provide the Owner with a Monthly Summary Report of the Substance Abuse Program compliance.

All Contractors must train their respective employees in methods that will allow them to recognize substance abusers. Supervisory Employees of the Owner or its subcontractor shall be trained to take action, and to confront a substance abuser in a manner consistent with generally accepted safety-training procedures.

The cost of implementing the Substance Abuse program shall be borne by each respective Contractor affected by this specification.

Suppliers, vendors, and visitors must become signatory to the terms of this specification and their abstinence from substance abuse, and their continued avoidance of violations of the specification at the project site. Furthermore, in the event of an incident and/or accident occurrences involving suppliers, vendors, and/or visitors, the same agrees to submit to the substance abuse testing when requested. Refusal to comply would be grounds to have the supplier, vendor, or visitor permanently barred from the Project site by regulators.

TESTING REQUIREMENTS

The Project requires:

- Post-offer/Pre-engagement drug and alcohol testing.
- Testing for reasonable suspicion of illegal drug use or alcohol use.
- Post accident and post incident drug and alcohol testing upon reasonable suspicion.
- Drug testing following discovery of illegal or unauthorized drugs or paraphernalia as creating reasonable suspicion.

All Prime Contractors must perform post-offer/pre-engagement, and post accident/incident testing upon reasonable suspicion, as follows:

- a. All drug testing must be conducted by a National Institute of Drug Abuse (NIDA) certified laboratory with test results interpreted by a licensed medical review officer (MRO).
- b. The initial screen tests for alcohol shall be performed by using either a saliva test or breathalyzer test comparable to the type used by state or local law enforcement officials. Furthermore, alcohol confirmatory tests shall be performed by using either blood alcohol test or a Breathalyzer test comparable to the type used by state or local law enforcement officials.
- c. Evidence of the negative test results of individual employees required by this specification shall be furnished to the Owner prior to the commencement of work by the individual employee and promptly after performance of any subsequent testing required by this specification. Acceptable negative test result format.
 - A certificate signed by the testing laboratory, setting forth the nature and results of performed; or
 - An identification card signed by the respective Prime Contractor and issued to the individual employee, setting forth as reported on a certificate issued by the testing laboratory. The name of the testing laboratory shall also appear on the identification card; provided the affected employee authorizes the issuance of such identification card.

COMPLIANCE PROCEDURE

The Owner reserves the right to audit any substance abuse program required by this specification to verify compliance results within twenty-four (24) hours of notification of the intent to audit. The Owner shall have free right of access to all relevant records of the Prime Contractor and their subcontractors and supplies for this purpose, provided such record disclosures are within the scope of the States guidelines pertaining to confidentiality of employee records.

The Contractor's pre-engagement employees who receive a positive test result shall immediately leave the Project Site. Transportation of employees receiving the

positive test result is the direct responsibility of the employing Prime Contractor, including employees of its subcontractors. Furthermore, pre-engagement employees receiving a positive test shall not be permitted to return to the Project Site earlier than 90 days from the date of the positive test. At this time the employee may begin the process outlined by this specification again.

DEFINITIONS/ CONFIDENTIALITY/RULES- DISCIPLINARY ACTIONS- GRIEVANCE PROCEDURES

1. DEFINITIONS:

- (a) Company Premises - the term "Company Premises" as used in this policy includes all property, facilities, land, building, structures, automobiles, trucks and other vehicles owned, leased or used by the Contractor on the Project. Construction job sites for which the Contractor has responsibility are included.
- (b) Prohibited Items & Substances - Prohibited substances include illegal drugs (including controlled substances, look alike drugs and designer drugs, alcoholic beverages, and drug paraphernalia in the possession of or being used by an employee on the job.
- (c) Employee - Individuals, who perform work for the Contractor, including, but not limited to management, supervision, engineering, craft workers and clerical personnel.
- (d) Accident - Any event resulting in injury to a person or property to which an employee, or contractor/contractor's employee, contributed as a direct or indirect cause.
- (e) Incident - An event which has all the attributes of an accident, except that no harm was caused to person or property.
- (f) Reasonable Cause - Reasonable cause shall be defined as tardiness, excessive absenteeism, and erratic behavior such as noticeable imbalance, incoherence, and disorientation.

2. CONFIDENTIALITY

- (a) All parties to this policy and program have only the interests of employees in mind; therefore, encourage any employee with a substance abuse problem

to come forward and voluntarily accept our assistance in dealing with the illness. An employee assistance program will provide guidance and direction for you during your recovery period. If you volunteer for help, the Contractor will make every reasonable effort to return you to work upon your recovery. The Contractor will also take action to assure that your illness is handled in a confidential manner.

- (b) All actions taken under this policy and program will be confidential and disclosed only to those with a "need to know."
- (c) When a test is required, the specimen will be identified with a code number, not by name, to insure confidentiality of the donor. Each specimen container will be properly label and made tamper proof. The donor must witness this procedure.
- (d) Unless an initial positive result is confirmed as positive, it shall be deemed negative and reported by the laboratory as such.
- (e) The handling and transportation of each specimen will be properly documented through the strict chain of custody procedures.

3. **RULES** - all employees must report to work in a physical condition that will enable them to perform their jobs in a safe and efficient manner. Employees shall not:

- (a) Use, possess, dispense or receive prohibited substances on or at the Project job site; or
- (b) Report to work at or on the Project with any measurable amount of prohibited substances in their system.

4. **DISCIPLINE** - When the Contractor has reasonable cause to believe an employee is under the influence of a prohibited substance, for reasons of safety, the employee may be suspended until test results are available. If no test results are received after three (3) working days, the employee, if available, shall return to work with back pay. If the test results prove negative, the employee shall be reinstated with back pay. In all other cases:

- (a) Applicants testing positive for drug use will not be hired.
- (b) Employees who have not voluntarily come forward, and who test positive for a drug use, will be terminated.

(c) Employees who refuse to cooperate with testing procedures will be terminated.

(d) Employees found in possession of drugs or drug paraphernalia will be terminated.

(e) Employees found under the influence of alcohol while on duty, or while operating a company vehicle, will be subject to termination.

5. **PRESCRIPTION DRUGS** - Employees using a prescribed medication which, in their physician's opinion, may impair the performance of their duties, either mental or motor functions, must immediately inform the supervisor of such prescription drug use if instructed by their physician to do so. For the safety of all employees, the Contractor will consult with you and your physician to determine if a reassignment of duties is necessary. The Contractor will attempt to accommodate your needs by making an appropriate reassignment. However, if a reassignment is not possible, you will be placed on temporary medical leave until released as fit for duty by the prescribing physician.

Appendix B

Prevailing Wage Requirements and Rates

Overview

This project will utilize **Davis Bacon** prevailing wage rates. All contractors and subcontractors are required to comply with all Prevailing Wage Requirements in the Ohio Revised Code. These requirements are outlined below and sample documents are contained in the following pages and will be utilized to comply with these requirements. **Please note that the City of Canton will withhold payroll and/or retainage for a pay application or for the project in total until all prevailing wage issues are resolved.**

Payroll Dates Form

Must be submitted to the Prevailing Wage Coordinator (PWC) on or before the date your company starts work under the contract. It is to be completed with the **actual payroll dates** and not a day of the week. This requirement applies to all contractors/subcontractors.

Letter of Authorization for Payroll Signature

The person signing the certified payrolls must be an Owner or Corporate Officer of the company, or an Authorization letter must be completed and sent to the Prevailing Wage Coordinator. The document sent **must be the original signed notarized document**. If the person signing the payroll changes during the course of the project then a new Letter of Authorization for payroll signature must be submitted.

Fringe Benefits Form

Please complete and return along with the payroll dates form and letter of authorization for payroll signature form.

Notification to Employee Form

If your company is a **non-union company** you **must provide a completed Notification form to each employee working on this site and provide the PWC a copy** (wage and fringe benefit amounts on Notification must match amounts listed on payrolls), the form must have the Prevailing Wage Coordinator information, if you are a **union company** you need to send the PWC **a copy of the contract/agreement your company has with the local Trade Union(s)**.

Certified Payroll

The **first certified payroll** must be sent to the Prevailing Wage Coordinator **within two weeks of 1st pay period on the job**, payrolls must be sent **weekly** to the Prevailing Wage Coordinator. If paying fringe benefits in "cash," include the payment of fringes in the base rate of pay. If paying fringe benefits into bona fide "plans, funds, or programs," list the amounts paid into each plan/program on the certified payroll. If the payroll form you use does not have sections for fringe benefits, you must provide the information in the remarks section on the payroll or as an attachment to the certified payroll. Any payroll form/document the contractor uses must provide all of the required information as listed on the WH 347 payroll form. **(You must provide the original signed documents to the Prevailing Wage Coordinator before you will receive your final payment.)**

Affidavit of Compliance

When each contractor/subcontractor has completed their work on the job site they're required to submit a Final Affidavit of Compliance before the primary contractor receives their final payment and any retainer. Must send Prevailing Wage Coordinator original signed document.

Apprentices

Any/all apprentices working on this project must be registered with the State of Ohio Apprenticeship Council or the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training (BAT), apprentices on site cannot exceed ratios of apprentices/trainees to journeymen specified in the approved program. Contractors/subs must provide the Prevailing Wage Coordinator a copy of the Apprenticeship Agreement from the program for each apprentice on the project with the first payroll on which they appear. You must provide the apprentice level/year, i.e. 1, 2, 3, etc. and/or percent of Journeyman's pay rate, i.e. 50%, 55%, etc. on the certified payrolls.

Subcontractors

If any subcontractors will be used during this project then a list of subcontractors including their name, address, and phone number must be provided to the Prevailing Wage Coordinator. The Prime contractor is responsible for all forms to be furnished to subcontractors, **along with wage rates** or any other modification vital to the project.

Prevailing Wage Rates

Attached are the State of Ohio **Davis Bacon** wage rates that will apply to this project. All applicable prevailing wage rates must be posted on the job site for the duration of the project.

PAYROLL DATES

PREVAILING WAGE LAW

Instructions to the Contractor: Please read the following and provide the required information noted on this form. This document must be submitted to the Prevailing Wage Coordinator for the Public Authority on or before your company starts any work under a contract for a public improvement. This requirement is also applicable to your subcontractors. Please make a copy of this document available to them. The prevailing wage laws states that contractors are responsible for the actions of their subcontractors.

_____ will begin performance under contract on
(Name of Contractor)
the _____ project on _____
(Name of Project and Location) (Start Date)
and will conclude work on said project on _____
(Ending Date, If Known)

In accordance with section 4115.071(C) of the Ohio Revised Code; listing of payroll dates, I hereby submit the following schedule of dates that my company is required to pay wages to it's workers while on this project.
(NOTE: If the life of the project is expected to be over (3) three months in length, provide only the days of the week your pay period starts and ends, plus the day you pay your workers)

_____	_____	_____
_____	_____	_____
_____	_____	_____

Day Pay Period Starts: _____

Day Pay Period Ends: _____

Day that Workers are Paid: _____

I acknowledge that I am required by section 4115.071(C) of the Ohio Revised Code that I must submit a copy of my company's certified payroll records for this project to the Prevailing Wage Coordinator of the Public Authority within two weeks of the initial pay date listed above. I further acknowledge that I am responsible to collect and submit my subcontractors prevailing wage documents, including their certified payroll records in accordance with law.

Contractor Signature

Date

Company Name & Address

Example

PAYROLL DATES PREVAILING WAGE LAW

Example

Instructions to the Contractor: Please read the following and provide the required information noted on this form. This document must be submitted to the Prevailing Wage Coordinator for the Public Authority on or before your company starts any work under a contract for a public improvement. This requirement is also applicable to your subcontractors. Please make a copy of this document available to them. The prevailing wage laws states that contractors are responsible for the actions of their subcontractors.

Donald P. Albrecht Inc. will begin performance under contract on
(Name of Contractor)

the Mahoning Road Economic Development project on 9/24/12
(Name of Project and Location) (Start Date)

and will conclude work on said project on 10/26/12
(Ending Date, If Known)

In accordance with section 4115.071(C) of the Ohio Revised Code; listing of payroll dates, I hereby submit the following schedule of dates that my company is required to pay wages to it's workers while on this project. (NOTE: If the life of the project is expected to be over (3) three months in length, provide only the days of the week your pay period starts and ends, plus the day you pay your workers)

<u>9/29/12</u>	<u>10/5/12</u>	<u>10/12/12</u>
<u>10/19/12</u>	<u>10/26/12</u>	<u>11/2/12</u>
<u>11/9/12</u>		

Day Pay Period Starts: Sunday

Day Pay Period Ends: Saturday

Day that Workers are Paid: Friday

I acknowledge that I am required by section 4115.071(C) of the Ohio Revised Code that I must submit a copy of my company's certified payroll records for this project to the Prevailing Wage Coordinator of the Public Authority within two weeks of the initial pay date listed above. I further acknowledge that I am responsible to collect and submit my subcontractors prevailing wage documents, including their certified payroll records in accordance with law.

Contractor Signature

Donald P. Albrecht Inc.

9/19/12

Date

1025 Brook Ave. N.W.

Massillon, Ohio 44646

Company Name & Address

LETTER OF AUTHORIZATION FOR PAYROLL SIGNATURE:

DATE: _____

COMPANY NAME: _____

ADDRESS: _____

FEDERAL I.D.# _____

GENTLEMEN:

RE: _____
(Project Name) (Project Number)

_____ Canton, Ohio 447
(Address)

_____ hereby authorizes
(Company Officer/ Owner – Title)

_____ as the person to
complete and sign all certified payroll forms for the above project.

BY: _____
(Print Name)

(Signature)

(Title)

Sworn and subscribed in my presence this _____ day of _____ 20____

Seal :

Notary Public

PREVAILING WAGE NOTIFICATION to EMPLOYEE

Project Name:	Job Number:
Contractor:	
Project Location	
Jobsite posting of Prevailing Wage rates located:	

Prevailing Wage Coordinator	Employee
Name:	Name:
Street: 218 Cleveland Ave SW	Street:
City: Canton	City:
State/Zip: Ohio 44702	State/Zip:
Phone:	Phone:

You will be performing work on this project that falls under these classifications. You will be paid the appropriate rate for the type of work you are performing.

Classification <small>Be Specific: Laborer I (II, III) Operating Engineer I (II, III)</small>	Prevailing Wage Rate Total Package	Minus your fringe benefits	Your hourly base rate

Hourly fringe benefits paid on your behalf by this Company:

Fringe	Amount	Fringe	Amount
Health Insurance		Vacation	
Life Insurance		Holiday	
Pension		Sick Pay	
Bonus		Training	
Other/ Cash		Total Hourly Fringes	

Contractor's Signature :	Date:
Employee's Signature :	Date:

FRINGE BENEFITS

PLEASE COMPLETE THIS FORM AND RETURN IT TO THE ADDRESS BELOW.

_____ FRINGE BENEFITS ARE ALL PAID IN CASH TO THE EMPLOYEE.

_____ FRINGE BENEFITS ARE PAID IN CASH AND TO THE BENEFIT PROGRAMS LISTED BELOW.

_____ FRINGE BENEFITS ARE ALL PAID TO THE FOLLOWING BENEFIT PROGRAMS:

HEALTH & WELFARE PLAN:

ADDRESS:

PENSION PLAN:

ADDRESS:

APPRENTICESHIP PROGRAM:

YOUR COMPANY IS:

_____ UNION

_____ NON-UNION

YOUR COMPANY PAYS ALL EMPLOYEES:

_____ WEEKLY

_____ BI-WEEKLY

FORWARD A BLANK FORM TO EACH SUBCONTRACTOR ON THE PROJECT FOR COMPLETION.
RETURN ALL FORMS TO:

CITY OF CANTON
218 CLEVELAND AVE SW
CANTON, OHIO 44702
ATTN: PREVAILING WAGE COORDINATOR

CONTRACTOR'S NAME: _____

ADDRESS: _____

PROJECT NAME: _____

Date _____
I, _____ (Name of Signatory Party) _____ (Title)
do hereby state

(1) That I pay or supervise the payment of the persons employed by _____
(Contractor or Subcontractor) _____ on the _____
(Building or Work) _____ that during the payroll period commencing on the _____
_____ day of _____ and ending the _____ day of _____
all persons employed on said project have been paid the full weekly wages earned, that no rebates have
been or will be made either directly or indirectly to or on behalf of said

_____ from the full
(Contractor or Subcontractor)
weekly wages earned by any persons on and that no deductions have been made either directly or indirectly
from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part
3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948,
63 Stat. 108, 72 Stat. 967, 76 Stat. 357, 40 U.S.C. § 3145), and described below.

(2) That any payrolls otherwise under this contract required to be submitted for the above period are
correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the
applicable wage rates contained in any wage determination incorporated into the contract that the
classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide
apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of
Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a
State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That _____
(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS
☐ - in addition to the basic hourly wage rates paid to each laborer or mechanic listed in
the above referenced payroll, payments of fringe benefits as listed in the contract
have been or will be made to appropriate programs for the benefit of such
employees, except as noted in section 4(c) below

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ - Each laborer or mechanic listed in the above referenced payroll has been paid,
as indicated on the payroll, an amount not less than the sum of the applicable
basic hourly wage rate plus the amount of the required fringe benefits as listed
in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION
REMARKS	
NAME AND TITLE	
SIGNATURE	
THE WILLFUL FALSIFICATION OF ANY OFFICIAL STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.	

Affidavit of Compliance

PREVAILING WAGES

I, _____
(Name of Person Signing Affidavit / Title)

do hereby certify that the wages paid to all employees of

(Company Name)

for all hours worked on the

(Project Name and Location)

project, during the period from _____ to _____ are in
(Project Dates)

compliance with prevailing wage requirements of the contract between

_____ and the City of Canton, Ohio.

I further certify that no rebates or deductions have or will be made, directly or indirectly, from any wages paid in connection with this project, other than those provided by law.

(Signature of Officer or Agent)

Sworn to and subscribed in my presence this _____ day of _____,
20____.

(Notary Public)

The above affidavit must be executed and sworn to by the officer or agent of the contractor or subcontractor who supervises the payment of employees. This affidavit must be submitted before the surety is released or the final payment due under the terms of the contract is made.

Instructions For Completing Payroll Form, WH-347

- [WH-347 \(PDF\)](#)

OMB Control No. 1235-0008, Expires 07/31/2024.

General: Form WH-347 has been made available for the convenience of contractors and subcontractors required by their Federal or Federally-aided construction-type contracts and subcontracts to submit weekly payrolls. Properly filled out, this form will satisfy the requirements of Regulations, Parts 3 and 5 (29 C.F.R., Subtitle A), as to payrolls submitted in connection with contracts subject to the Davis-Bacon and related Acts.

While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) requires contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) Regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Under the Davis-Bacon and related Acts, the contractor is required to pay not less than prevailing wage, including fringe benefits, as predetermined by the Department of Labor. The contractor's obligation to pay fringe benefits may be met either by payment of the fringe benefits to bona fide benefit plans, funds or programs or by making payments to the covered workers (laborers and mechanics) as cash in lieu of fringe benefits.

This payroll provides for the contractor to show on the face of the payroll all monies to each worker, whether as basic rates or as cash in lieu of fringe benefits, and provides for the contractor's representation in the statement of compliance on the payroll (as shown on page 2) that he/she is paying for fringe benefits required by the contract and not paid as cash in lieu of fringe benefits. Detailed instructions concerning the preparation of the payroll follow:

Contractor or Subcontractor: Fill in your firm's name and check appropriate box.

Address: Fill in your firm's address.

Payroll No.: Beginning with the number "1", list the payroll number for the submission.

For Week Ending: List the workweek ending date.

Project and Location: Self-explanatory.

Project or Contract No.: Self-explanatory.

Column 1 - Name and Individual Identifying Number of Worker: Enter each worker's full name and an individual identifying number (e.g., last four digits of worker's social security number) on each weekly payroll submitted.

Column 2 - No. of Withholding Exemptions: This column is merely inserted for the employer's convenience and is not a requirement of Regulations, Part 3 and 5.

Column 3 - Work Classifications: List classification descriptive of work actually performed by each laborer or mechanic. Consult classification and minimum wage schedule set forth in contract specifications. If additional classifications are deemed necessary, see Contracting Officer or Agency representative. An individual may be shown as having worked in more than one classification provided an accurate breakdown of hours worked in each classification is maintained and shown on the submitted payroll by use of separate entries.

Column 4 - Hours worked: List the day and date and straight time and overtime hours worked in the applicable boxes. On all contracts subject to the Contract Work Hours Standard Act, enter hours worked in excess of 40 hours a week as "overtime".

Column 5 - Total: Self-explanatory

Column 6 - Rate of Pay (Including Fringe Benefits): In the "straight time" box for each worker, list the actual hourly rate paid for straight time worked, plus cash paid in lieu of fringe benefits paid. When recording the straight time hourly rate, any cash paid in lieu of fringe benefits may be shown separately from the basic rate. For example, "\$12.25/.40" would reflect a \$12.25 base hourly rate plus \$.40 for fringe benefits. This is of assistance in correctly computing overtime. See "Fringe Benefits" below. When overtime is worked, show the overtime hourly rate paid plus any cash in lieu of fringe benefits paid in the "overtime" box for each worker; otherwise, you may skip this box. See "Fringe Benefits" below. Payment of not less than time and one-half the basic or regular rate paid is required for overtime under the Contract Work Hours Standard Act of 1962 if the prime contract exceeds \$100,000. In addition to paying no less than the predetermined rate for the classification which an individual works, the contractor must pay amounts predetermined as fringe benefits in the wage decision made part of the contract to approved fringe benefit plans, funds or programs or shall pay as cash in lieu of fringe benefits. See "FRINGE BENEFITS" below.

Column 7 - Gross Amount Earned: Enter gross amount earned on this project. If part of a worker's weekly wage was earned on projects other than the project described on this payroll, enter in column 7 first the amount earned on the Federal or Federally assisted project and then the gross amount earned during the week on all projects, thus "\$163.00/\$420.00" would reflect the earnings of a worker who earned \$163.00 on a Federally assisted construction project during a week in which \$420.00 was earned on all work.

Column 8 - Deductions: Five columns are provided for showing deductions made. If more than five deduction are involved, use the first four columns and show the balance deductions under "Other" column; show actual total under "Total Deductions" column; and in the attachment to the payroll describe the deduction(s) contained in the "Other" column. All deductions must be in accordance with the provisions of the Copeland Act Regulations, 29 C.F.R., Part 3. If an individual worked on other jobs in addition to this project, show actual deductions from his/her weekly gross wage, and indicate that deductions are based on his gross wages.

Column 9 - Net Wages Paid for Week: Self-explanatory.

Totals - Space has been left at the bottom of the columns so that totals may be shown if the contractor so desires.

Statement Required by Regulations, Parts 3 and 5: While the "statement of compliance" need not be notarized, the statement (on page 2 of the payroll form) is subject to the penalties provided by 18 U.S.C. § 1001, namely, a fine, possible imprisonment of not more than 5 years, or both. Accordingly, the party signing this statement should have knowledge of the facts represented as true.

Items 1 and 2: Space has been provided between items (1) and (2) of the statement for describing any deductions made. If all deductions made are adequately described in the "Deductions" column above, state "See Deductions column in this payroll." See "FRINGE BENEFITS" below for instructions concerning filling out paragraph 4 of the statement.

Item 4 FRINGE BENEFITS - Contractors who pay all required fringe benefits: If paying all fringe benefits to approved plans, funds, or programs in amounts not less than were determined in the applicable wage decision of the Secretary of Labor, show the basic cash hourly rate and overtime rate paid to each worker on the face of the payroll and check paragraph 4(a) of the statement on page 2 of the WH-347 payroll form to indicate the payment. Note any exceptions in section 4(c).

Contractors who pay no fringe benefits: If not paying all fringe benefits to approved plans, funds, or programs in amounts of at least those that were determined in the applicable wage decision of the Secretary of Labor, pay any remaining fringe benefit amount to each laborer and mechanic and insert in the "straight time" of the "Rate of Pay" column of the payroll an amount not less than the predetermined rate for each classification plus the amount of fringe benefits determined for each classification in the application wage decision. Inasmuch as it is not necessary to pay time and a half on cash paid in lieu of fringe benefits, the overtime rate shall be not less than the sum of the basic predetermined rate, plus the half time premium on basic or regular rate, plus the required cash in lieu of fringe benefits at the straight time rate. In addition, check paragraph 4(b) of the statement on page 2 the payroll form to indicate the payment of fringe benefits in cash directly to the workers. Note any exceptions in section 4(c).

Use of Section 4(c), Exceptions

Any contractor who is making payment to approved plans, funds, or programs in amounts less than the wage determination requires is obliged to pay the deficiency directly to the covered worker as cash in lieu of fringe benefits. Enter any exceptions to section 4(a) or 4(b) in section 4(c). Enter in the Exception column the craft, and enter in the Explanation column the hourly amount paid each worker as cash in lieu of fringe benefits and the hourly amount paid to plans, funds, or programs as fringe benefits. The contractor must pay an amount not less than the predetermined rate plus cash in lieu of fringe benefits as shown in section 4(c) to each such individual for all hours worked (unless otherwise provided by applicable wage determination) on the Federal or Federally assisted project. Enter the rate paid and amount of cash paid in lieu of fringe benefits per hour in column 6 on the payroll. See paragraph on "Contractors who pay no fringe benefits" for computation of overtime rate.

Public Burden Statement: We estimate that it will take an average of 55 minutes to complete this collection of information, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection of information, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W., Washington, D.C. 20210.

Note: In order to view, fill out, and print PDF forms, you need Adobe® Acrobat® Reader® version 5 or later, which you may download for free at www.adobe.com/products/acrobat/readstep2.html.

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Wage and Hour Division

An agency within the U.S.
Department of Labor

200 Constitution Ave NW
Washington, DC 20210

1-866-4-US-WAGE

1-866-487-9243

www.dol.gov

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White House

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A. APPLICABILITY

The Project or Program to which the construction work covered by this Contract pertains is being assisted by the United States of America, and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

(1) MINIMUM WAGES

- (i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment, computed at rates not less than those contained in the wage determination of the Secretary of Labor (which is attached hereto and made a part hereof), regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH1321)) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place, where it can be easily seen by the workers.

(ii) Additional Classifications.

- (A) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:
 - (1) The work to be performed by the classification requested is not performed by a classification in the wage determination;
 - (2) The classification is utilized in the area by the construction industry; and
 - (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (B) If the contractor, the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division ("Administrator"), Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget ("OMB") under OMB control number 1235-0023.)
- (C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, or HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1235-0023.)

(D) The wage rate (including fringe benefits, where appropriate) determined pursuant to subparagraphs (1)(ii)(B) or (C) of this paragraph, shall be paid to all workers performing work in the classification under this Contract from the first day on which work is performed in the classification.

- (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
- (iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1235-0023.)

- (2) **Withholding.** HUD or its designee shall, upon its own action or upon written request of an authorized representative of the U.S. Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Department of Labor shall make such disbursements in the case of direct Davis-Bacon Act contracts.

(3) **Payrolls and basic records.**

- (i) **Maintaining Payroll Records.** Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification(s), hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid.

Whenever the Secretary of Labor has found, under 29 CFR 5.5(a)(1)(iv), that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1235-0023 and 1215-0018)

(ii) **Certified Payroll Reports.**

- (A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead, the payrolls only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <https://www.dol.gov/agencies/whd/forms> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the U.S. Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1235-0008.)

- (B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
 - (1) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;
 - (2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;
 - (3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract; and
- (C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph (a)(3)(ii)(b).
- (D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph (a)(3)(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the U.S. Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and Trainees.

- (i) **Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency (where appropriate), to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program.

If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed, unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (iii) **Equal employment opportunity.** The utilization of apprentices, trainees, and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.
- (5) **Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this Contract.
- (6) **Subcontracts.** The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs (1) through (11) in this paragraph (a) and such other clauses as HUD or its designee may, by appropriate instructions, require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.
- (7) **Contract termination; debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
- (8) **Compliance with Davis-Bacon and Related Act Requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this Contract.
- (9) **Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this Contract shall not be subject to the general disputes clause of this Contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.
- (10) **Certification of Eligibility.**
 - (i) By entering into this Contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

- (ii) No part of this Contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.
- (iii) Anyone who knowingly makes, presents, or submits a false, fictitious, or fraudulent statement, representation or certification is subject to criminal, civil and/or administrative sanctions, including fines, penalties, and imprisonment (e.g., 18 U.S.C. §§ 287, 1001, 1010, 1012; 31 U.S.C. §§ 3729, 3802).

(11) Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic, to whom the wage, salary, or other labor standards provisions of this Contract are applicable, shall be discharged or in any other manner discriminated against by the contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The provisions of this paragraph (b) are applicable where the amount of the prime contract exceeds **\$100,000**. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

- (1) Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work, which may require or involve the employment of laborers or mechanics, shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek, unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.
- (2) Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in subparagraph B(1) of this paragraph, the contractor, and any subcontractor responsible therefor, shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph B(1) of this paragraph, in the sum of **\$27** for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph B(1) of this paragraph. In accordance with the Federal Civil Penalties Inflation Adjustment Act of 1990 (28 U.S.C. § 2461 Note), the Department of Labor adjusts this civil monetary penalty for inflation no later than January 15 each year.
- (3) Withholding for unpaid wages and liquidated damages.** HUD or its designee shall, upon its own action or upon written request of an authorized representative of the U.S. Department of Labor, withhold or cause to be withheld from any moneys payable on account of work performed by the contractor or subcontractor under any such contract, or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages, as provided in the clause set forth in subparagraph B(2) of this paragraph.
- (4) Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph B(1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs B(1) through (4) of this paragraph.

C. HEALTH AND SAFETY

The provisions of this paragraph (c) are applicable where the amount of the prime contract exceeds **\$100,000**.

- (1)** No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his or her health and safety, as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.
- (2)** The contractor shall comply with all regulations issued by the Secretary of Labor pursuant to 29 CFR Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96), 40 U.S.C. § 3701 et seq.
- (3)** The contractor shall include the provisions of this paragraph in every subcontract, so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

Appendix B

"General Decision Number: OH20240106 01/26/2024

Superseded General Decision Number: OH20230106

State: Ohio

Construction Type: Building

Counties: Carroll and Stark Counties in Ohio.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	<ul style="list-style-type: none">. Executive Order 14026 generally applies to the contract.. The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	<ul style="list-style-type: none">. Executive Order 13658 generally applies to the contract.. The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be

adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/05/2024
1	01/26/2024

ASBE0002-003 08/01/2023

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR.....	\$ 42.40	28.93

BROH0006-003 05/01/2022

	Rates	Fringes
BRICKLAYER.....	\$ 30.76	19.07

BROH0006-008 05/01/2022

	Rates	Fringes
TILE SETTER.....	\$ 30.76	19.07

BROH0008-007 06/01/2022

	Rates	Fringes
TILE FINISHER.....	\$ 24.16	16.11

* CARP0285-007 05/01/2023

	Rates	Fringes
CARPENTER (Drywall Hanging and Metal Stud Installation Only).....	\$ 31.36	22.16

ELEC0540-001 08/29/2022

	Rates	Fringes
ELECTRICIAN (Low Voltage Wiring Only).....	\$ 23.26	17.04

ELEC0540-008 12/26/2022		

	Rates	Fringes
ELECTRICIAN (Excludes Low Voltage Wiring).....	\$ 36.28	27.04

ENGI0018-035 05/01/2018		

	Rates	Fringes
POWER EQUIPMENT OPERATOR Backhoe/Excavator/Trackhoe..	\$ 35.89	15.09

ENGI0066-045 06/01/2017		

	Rates	Fringes
POWER EQUIPMENT OPERATOR Forklift.....	\$ 28.87	19.66
Grader/Blade.....	\$ 32.42	19.66
Mechanic.....	\$ 32.92	19.66

IRON0550-010 05/01/2023		

	Rates	Fringes
IRONWORKER (Ornamental, Reinforcing and Structural).....	\$ 33.00	22.27

LAB01015-006 05/01/2023		

	Rates	Fringes
LABORER Common or General.....	\$ 31.52	12.65
Mason Tender - Brick.....	\$ 33.52	12.65

PAIN0841-003 06/01/2023		

	Rates	Fringes
PAINTER (Brush and Roller).....	\$ 30.18	15.50

PAIN1162-003 05/01/2023		

	Rates	Fringes
GLAZIER.....	\$ 29.37	14.39

 PLUM0094-007 05/01/2023

	Rates	Fringes
PLUMBER (Includes HVAC Unit Installation).....	\$ 38.03	23.09

 PLUM0168-005 05/01/2016

	Rates	Fringes
PIPEFITTER (Excludes HVAC Unit Installation).....	\$ 34.53	17.49

 ROOF0088-003 06/01/2023

	Rates	Fringes
ROOFER.....	\$ 30.07	21.26

 SHEE0033-027 06/01/2023

	Rates	Fringes
SHEET METAL WORKER (HVAC Duct Installation Only).....	\$ 34.90	30.49

 * UAVG-OH-0021 01/01/2019

	Rates	Fringes
OPERATOR: Oiler.....	\$ 27.56	16.37

 * UAVG-OH-0023 01/01/2019

	Rates	Fringes
LABORER: Mason Tender - Cement/Concrete.....	\$ 29.55	10.90

 SUOH2012-108 08/29/2014

	Rates	Fringes
CARPENTER, Excludes Drywall		

Hanging, and Metal Stud Installation.....	\$ 24.30	10.71
CEMENT MASON/CONCRETE FINISHER...	\$ 26.07	12.34
LABORER: Pipelayer.....	\$ 23.98	8.58
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 30.26	12.58
OPERATOR: Bulldozer.....	\$ 22.55	8.03
OPERATOR: Crane.....	\$ 29.51	11.77
OPERATOR: Loader.....	\$ 29.66	12.61
OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....	\$ 30.28	13.29
OPERATOR: Roller.....	\$ 28.83	12.72
PAINTER: Spray.....	\$ 22.78	12.40
SHEET METAL WORKER, Excludes HVAC Duct Installation.....	\$ 34.16	0.00
TRUCK DRIVER: Dump (All Types)...	\$ 22.78	12.61

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO

is available at
<https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates

the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

Contract Document Provisions

The following contract requirements and forms are to be included in the construction contract documents. Completed copies of the forms are to be submitted to Ohio EPA within one week after bids are received, or sooner dependent on your individual project schedule. Bid packages for WPCLF projects should be submitted to DEFA in the central office while bid packages for WSRLA projects should be submitted to the appropriate DDAGW district office.

Equal Employment Opportunity (EEO) Requirements

The Contractor's EEO Certification Form must be (1) included in the contract documents and (2) referenced in the Instructions to Bidders, informing bidders that the form must be completed and submitted with their bid.

NOTE: If the loan applicant has its own EEO requirements, local procedures and forms may be substituted for the EPA form.

Debarment

The Certification Regarding Debarment, Suspension, and Other Responsibility Matters must be (1) included in the contract documents and (2) referenced in the Instructions to Bidders, informing bidders that the form must be completed and submitted with their bid.

Disadvantaged Business Enterprises (DBE) Utilization

The DBE Specification language and instructions to the bidders and Forms 6100-3, 6100-4 and 6100-2 must be (1) included in the contract documents and (2) referenced in the Instructions to Bidders, informing bidders that the forms must be completed and submitted with their bid.

NOTE: If the loan applicant has its own DBE requirements or if other funding programs with potentially competing DBE requirements are participating in the project funding, please contact Ohio EPA – DEFA for specific instructions regarding the DBE requirements.

Davis-Bacon wage rate requirements

The contract documents must include language that requires contractors and subcontractors to pay wages at rates not less than those prevailing on similar projects within the area as determined by the US Secretary of Labor. In addition, the loan recipient will be required to conduct wage interviews and monitor payroll for compliance.

Build America, Buy America (Lead Service Line, Emerging Contaminant, Equivalency Projects)

~~Build America Buy America Act (BABA) requirements apply to Lead Service Line, Emerging Contaminants and equivalency projects funded by a WPCLF assistance agreement and/or a WSRLA assistance agreement. Equivalency projects are those receiving funding from federal capitalization grants that support the WPCLF and WSRLA programs. The acknowledgement form must be included in the contract documents. The acknowledgement form should be signed by the contractor and submitted with the final bid package. It is recommended that the BABA guidance document and questions and answers document be included in the contract documents.~~

WPCLF and WSRLA PROJECTS

Regulations and Forms to be Included with Contract Documents

American Iron and Steel

All treatment works projects funded by a WPCLF assistance agreement and all public water system projects funded by a WSRLA assistance agreement are required to comply with American Iron and Steel (AIS) requirements. The acknowledgement form must be included in the contract documents. The acknowledgement form should be signed by the contractor and submitted with the final bid package. It is recommended that the AIS guidance document and questions and answers document be included in the contract documents.

Bipartisan Infrastructure Law Signage Requirements

~~The Bipartisan Infrastructure Law (BIL) mandates that recipients of BIL funding must install a sign in compliance with the design specifications provided by the United States Environmental Protection Agency (USEPA). These signs should be placed either on the construction site or in a location that is easily visible and directly relevant to the respective construction project. BIL-specific signage is applicable to all construction projects that receive funding under BIL, including those related to Lead Service Line, Emerging Contaminants, and equivalency projects.~~

~~Equivalency projects include projects that receive funding through federal capitalization grants supporting the Water Pollution Control Loan Fund (WPCLF) and the Water Supply Revolving Loan Account (WSRLA) programs. For all BIL-funded and equivalency projects, recipients are responsible for ensuring that a sign is prominently displayed at the construction site. This sign should feature the official "Investing in America" emblem and clearly identify the project as "funded by President Biden's Bipartisan Infrastructure Law."~~

~~These signs must be placed in locations that are easily visible, directly associated with the ongoing work, and they should be maintained in good condition throughout the entire construction period. Signage guidelines and design specifications provided by EPA for using the official Investing in America emblem are available at: <https://www.epa.gov/invest/investing-america-signage>.~~

The following contract requirements are to be included in the construction contract documents but are not required to be submitted to Ohio EPA for contract endorsement.

Violating Facilities Clause

Language prohibiting the use of equipment or services from anyone on the EPA List of Violating Facilities must be included in the contract documents.

Small Businesses in Rural Areas (SBRA)

Language encouraging the participation of small businesses in rural areas should be included in the contract documents.

Prohibition on Telecommunications and Video Surveillance

Restrictions to loan recipients and subrecipients on certain telecommunications and video surveillance services or equipment due to Public Law 115-232.

WPCLF and WSRLA PROJECTS

Regulations and Forms To Be Included with Contract Documents

Insurance Provisions

Section 3.5 of the WPCLF/WSRLA Loan Agreement contains specific requirements regarding insurance for all contractors and all subcontractors for the life of the contract. These insurance requirements must be reflected in the contract documents. Adjust the language as needed to meet the specifics of the construction project while still meeting the provisions of the Loan Agreement.

Materials Testing

In addition to the details included with specific equipment testing in the specifications, there should be an overall statement regarding testing for the project. Adjust the language as needed to meet the specifics of the construction project.

Continuous Treatment Provisions

It is important that construction activities not result in any temporary violations of Drinking Water or NPDES permit requirements (for permitted facilities). Construction activities should interrupt wastewater service to the individual resident as little as possible. For drinking water projects, it is important that construction activities not result in any disruption of service. The example language is intended for construction work occurring at an existing drinking water plant or a WWTP and must be adjusted to meet the specifics of the construction project.

WPCLF/WSRLA Change Order Form

All change orders for the construction project must be executed on the WPCLF/WSRLA change order form. The form must be (1) included in the contract documents and (2) the instructions referenced in the Contract Documents.

The following contract requirements are provided in Ohio Revised Code (ORC). Some loan applicants have local requirements that supersede ORC provisions for competitive bidding, and these local requirements can be applied instead of ORC, except for those requirements specified in the WPCLF/WSRLA loan agreements.

Bid Guarantee

The requirements for a bid guarantee (which can be a bond or a certified check, cashier's check, or letter of credit) are covered in ORC 153.54.

Payment and Performance Bonds

The requirements for a Payment and Performance Bond are covered in ORC 153.54 and Section 3.4 of the WPCLF/WSRLA Loan Agreements.

Payment Retention

The requirement for payment retainage is provided in ORC 153.12. Details on how the escrow account that holds the retainage are provided in ORC 153.13. Further details on how and when to pay for materials delivered and installed are provided in ORC 153.14.

Completion Time

The contract documents must state the length of the contract time per ORC 153.19. The dates for Initiation of Operation and Project Completion are specified in the WPCLF/WSRLA Loan Agreements and need to coincide with the specified contract time.

The following are contract provisions to consider but are not required. The language provided for each are samples only and must be adjusted to reflect the specifics of the project and local needs.

Local Protest Procedure

Some statement as to when a valid protest must be filed, in what form it must be filed and who it must be filed with should be included. ORC 153.12 has some default procedures for handling disputes. If the owner wants more control than provided in ORC, a procedure needs to be spelled out in the Contract Documents.

Basis and Method for Award

The contract documents should include some language that clearly states what the Owner will consider when determining the successful bidder and to provide a clear basis for the Owner when they have a need to reject the low bidder and go with a different bidder.

Payment Methods

To minimize uncertainty and arguments that can slow down the progress of construction it is useful to provide language stating how and when the Contractor will get paid. In addition to ORC and other local requirements, the involvement of public funding Agencies such as the WPCLF, WSRLA, Ohio Public Works Commission and Community Development Block Grant impact the process and timing for payments.

Contract Documents Review

Whenever possible, all the provisions listed above must be included in the contract documents for the project prior to advertisement for bids. Ohio EPA's review for these contract provisions will occur as part of our normal detail plans and specifications review. The bidding documents are to be submitted to Ohio EPA for review regardless of whether a Permit to Install or a Plan Approval is required for the project.

After bidding has started:

In those cases when WPCLF or WSRLA funding is being requested after advertisement for bids has started, add all missing contract provisions, forms, and requirements via addendum.

After bids have been opened but before contracts have been signed:

If the bid advertisement period is over and bids have been opened, but the construction contract have not been signed yet, provide a draft contract change order which would be used to incorporate all missing contract provisions, forms, and requirements into the contract. This should be done in consultation with local legal counsel to address any potential bid protest concerns.

Construction contracts have already been signed:

If the construction contract has already been signed, a contract change order must be executed incorporating all missing contract provisions, forms, and requirements into the contract.

A [Contract Documents Review checklist](#) is provided here to help ensure that all requirements are included and to help expedite Ohio EPA's review of your documents.

Bid Package Submittals

Certain documents must be submitted to Ohio EPA within one week after bids are received, or sooner dependent on your individual project schedule. Please [look here for a complete list](#) of the required submittals.

NOTE: THE CONTRACT LANGUAGE SAMPLES PROVIDED HEREIN ARE EXAMPLES OF WHAT COULD BE INCLUDED IN ALL CONTRACTS THAT USE WPCLF OR WSRLA FUNDS. OHIO EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THESE CLAUSES WITH RESPECT TO STATE OR LOCAL LAW. IT IS IMPERATIVE THAT ANY PARTY INSERTING THESE CLAUSES INTO A CONTRACT VERIFY THAT THEY ARE LEGAL AND ENFORCEABLE ACCORDING TO STATE AND LOCAL LAWS, REGULATIONS, AND ORDINANCES.

Equal Employment Opportunity (EEO) Requirements
(Required Contract Provision)

The Contractor's EEO Certification Form provided on the following page must be:

- (1) included in the contract documents and
- (2) referenced in the Instructions to Bidders, informing bidders that the form must be completed and submitted with their bid.

NOTE: If the loan applicant has its own EEO requirements, local procedures and forms may be substituted for the EPA form.

Contractor Equal Employment Opportunity Certification

During the performance of this contract, the undersigned agrees as follows:

1. The undersigned will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The undersigned will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The undersigned agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this equal opportunity (federally assisted construction) clause.
2. The undersigned will, in all solicitations or advertisements for employees placed by or on behalf of the undersigned, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.
3. The undersigned will send to each labor union or representative of workers, with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representative of the undersigned's commitment under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. The undersigned will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
5. The undersigned will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and relevant orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records and accounts by the administering agency of the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
6. In the event of the undersigned's non-compliance with the equal opportunity (federally assisted construction) clause of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part, and the undersigned may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rules, regulations, or order of the Secretary of Labor, or as provided by law.
7. The undersigned will include this equal opportunity (federally assisted construction) clause in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order No. 11246 of September 24, 1965, so that such provision will be binding upon each subcontract or vendor. The undersigned will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for non compliance: Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor, as a result of such direction by the administering agency the undersigned may request the United States to enter into such litigation to protect the interest of the United States.

(Signature)

(Date)

(Name and Title of Signer, Please type)

(Firm Name)

Debarment Requirements

(Required Contract Provision)

The Certification Regarding Debarment, Suspension, and Other Responsibility Matters form included on the following page must be:

- (1) included in the contract documents and
- (2) referenced in the Instructions to Bidders, informing bidders that the form must be completed and submitted with their bid.

Certification Regarding Debarment, Suspension, and Other Responsibility Matters

INSTRUCTIONS

Under Executive Order 12549 an individual or organization debarred or excluded from participation in Federal assistance or benefit programs may not receive any assistance award under a Federal program or a subagreement thereunder for \$25,000 or more.

Accordingly, each prospective recipient of an EPA grant, loan, or cooperative agreement and any contract or subagreement participant thereunder must complete the attached certification provide an explanation why they cannot. For further details, see the regulation 40 CFR 32.510, Participants' responsibilities.

Go to <https://sam.gov/content/exclusions> to search for excluded parties. The record includes information regarding entities debarred, suspended, proposed for debarment, excluded or disqualified under the nonprocurement common rule, or otherwise declared ineligible from receiving Federal contracts, certain subcontracts, and certain Federal assistance and benefits. This information may include names, addresses, DUNS numbers, Social Security Numbers, Employer Identification Numbers or other Taxpayer Identification Numbers, if available and deemed appropriate and permissible to publish by the agency taking the action.

Where To Submit

The prospective EPA grant, loan, or cooperative agreement recipient must return the signed certification or explanation with its application to Ohio EPA.

A prospective prime contractor must submit a complete certification or explanation to the individual or organization awarding the contract.

Each prospective subcontractor must submit a complete certification or explanation to the prime contractor for the project.

Applicants may reproduce these materials as needed and provide them to their prospective prime contractor, who, in turn, may reproduce and provide them to prospective subcontractors.

Additional copies / assistance may be requested from:

Ohio EPA
Division of Environmental and Financial Assistance
P.O. Box 1049
Columbus, Ohio 43216-1049
(614) 644-2798
www.epa.ohio.gov/defa/

Certification Regarding Debarment, Suspension, and Other Responsibility Matters

The prospective participant certifies to the best of its knowledge and belief that it and its principals:

- (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- (b) Have not within a three year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
- (c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (b) of this certification;
- (d) Have not within a three year period preceding this application / proposal had one or more public transactions (Federal, State, or local) terminated for cause or default; and
- (e) Will not utilize a subcontractor or supplier who is unable to certify (a) through (d) above.

I understand that a false statement on this certification may be grounds for rejection of this proposal or termination of the award. In addition, under 18 USC Sec. 1001, a false statement may result in a fine of up to \$10,000 or imprisonment for up to 5 years, or both.

Type Name & Title of Authorized Representative

Signature of Authorized Representative

Date

☐ I am unable to certify to the above statements. My explanation is attached.

Disadvantaged Business Enterprises (DBE) Utilization

(Required Contract Provision)

USEPA has a program to encourage the participation of disadvantaged businesses in the construction activities funded by the Clean Water and Drinking Water SRF's. "DBE" is an all inclusive term that includes Minority Business Enterprises (MBE), Women Business Enterprises (WBE), Small Business Enterprises (SBE), Small Business in Rural Areas (SBRA), HUBZone Small Business, Labor Surplus Area Firms (LSAF), and other entities defined as socially and/or economically disadvantaged. While the WPCLF and WSRLA strongly encourage participation by all disadvantaged groups, specific participation goals are negotiated with USEPA only for Minority Business Enterprises and Women's Business Enterprises.

Goals

As a condition of receiving capitalization grants from U.S. EPA for the Water Pollution Control Loan Fund (WPCLF) and the Water Supply Revolving Loan Account (WSRLA), the Ohio EPA negotiates "fair share" Disadvantaged Business Enterprises (DBE) objectives with U.S. EPA. The current negotiated goals for construction related activities are 1.3% of all contracts to MBEs and 1.0% of all contracts to WBEs.

DBE Certification

Under the DBE program, qualified DBE's are those that have been certified as an MBE or WBE. Certifications can be obtained from a federal agency such as the Small Business Administration or the Department of Transportation or by an approved State agency. The Unified Certification Program (UCP) administered by the Ohio Department of Transportation (ODOT) can provide the necessary DBE certifications. Information on the UCP can be found at www.ohioucp.org as well as the ODOT website www.dot.state.oh.us/divisions/equalopportunity/pages/dbe.aspx.

DBE Qualifications

To qualify for MBE certification, businesses must be 51 percent owned and controlled by a U.S. citizen and Ohio resident belonging to an African American, Native American, Hispanic, or Asian American ethnic group. In addition, the business must be in operation for at least one year prior to submitting an application. For DBE status, a business must be at least 51 percent owned by a socially and economically disadvantaged person who participates in the daily operations of the business. This person must be a woman or of African-American, Hispanic, Native American, Asian American ethnicity.

Program Requirements

To comply with DBE program requirements the WPCLF/WSRLA loan recipient must do the following:

1. Create and maintain a bidder's list (see description below)

2. Include contract conditions applicable to the DBE program in all procurement contracts entered into by the Borrower for all WPCLF and WSRLA projects. These conditions are listed below.
3. Follow, document, and maintain documentation of good faith efforts on the part of prime contractors to ensure that Disadvantaged Business Enterprises (DBEs) have the opportunity to participate in the project.
4. Review the Form 6100-3 and 6100-4 submittals provided by bidders on the project for completeness and obtain any additional information necessary to verify the certification status of all proposed subcontractors.
5. Obtain documentation of the good faith efforts of the prime contractor if the prime contractor does not meet the MBE or WBE goal.
6. Obtain a written confirmation from any prime contractor states that they will not meet the MBE and WBE goals because they will not be entering into any agreements for goods or services with any company, firm, joint venture, or individual.
7. Submit the following to the Ohio EPA/DEFA as part of the bid package upon which the WPCLF/WSRLA loan amount is determined:
 - Form 6100-3 from each subcontractor
 - Form 6100-4 from each prime contractor
 - a copy of the Good Faith Efforts documentation from any prime contractors that will not meet the MBE and WBE goals,
 - if any of the prime contractors will not meet the MBE and WBE goals because they will not be entering into any agreements for goods or services with any company, firm, joint venture, or individual, a copy of the written confirmation from that prime contractor
8. Report MBE/WBE accomplishments on Form 5700-52A annually (within 15 days after October 1st).

NOTE: It is up to the WPCLF/WSRLA loan recipient whether or not to require completion and submission of Forms 6100-3 and 6100-4 from all bidders with the bid proposal or to accept completion and submission from the successful bidder(s) only at some time after bids are received. Regardless of whether the forms are completed and submitted with the bids or at some later time once the successful bidders are identified, completed forms are to be submitted to Ohio EPA with the bid package.

To comply with DBE program requirements all prime contractors must do the following:

1. Follow, document, and maintain documentation of their good faith efforts.
2. Complete and submit **Form 6100-4 DBE Subcontractor Utilization Summary** as part of the bid proposal package to the loan recipient.
3. Have its Disadvantaged Business Enterprise subcontractors complete **Form 6100-3 DBE Subcontractor Proposed Performance Form** and submit those as part of the bid proposal package to the loan recipient.
4. Provide **Form 6100-2 DBE Subcontractor Actual Participation Form** to all of its Disadvantaged Business Enterprise subcontractors for completion at the end of the work.
5. During construction, provide the data necessary so that the loan recipient can report MBE/WBE accomplishments on Form 5700-52A annually (within 15 days after October 1st).

Bidders List

The Borrower must create, maintain, and use a bidders list for purposes of soliciting both MBE/WBEs and non-MBE/WBEs during procurement of construction, equipment, supplies, and services. This list shall include:

1. Entity's name with point of contact;
2. Entity's mailing address, telephone number, and e-mail address;
3. The procurement on which the entity bid or quoted, and when; and
4. Entity's status as an MBE/WBE or non-MBE/WBE.

Borrowers that receive less than \$250,000 or less in any one fiscal year can be exempt from maintaining a Bidders List.

The Bidders List shall be maintained until the project period has expired and the Borrower is no longer receiving EPA funding. The Bidders List must include all firms that bid on the prime contracts, or bid or gave a quote on subcontracts, including both MBE/WBEs and non-MBE/WBEs.

Required Contract Conditions

The DBE Specification language and instructions to the bidders and Forms 6100-2, 6100-3 and 6100-4 must be included in the contract documents and referenced in the Instructions to Bidders, informing bidders that the forms must be completed and submitted with their bid for all WPCLF and WSRLA projects:

1. The prime contractor must pay its subcontractor for satisfactory performance no more than 30 days from the prime contractor's receipt of payment from the owner.
2. The prime contractor must notify the owner in writing prior to the termination of any Disadvantage Business Enterprise subcontractor for convenience by the prime contractor.
3. If a Disadvantage Business Enterprise contractor fails to complete work under the subcontract for any reason, the prime contractor must employ the six Good Faith Efforts (listed below) if soliciting a replacement contractor.
4. The prime contractor must employ the six Good Faith Efforts even if the prime contractor has achieved its fair share objectives.
5. An owner must ensure that each procurement contract it awards contains the following terms and conditions:

The contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The contractor shall carry out applicable requirements of 40 CFR Part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies.

Good Faith Efforts

Borrowers and their prime contractors must follow, document, and maintain documentation of their good faith efforts as listed below to ensure that Disadvantaged Business Enterprises (DBEs) have the opportunity to participate in the project by increasing DBE awareness of procurement efforts and outreach.

1. Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities; including DBEs on solicitation lists and soliciting them whenever they are potential sources.
2. Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitation for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
3. Consider in the contracting process whether firms competing for large contracts could be subcontracted with DBEs. This will include dividing total requirements when economically feasible into smaller tasks or quantities to permit participation by DBEs in the competitive process.
4. Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.
5. Use the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce.
6. If the prime contractor awards subcontracts, require the prime contractor to take the steps in numbers 1 through 5 above.

DBE Forms

Form 6100-3 – Each prime contractor must have its DBE subcontractors complete **Form 6100-3 DBE Subcontractor Proposed Performance Form**. This form gives the DBE subcontractor the opportunity to report the scope and cost of the subcontract and it should be forwarded to the Prime Contractor along with the DBE's quote. Each subcontractor completes one Form 6100-3. The Borrower must submit all Form 6100-3 forms to the Ohio EPA/DEFA as part of the bid package upon which the WPCLF/WSRLA loan amount is determined.

Form 6100-4 – Each prime contractor must complete and submit **Form 6100-4 DBE Subcontractor Utilization Summary** as part of the prime contractor's bid proposal package to the Borrower. This form summarizes the Prime Contractor's intended use of identified DBE(s) and the estimated dollar amount of each subcontract. Only one Form 6100-4 form is required from each Prime Contractor. The Borrower must submit this form to the Ohio EPA/DEFA as part of the bid package upon which the WPCLF/WSRLA loan amount is determined.

Form 6100-2 - The prime contractor must provide **Form 6100-2 DBE Subcontractor Actual Participation Form** to all of its Disadvantaged Business Enterprise subcontractors.

This form gives the DBE subcontractor the opportunity to describe the work the DBE received from the Prime Contractor, how much the DBE was paid and any other concerns the DBE might have. Disadvantaged Business Enterprise subcontractors must send completed Form 6100-2 directly to the Region 5 DBE Coordinator after the work by the subcontractor is done and is NOT submitted with the bid package to Ohio EPA.

Region 5 MBE/WBE Coordinator
USEPA, Acquisition and Assistance Branch
77 West Jackson Boulevard (MC-10J)
Chicago, IL 60604

Reporting During Construction – Form 5700-52A

The purpose of MBE/WBE reporting is to monitor the grant recipient's accomplishments in utilizing MBEs and WBEs; and adherence to the good faith efforts (i.e., outreach to MBEs, WBEs, and other DBEs); and progress in achieving MBE and WBE Goals. During the progress of the construction project, the loan recipient must complete & submit Form 5700-52A annually (**within 15 days after October 1st**). If there were no MBEs or WBEs utilized, or no procurement expenditures of any kind were made during the reporting period, a "negative report" is still required.

Reports are to be sent to:

Florel Fraser, Ohio EPA – DEFA
P.O. Box 1049
Columbus, OH 43216-1049
E-mail address: Florel.Fraser@epa.ohio.gov
Phone: (614) 644-3636

**Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form**

This form is intended to capture the DBE¹ subcontractor's² description of work to be performed and the price of the work submitted to the prime contractor. An EPA Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractors bid or proposal package.

Subcontractor Name		Project Name	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact	
Address			
Telephone No.		Email Address	
Prime Contractor Name		Issuing/Funding Entity:	

Contract Item Number	Description of Work Submitted to the Prime Contractor Involving Construction, Services , Equipment or Supplies	Price of Work Submitted to the Prime Contractor
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> DBE Certified By: <input type="radio"/> ODOT <input type="radio"/> DAS/EDGE <input type="radio"/> Other: _____ </div> <div style="width: 50%;"> Meets/ exceeds EPA certification standards? <input type="radio"/> YES <input type="radio"/> NO <input type="radio"/> Unknown </div> </div>		

¹ A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

² Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

**Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form**

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 I.

Prime Contractor Signature	Print Name
Title	Date

Subcontractor Signature	Print Name
Title	Date

**Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Utilization Form**

This form is intended to capture the prime contractor's actual and/or anticipated use of identified certified DBE¹ subcontractors² and the estimated dollar amount of each subcontract. An EPA Financial Assistance Agreement Recipient must require its prime contractors to complete this form and include it in the bid or proposal package. Prime contractors should also maintain a copy of this form on file.

Prime Contractor Name		Project Name	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact	
Address			
Telephone No.		Email Address	
Issuing/Funding Entity:			

I have identified potential DBE certified subcontractors	___YES___NO		
If yes, please complete the table below. If no, please explain:			
Subcontractor Name/ Company Name	Company Address/ Phone/ Email	Est. Dollar Amt.	Currently DBE Certified?

Continue on back if needed

¹ A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

² Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

**Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Utilization Form**

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 I.

Prime Contractor Signature	Print Name
Title	Date

**Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Participation Form**

An EPA Financial Assistance Agreement Recipient must require its prime contractors to provide this form to its DBE subcontractors. This form gives a DBE¹ subcontractor² the opportunity to describe work received and/or report any concerns regarding the EPA-funded project (e.g., in areas such as termination by prime contractor, late payments, etc.). The DBE subcontractor can, as an option, complete and submit this form to the EPA DBE Coordinator at any time during the project period of performance.

Subcontractor Name		Project Name	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact	
Address			
Telephone No.		Email Address	
Prime Contractor Name		Issuing/Funding Entity:	

Contract Item Number	Description of Work Received from the Prime Contractor Involving Construction, Services , Equipment or Supplies	Amount Received by Prime Contractor

¹ A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

² Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

Disadvantaged Business Enterprise (DBE) Program DBE Subcontractor Participation Form

Please use the space below to report any concerns regarding the above EPA-funded project:

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

Subcontractor Signature	Print Name
Title	Date

ALERT

“Total Procurement” fields and “MBE/WBE Combined Procurement” fields located in section 4B of this form should include Federal funds provided under the assistance agreement, recipient matching funds, and funds from other sources that are included in the assistance agreement.

Due to process time of Paperwork Reduction Act procedures, EPA is not able to update the [EPA Form 5700-52A](#) immediately to reflect this clarification.

If EPA grant recipients have questions about [EPA Form 5700-52A](#), please work with your respective Grants Specialist or [DBE Coordinator](#).



U.S. ENVIRONMENTAL PROTECTION AGENCY MBE/WBE UTILIZATION UNDER FEDERAL GRANTS AND COOPERATIVE AGREEMENTS

This collection of information is approved by OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. (OMB Control No. 2030-0020). Responses to this collection of information are required to obtain an assistance agreement (40 CFR Part 30, 40 CFR Part 31, and 40 CFR Part 33 for awards made prior to December 26, 2014, and 2 CFR 200, 2 CFR 1500, and 40 CFR Part 33 for awards made after December 26, 2014). An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The public reporting and recordkeeping burden for this collection of information is estimated to be 1 hour per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates and any suggested methods for minimizing respondent burden to the Regulatory Support Division Director, U.S. Environmental Protection Agency (2821T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

1A. REPORTING PERIOD October 1, — September 30,				1B. REPORT TYPE <input type="checkbox"/> Annual <input type="checkbox"/> Final Report (Project completed)	
1C: Revision of a Prior Year Report? <input type="radio"/> No <input type="radio"/> Yes If yes, what reporting period is being revised and briefly describe the changes made. Note: The revised report will replace the associated original report in its entirety.					
2A. RECIPIENT UNIQUE ENTITY IDENTIFIER					
2B. RECIPIENT REPORTING CONTACT Name: Email: Phone:					
3. FEDERAL AWARD IDENTIFICATION NUMBER (FAIN) (For SRF state recipients, please include all numbers for all open assistance agreements being reported on this form.)					
4A. If NO procurements were made this reporting period (by the recipient, sub-recipient(s), loan recipient(s), and prime contractor(s)), CHECK and SKIP to Block No. 6. (Procurements are all expenditures through contract, order, purchase, lease or barter of supplies, equipment, construction, or services needed to complete Federal assistance programs.) <input type="checkbox"/>					
4B. Total Procurements & MBE/WBE Accomplishments This Reporting Period (in dollars)					
	Construction	Non-Construction	Total		
Total Procurement:	\$ _____	\$ _____	\$ _____		
MBE/WBE Combined Procurement:	\$ _____	\$ _____	\$ _____		
5A. Good Faith Efforts: If procurements were made, indicate whether your organization has followed the six Good Faith efforts found in 40 CFR Part 33, Subpart C, 40 CFR 33.501 and 2 CFR 200.321. <input type="checkbox"/> Yes, my organization has implemented and documented each of the six Good Faith Efforts on the procurements made during this reporting period. <input type="checkbox"/> No, my organization has not implemented and documented each of the six Good Faith Efforts on the procurements made during this reporting period.			5B. If procurements were made, but no MBE/WBE procurements are being reported, then check the applicable box(es) for the reason(s) why no MBE/WBE procurements were made. <input type="checkbox"/> No MBE/WBE(s) applied <input type="checkbox"/> No MBE/WBE(s) were qualified <input type="checkbox"/> Other:		
6. NAME OF RECIPIENT'S AUTHORIZED REPRESENTATIVE			TITLE		
7. SIGNATURE OF RECIPIENT'S AUTHORIZED REPRESENTATIVE			DATE		

Instructions:

A. General Instructions:

MBE/WBE utilization is based on 40 CFR Part 33 and 2 CFR Parts 200 and 1500. The reporting requirement reflects the change in the reporting threshold described in Recipient/ Applicant Information Notice-2018-G04 issued by EPA's Office of Grants and Debarment on September 7, 2018 (<https://www.epa.gov/grants/rain-2018-g04>). EPA Form 5700-52A must be completed annually by recipients of financial assistance agreements where the combined total of funds budgeted for procuring supplies, equipment, construction and services exceeds the current Simplified Acquisition Threshold as set by the Federal Acquisition Regulation at 48 CFR Subpart 2.1. This reporting requirement applies to all new and existing awards and voids all previous reporting requirements.

In determining whether the threshold is exceeded for a particular assistance agreement, the analysis must focus on funds budgeted for procurement under the supplies, equipment, construction, services or "other" categories, and include funds budgeted for procurement under sub- awards or loans.

Reporting will also be required in cases where the details of the budgets of sub-awards/loans are not clear at the time of the grant awards and the combined total of the procurement and sub-awards and/or loans exceeds the Simplified Acquisition Threshold.

For example, if the Simplified Acquisition Threshold is \$250,000, then if a recipient has \$300,000 budgeted under procurement, then completion of this report is required.

When reporting is required, all procurement actions are reportable, not just the portion which exceeds the Simplified Acquisition Threshold.

If at the time of award the budgeted funds exceed the Simplified Acquisition Threshold but actual expenditures fall below, a report is still required.

If at the time of award, the combined total of funds budgeted for procurements in any category is less than or equal to the Simplified Acquisition Threshold and is

maintained below the threshold, no DBE report is required to be submitted.

Recipients are required to report 30 days after the end of each federal fiscal year (i.e. October 30th), per the terms and conditions of the financial assistance agreement.

Final reports are due October 30th or 120 days after the end of the project period, whichever comes first.

MBE/WBE program requirements, including reporting, are material terms and conditions of the financial assistance agreement. Failure to comply may lead to termination of the financial assistance agreement which is then reported to the OMB-designated integrity and performance system accessible through SAM (currently FAPIIS) pursuant to 2 CFR 200.339(b).

B. Submission:

Recipients must submit completed forms to the point of contact associated with the awarding office for the applicable assistance agreement.

Information on specific points of contact for EPA's Headquarters and ten Regional Offices is located at:

<https://www.epa.gov/grants/frequently-asked-questions-disadvantaged-business-enterprises>

Questions regarding the completion of this form should be directed to the DBE Coordinator associated with the awarding office for the applicable assistance agreement. A list of the DBE Coordinators for each awarding office can be located here:

<https://www.epa.gov/grants/epa-dbe-program-coordinators>

c. Instructions:

1A. Specify Federal fiscal year this report covers. The Federal fiscal year runs from October 1st through September 30th (**e.g. November 29, 2020 falls within Federal fiscal year 2021**)

1B. Specify report type. Check the annual reporting box if this is an annual report. If it is a final report, check the final report box to indicate if the project is completed.

1C. Indicate if this is a revision to a previous year and provide a brief description of the revision you are making including what reporting period is being revised. The revised report will replace the associated original report in its entirety.

2A. Provide your organization's Unique Entity Identifier. More information about Unique Entity Identifier, including its meaning, can be found in 2 CFR Part 25.

2B. Identify the name and contact information for the person located within the recipient organization that can be contacted if questions arise from this report.

3. Provide the Federal Award Identification Number (FAIN) assigned by EPA. A separate report must be submitted for each Assistance Agreement.

***For SRF recipients:** In box 3 list numbers for ALL OPEN Assistance Agreements being reported on this form.

4A. Self-explanatory. **Note:** Procurement means expenditures under the supplies, equipment, construction, services or "other" categories, and include funds expended for procurement under sub-awards or loans.

4B. Provide the total dollar amount (in dollars) of **ALL** procurements awarded this reporting period by construction, non-construction, and grand total by the recipient, sub-recipients, and SRF loan recipients, **including** MBE/WBE expenditures, not just the portion which exceeds the threshold. For example: Actual dollars for procurement from the procuring office; actual contracts let from the contracts office; actual goods, services, supplies, etc., from other sources including the central purchasing/ procurement centers).

Provide the total dollar amount (in dollars) of MBE/WBE procurements **ONLY** awarded this reporting period by construction, non-construction, and grand total by the recipient, sub-recipients, SRF loan recipients, and prime contractors not just the portion which exceeds the threshold.

***For SRF recipients only:** In 4B, please enter the total annual procurement amount under all of your SRF Assistance Agreements. The figure reported in this section is **not** directly tied to an individual Assistance Agreement identification number. **(SRF state recipients report state procurements in this section)**

5A. Self-explanatory.

5B. If procurements were made during this reporting period, but no procurements with MBE(s) or WBE(s) are being reported, then select the reason why. If "Other" is chosen, please fill in with the reason.

6. Self-explanatory.

7. Self-explanatory.

****This data is requested to comply with provisions mandated by: statute or regulations (40 CFR Part 33 and/or 2 CFR Parts 200 and 1500); OMB Circulars; or added by EPA to ensure sound and effective assistance management. Accurate, complete data are required to obtain funding, while no pledge of confidentiality is provided.**

Davis-Bacon Wage Rate Requirements

(required contract provision)

Background and Applicability

On October 30, 2009, P.L. 111-88, "Making appropriations for the Department of the Interior, environment, and related agencies for the fiscal year ending September 30, 2010, and for other purposes," was enacted. This law provides appropriations for both the Clean Water State Revolving Fund (CWSRF) and the Drinking Water State Revolving Fund (DWSRF) for Fiscal Year 2010, while adding new requirements to these already existing programs. One new requirement requires the application of Davis-Bacon Act requirements.

Application of the Davis-Bacon Act requirements extend not only to assistance agreements funded with Fiscal Year 2010 appropriations, but to all assistance agreements executed on or after October 30, 2009, whether the source of the funding is prior year's appropriations, state match, bond proceeds, interest earnings, principal repayments, or any other source of funding so long as the project is financed by an SRF assistance agreement. If a project began construction prior to October 30, 2009 but is financed or refinanced through an assistance agreement executed on or after October 30, 2009, Davis-Bacon Act requirements will apply to all construction that occurs on or after October 30, 2009, through completion of construction.

Ohio EPA Responsibilities

With respect to the Water Pollution Control Loan Fund (WPCLF) and Water Supply Revolving Loan Account (WSRLA) revolving funds, EPA provides capitalization grants to each State which in turn provides funding assistance to eligible recipients within the State. Typically, the assistance recipients are municipal or other local governmental entities that manage the funds. Occasionally, the assistance recipients may be a private for profit or not for profit entity. Although EPA and the State are responsible for ensuring assistance recipients incorporate the wage rate requirements set forth herein as part of contracts for WPCLF and WSRLA funding, the assistance recipient has the primary responsibility to maintain payroll records and for compliance with Davis-Bacon Act requirements as described below.

Municipal Or Other Local Governmental Entities Recipient's Responsibilities

The following is intended to help assistance recipients understand and meet their obligations related to Davis-Bacon (DB). Each assistance recipients should, however, review the contract/subcontract requirements that are set forth later in this document for a more full understanding of DB obligations.

Prior to advertising for bids:

- > Obtain the wage determination for the locality in which a covered activity subject to DB will take place from the Department of Labor (DOL) at www.wdol.gov.
- > Incorporate these wage determinations into the request for bids.
- > Include the required contract provisions (see below) into the contract documents.
- > Require prime contracts to include provisions that subcontractors follow the wage determination incorporated into the prime contract.

During the advertisement period:

- > Monitor www.wdol.gov on a weekly basis to ensure that the wage determination contained in the request for bids remains current.
- > If DOL modifies the DB wage determination more than 10 days prior to the bid opening, issue an addendum reflecting the modification.
- > If DOL modifies or supersedes the DB wage determination less than 10 days prior to bid opening and you cannot issue an addendum for the change, you must request a finding from Ohio EPA that there is not reasonable time to notify interested contractors of the modification of the wage determination. The Ohio EPA will give you a report of its findings.

After opening bids:

- > If the contract(s) aren't awarded within 90 days of the bid opening you must monitor www.wdol.gov on a weekly basis to ensure that wage determinations used in the bids remain current.
- > If the contract(s) aren't awarded within 90 days of the bid opening, any modifications or supersedes that DOL makes to the wage determination must be incorporated into the contract unless (1) you request an extension from Ohio EPA AND (2) Ohio EPA obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv).

After contracts are signed and during construction:

- > Review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.
- > DOL may issue a revised wage determination applicable to one or all of your contracts after the award of the contract or execution of the change order which incorporated DB requirements into the contract if DOL determines that you have failed to incorporate a wage determination or have used a wage determination that clearly does not apply to the contract. If this occurs, you shall either terminate the contract or change order and rebid the contract OR incorporate DOL's wage determination retroactive to the beginning of the contract by change order. The contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.
- > Periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. You must use Standard Form 1445 or equivalent documentation to memorialize the interviews.
- > Establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, you must:
 - conduct all interviews in confidence.
 - conduct interviews with a representative group of covered employees within two weeks of each contractor or subcontractor's submission of its initial weekly payroll data and two weeks prior to the estimated completion date for the contract or subcontract.
 - conduct more frequent interviews if the initial interviews or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB.
 - immediately conduct necessary interviews in response to an alleged violation of the prevailing wage requirements.
- > Periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. You must:
 - establish and follow a spot check schedule based on your assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract.
 - spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract at a minimum.
 - conduct more frequent spot checks if the initial spot check or other information indicates that there

is a risk that the contractor or subcontractor is not complying with DB.

- during the examinations, verify evidence of fringe benefit plans and payments thereunder by contractors and subcontractors who claim credit for fringe benefit contributions.

> Periodically review contractors' and subcontractors' use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the DOL or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews.

> Immediately report potential violations of the DB prevailing wage requirements to Andrew Lausted at EPA Region V at 312-886-0189 and to the appropriate DOL Wage and Hour District Office listed at <http://www.dol.gov/esa/contacts/whd/america2.htm>.

If contracts have already been signed and DB requirements need to be incorporated:

> If contracts have already been signed prior to WPCLF/WSRLA funding being provided, you must issue a change order, task order, work assignment or similar legally binding instrument and incorporate the appropriate DOL wage determination from www.wdol.gov as well as the required contract provisions into the contract(s).

> Initiate the contractor and subcontractor review and wage interview requirements as described above and provided in the **Contract And Subcontract Provisions**.

**Private For Profit Or Not For Profit (Non-Governmental) Entities
Recipient's Responsibilities**

The requirements, responsibilities and contract provisions for Private For Profit or Not For Profit Entities (Non-Governmental Entities) is exactly the same as for Municipal Or Other Local Governmental Entities EXCEPT for the following:

Prior to advertising for bids:

> Obtain the proposed wage determinations for specific localities from www.wdol.gov.

> Submit the wage determination to Ohio EPA for approval prior to inserting the wage determination into the solicitation unless subsequently directed otherwise by Ohio EPA.

Contract And Subcontract Provisions For Contracts In Excess Of \$2,000

The following language must be included in full in any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a public building or public work, or building or work financed in whole or in part with WPCLF or WSRLA funds and which is subject to the labor standards provisions of any of the acts listed in §5.1:

NOTE: Modify the first sentence to include the name of the WPCLF/WSRLA funding recipient prior to including these provisions in the contract documents.

Wage Rate Requirements

As used in these provisions "subrecipient" means _____ (fill in WPCLF/WSRLA funding recipient name here).

(a) The following applies to any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a public building or public

work, or building or work financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1.

(1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Subrecipients may obtain wage determinations from the U.S. Department of Labor's web site, www.wdol.gov.

(ii)(A) The subrecipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The EPA award official shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the subrecipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the subrecipient(s) to the State award official. The State award official will transmit the report, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department

of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the and the subrecipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the questions, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account asset for the meeting of obligations under the plan or program.

(2) Withholding. The subrecipient(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the

plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the subrecipient, that is, the entity that receives the subgrant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the subrecipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the subrecipient(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the subrecipient(s).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees --

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe

benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may be appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and subrecipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

Contract Provision For Contracts In Excess Of \$100,000 And Subject To The Overtime Provisions Of The Contract Work Hours And Safety Standards Act

The following language must be included in full in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These provisions are to be included in addition to the provisions for contracts in excess of \$2,000. As used in these paragraphs, the terms laborers and mechanics include watchmen and guards.

(b) Contract Work Hours and Safety Standards Act. The following applies to any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. As used in these paragraphs, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a)(1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

(3) Withholding for unpaid wages and liquidated damages. The subrecipient, upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

Contract Provision For Contracts In Excess Of \$100,000 Subject ONLY To The Contract Work Hours And Safety Standards Act

In addition to the provisions for contracts in excess of \$2,000, for any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, you must insert clauses requiring:

(c) The following applies to any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1.

The contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid.

The records shall be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the Ohio EPA, EPA and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

AMERICAN IRON AND STEEL ACKNOWLEDGEMENT

The Contractor acknowledges to and for the benefit of the City of _____ (“Purchaser”) and the State of Ohio (the “State”) that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund and/or Drinking Water State Revolving Fund that have statutory requirements commonly known as “American Iron and Steel;” that requires all of the iron and steel products used in the project to be produced in the United States (“American Iron and Steel Requirement”) including iron and steel products provided by the Contractor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser or State to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney’s fees) incurred by the Purchaser or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Purchaser). While the Contractor has no direct contractual privity with the State, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State.

Signature

Date

Name and Title of Authorized Signatory, Please Print or Type

Bidder’s Firm

- ☐ Check here if the WPCLF or WSRLA applicant will be requesting an individual waiver for non-American made iron and steel products. Please note that the waiver box does not need to be marked for nationwide waivers.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 20 2014

OFFICE OF WATER

MEMORANDUM

SUBJECT: Implementation of American Iron and Steel provisions of P.L. 113-76, Consolidated Appropriations Act, 2014

FROM: f (Andrew D. Sawyers, Director C.
1) Office of Wastewater Management (4201M)

Peter C. Grevatt, Director
Office of Ground Water and Drinking Water (4601M)

TO: Water Management Division Directors
Regions I - X

P.L. 113-76, Consolidated Appropriations Act, 2014 (Act), includes an "American Iron and Steel (AIS)" requirement in section 436 that requires Clean Water State Revolving Loan Fund (CWSRF) and Drinking Water State Revolving Loan Fund (DWSRF) assistance recipients to use iron and steel products that are produced in the United States for projects for the construction, alteration, maintenance, or repair of a public water system or treatment works if the project is funded through an assistance agreement executed beginning January 17, 2014 (enactment of the Act), through the end of Federal Fiscal Year 2014.

Section 436 also sets forth certain circumstances under which EPA may waive the AIS requirement. Furthermore, the Act specifically exempts projects where engineering plans and specifications were approved by a State agency prior to January 17, 2014.

The approach described below explains how EPA will implement the AIS requirement. The first section is in the form of questions and answers that address the types of projects that must comply with the AIS requirement, the types of products covered by the AIS requirement, and compliance. The second section is a step-by-step process for requesting waivers and the circumstances under which waivers may be granted.

Implementation

The Act states:

Sec. 436. (a)(1) None of the funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j–12) shall be used for a project for the construction, alteration, maintenance, or repair of a public water system or treatment works unless all of the iron and steel products used in the project are produced in the United States.

(2) In this section, the term “iron and steel products” means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(b) Subsection (a) shall not apply in any case or category of cases in which the Administrator of the Environmental Protection Agency (in this section referred to as the “Administrator”) finds that—

(1) applying subsection (a) would be inconsistent with the public interest;

(2) iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or

(3) inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

(c) If the Administrator receives a request for a waiver under this section, the Administrator shall make available to the public on an informal basis a copy of the request and information available to the Administrator concerning the request, and shall allow for informal public input on the request for at least 15 days prior to making a finding based on the request. The Administrator shall make the request and accompanying information available by electronic means, including on the official public Internet Web site of the Environmental Protection Agency.

(d) This section shall be applied in a manner consistent with United States obligations under international agreements.

(e) The Administrator may retain up to 0.25 percent of the funds appropriated in this Act for the Clean and Drinking Water State Revolving Funds for carrying out

the provisions described in subsection (a)(1) for management and oversight of the requirements of this section.

(f) This section does not apply with respect to a project if a State agency approves the engineering plans and specifications for the project, in that agency's capacity to approve such plans and specifications prior to a project requesting bids, prior to the date of the enactment of this Act.

The following questions and answers provide guidance for implementing and complying with the AIS requirements:

Project Coverage

1) What classes of projects are covered by the AIS requirement?

All treatment works projects funded by a CWSRF assistance agreement, and all public water system projects funded by a DWSRF assistance agreement, from the date of enactment through the end of Federal Fiscal Year 2014, are covered. The AIS requirements apply to the entirety of the project, no matter when construction begins or ends. Additionally, the AIS requirements apply to all parts of the project, no matter the source of funding.

2) Does the AIS requirement apply to nonpoint source projects or national estuary projects?

No. Congress did not include an AIS requirement for nonpoint source and national estuary projects unless the project can also be classified as a 'treatment works' as defined by section 212 of the Clean Water Act.

3) Are any projects for the construction, alteration, maintenance, or repair of a public water system or treatment works excluded from the AIS requirement?

Any project, whether a treatment works project or a public water system project, for which engineering plans and specifications were approved by the responsible state agency prior to January 17, 2014, is excluded from the AIS requirements.

4) What if the project does not have approved engineering plans and specifications but has signed an assistance agreement with a CWSRF or DWSRF program prior to January 17, 2014?

The AIS requirements do not apply to any project for which an assistance agreement was signed prior to January 17, 2014.

5) What if the project does not have approved engineering plans and specifications, but bids were advertised prior to January 17, 2014 and an assistance agreement was signed after January 17, 2014?

If the project does not require approved engineering plans and specifications, the bid advertisement date will count in lieu of the approval date for purposes of the exemption in section 436(f).

6) What if the assistance agreement that was signed prior to January 17, 2014, only funded a part of the overall project, where the remainder of the project will be funded later with another SRF loan?

If the original assistance agreement funded any construction of the project, the date of the original assistance agreement counts for purposes of the exemption. If the original assistance agreement was only for planning and design, the date of that assistance agreement will count for purposes of the exemption only if there is a written commitment or expectation on the part of the assistance recipient to fund the remainder of the project with SRF funds.

7) What if the assistance agreement that was signed prior to January 17, 2014, funded the first phase of a multi-phase project, where the remaining phases will be funded by SRF assistance in the future?

In such a case, the phases of the project will be considered a single project if all construction necessary to complete the building or work, regardless of the number of contracts or assistance agreements involved, are closely related in purpose, time and place. However, there are many situations in which major construction activities are clearly undertaken in phases that are distinct in purpose, time, or place. In the case of distinct phases, projects with engineering plans and specifications approval or assistance agreements signed prior to January 17, 2014 would be excluded from AIS requirements while those approved/signed on January 17, 2014, or later would be covered by the AIS requirements.

8) What if a project has split funding from a non-SRF source?

Many States intend to fund projects with “split” funding, from the SRF program and from State or other programs. Based on the Act language in section 436, which requires that American iron and steel products be used in any project for the construction, alteration, maintenance, or repair of a public water system or treatment works receiving SRF funding between and including January 17, 2014 and September 30, 2014, any project that is funded in whole or in part with such funds must comply with the AIS requirement. A “project” consists of all construction necessary to complete the building or work regardless of the number of contracts or assistance agreements involved so long as all contracts and assistance agreements awarded are closely related in purpose, time and place. This precludes the intentional splitting of SRF projects into separate and smaller contracts or assistance agreements to avoid AIS coverage on some portion of a larger project, particularly where the activities are integrally and proximately related to the whole. However, there are many situations in which major construction activities are clearly undertaken in separate phases that are distinct in purpose, time, or place, in which

case, separate contracts or assistance agreement for SRF and State or other funding would carry separate requirements.

9) What about refinancing?

If a project began construction, financed from a non-SRF source, prior to January 17, 2014, but is refinanced through an SRF assistance agreement executed on or after January 17, 2014 and prior to October 1, 2014, AIS requirements will apply to all construction that occurs on or after January 17, 2014, through completion of construction, unless, as is likely, engineering plans and specifications were approved by a responsible state agency prior to January 17, 2014. There is no retroactive application of the AIS requirements where a refinancing occurs for a project that has completed construction prior to January 17, 2014.

10) Do the AIS requirements apply to any other EPA programs, besides the SRF program, such as the Tribal Set-aside grants or grants to the Territories and DC?

No, the AIS requirement only applies to funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j-12)

Covered Iron and Steel Products

11) What is an iron or steel product?

For purposes of the CWSRF and DWSRF projects that must comply with the AIS requirement, an iron or steel product is one of the following made primarily of iron or steel that is permanently incorporated into the public water system or treatment works:

- Lined or unlined pipes or fittings;
- Manhole Covers;
- Municipal Castings (defined in more detail below);
- Hydrants;
- Tanks;
- Flanges;
- Pipe clamps and restraints;
- Valves;
- Structural steel (defined in more detail below);
- Reinforced precast concrete; and
- Construction materials (defined in more detail below).

12) What does the term ‘primarily iron or steel’ mean?

‘Primarily iron or steel’ places constraints on the list of products above. For one of the listed products to be considered subject to the AIS requirements, it must be made of greater than 50% iron or steel, measured by cost. The cost should be based on the material costs.

13) Can you provide an example of how to perform a cost determination?

For example, the iron portion of a fire hydrant would likely be the bonnet, body and shoe, and the cost then would include the pouring and casting to create those components. The other material costs would include non-iron and steel internal workings of the fire hydrant (i.e., stem, coupling, valve, seals, etc). However, the assembly of the internal workings into the hydrant body would not be included in this cost calculation. If one of the listed products is not made primarily of iron or steel, United States (US) provenance is not required. An exception to this definition is reinforced precast concrete, which is addressed in a later question.

14) If a product is composed of more than 50% iron or steel, but is not listed in the above list of items, must the item be produced in the US? Alternatively, must the iron or steel in such a product be produced in the US?

The answer to both question is no. Only items on the above list must be produced in the US. Additionally, the iron or steel in a non-listed item can be sourced from outside the US.

15) What is the definition of steel?

Steel means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of steel covers carbon steel, alloy steel, stainless steel, tool steel and other specialty steels.

16) What does ‘produced in the United States’ mean?

Production in the United States of the iron or steel products used in the project requires that all manufacturing processes, including application of coatings, must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives. All manufacturing processes includes processes such as melting, refining, forming, rolling, drawing, finishing, fabricating and coating. Further, if a domestic iron and steel product is taken out of the US for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components

do not have to be of domestic origin.

17) Are the raw materials used in the production of iron or steel required to come from US sources?

No. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-US sources.

18) If an above listed item is primarily made of iron or steel, but is only at the construction site temporarily, must such an item be produced in the US?

No. Only the above listed products made primarily of iron or steel, permanently incorporated into the project must be produced in the US. For example trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

19) What is the definition of ‘municipal castings’?

Municipal castings are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and surface infrastructure. They are typically made of grey or ductile iron, or steel. Examples of municipal castings are:

- Access Hatches;
- Ballast Screen;
- Benches (Iron or Steel);
- Bollards;
- Cast Bases;
- Cast Iron Hinged Hatches, Square and Rectangular;
- Cast Iron Riser Rings;
- Catch Basin Inlet;
- Cleanout/Monument Boxes;
- Construction Covers and Frames;
- Curb and Corner Guards;
- Curb Openings;
- Detectable Warning Plates;
- Downspout Shoes (Boot, Inlet);
- Drainage Grates, Frames and Curb Inlets;
- Inlets;
- Junction Boxes;
- Lampposts;
- Manhole Covers, Rings and Frames, Risers;

Meter Boxes;
Service Boxes;
Steel Hinged Hatches, Square and Rectangular;
Steel Riser Rings;
Trash receptacles;
Tree Grates;
Tree Guards;
Trench Grates; and
Valve Boxes, Covers and Risers.

20) What is ‘structural steel’?

Structural steel is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees and zees. Other shapes include H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

21) What is a ‘construction material’ for purposes of the AIS requirement?

Construction materials are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered “structural steel”. This includes, but is not limited to, the following products: wire rod, bar, angles, concrete reinforcing bar, wire, wire cloth, wire rope and cables, tubing, framing, joists, trusses, fasteners (i.e., nuts and bolts), welding rods, decking, grating, railings, stairs, access ramps, fire escapes, ladders, wall panels, dome structures, roofing, ductwork, surface drains, cable hanging systems, manhole steps, fencing and fence tubing, guardrails, doors, and stationary screens.

22) What is not considered a ‘construction material’ for purposes of the AIS requirement?

Mechanical and electrical components, equipment and systems are not considered construction materials. Mechanical equipment is typically that which has motorized parts and/or is powered by a motor. Electrical equipment is typically any machine powered by electricity and includes components that are part of the electrical distribution system.

The following examples (including their appurtenances necessary for their intended use and operation) are NOT considered construction materials: pumps, motors, gear reducers, drives (including variable frequency drives (VFDs)), electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators), mixers, gates, motorized screens (such as traveling screens), blowers/aeration equipment, compressors, meters, sensors, controls and switches, supervisory control and data acquisition (SCADA), membrane bioreactor systems, membrane filtration systems, filters, clarifiers and clarifier mechanisms, rakes, grinders, disinfection systems, presses (including belt presses), conveyors, cranes, HVAC (excluding ductwork), water heaters,

heat exchangers, generators, cabinetry and housings (such as electrical boxes/enclosures), lighting fixtures, electrical conduit, emergency life systems, metal office furniture, shelving, laboratory equipment, analytical instrumentation, and dewatering equipment.

23) If the iron or steel is produced in the US, may other steps in the manufacturing process take place outside of the US, such as assembly?

No. Production in the US of the iron or steel used in a listed product requires that all manufacturing processes must take place in the United States, except metallurgical processes involving refinement of steel additives.

24) What processes must occur in the US to be compliant with the AIS requirement for reinforced precast concrete?

While reinforced precast concrete may not be at least 50% iron or steel, in this particular case, the reinforcing bar and wire must be produced in the US and meet the same standards as for any other iron or steel product. Additionally, the casting of the concrete product must take place in the US. The cement and other raw materials used in concrete production are not required to be of domestic origin.

If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered to be a construction material and must be produced in the US.

Compliance

25) How should an assistance recipient document compliance with the AIS requirement?

In order to ensure compliance with the AIS requirement, specific AIS contract language must be included in each contract, starting with the assistance agreement, all the way down to the purchase agreements. Sample language for assistance agreements and contracts can be found in Appendix 3 and 4.

EPA recommends the use of a step certification process, similar to one used by the Federal Highway Administration. The step certification process is a method to ensure that producers adhere to the AIS requirement and assistance recipients can verify that products comply with the AIS requirement. The process also establishes accountability and better enables States to take enforcement actions against violators.

Step certification creates a paper trail which documents the location of the manufacturing process involved with the production of steel and iron materials. A step certification is a process under which each handler (supplier, fabricator, manufacturer,

processor, etc) of the iron and steel products certifies that their step in the process was domestically performed. Each time a step in the manufacturing process takes place, the manufacturer delivers its work along with a certification of its origin. A certification can be quite simple. Typically, it includes the name of the manufacturer, the location of the manufacturing facility where the product or process took place (not its headquarters), a description of the product or item being delivered, and a signature by a manufacturer's responsible party. Attached, as Appendix 5, are sample certifications. These certifications should be collected and maintained by assistance recipients.

Alternatively, the final manufacturer that delivers the iron or steel product to the worksite, vendor, or contractor, may provide a certification asserting that all manufacturing processes occurred in the US. While this type of certification may be acceptable, it may not provide the same degree of assurance. Additional documentation may be needed if the certification is lacking important information. Step certification is the best practice.

26) How should a State ensure assistance recipients are complying with the AIS requirement?

In order to ensure compliance with the AIS requirement, States SRF programs must include specific AIS contract language in the assistance agreement. Sample language for assistance agreements can be found in Appendix 3.

States should also, as a best practice, conduct site visits of projects during construction and review documentation demonstrating proof of compliance which the assistance recipient has gathered.

27) What happens if a State or EPA finds a non-compliant iron and/or steel product permanently incorporated in the project?

If a potentially non-compliant product is identified, the State should notify the assistance recipient of the apparent unauthorized use of the non-domestic component, including a proposed corrective action, and should be given the opportunity to reply. If unauthorized use is confirmed, the State can take one or more of the following actions: request a waiver where appropriate; require the removal of the non-domestic item; or withhold payment for all or part of the project. Only EPA can issue waivers to authorize the use of a non-domestic item. EPA may use remedies available to it under the Clean Water Act, the Safe Drinking Water Act, and 40 CFR part 31 grant regulations, in the event of a violation of a grant term and condition.

It is recommended that the State work collaboratively with EPA to determine the appropriate corrective action, especially in cases where the State is the one who identifies the item in noncompliance or there is a disagreement with the assistance recipient.

If fraud, waste, abuse, or any violation of the law is suspected, the Office of Inspector General (OIG) should be contacted immediately. The OIG can be reached at 1-888-546-8740 or OIG_Hotline@epa.gov. More information can be found at this website: <http://www.epa.gov/oig/hotline.htm>.

28) How do international trade agreements affect the implementation of the AIS requirements?

The AIS provision applies in a manner consistent with United States obligations under international agreements. Typically, these obligations only apply to direct procurement by the entities that are signatories to such agreements. In general, SRF assistance recipients are not signatories to such agreements, so these agreements have no impact on this AIS provision. In the few instances where such an agreement applies to a municipality, that municipality is under the obligation to determine its applicability and requirements and document the actions taken to comply for the State.

Waiver Process

The statute permits EPA to issue waivers for a case or category of cases where EPA finds (1) that applying these requirements would be inconsistent with the public interest; (2) iron and steel products are not produced in the US in sufficient and reasonably available quantities and of a satisfactory quality; or (3) inclusion of iron and steel products produced in the US will increase the cost of the overall project by more than 25 percent.

In order to implement the AIS requirements, EPA has developed an approach to allow for effective and efficient implementation of the waiver process to allow projects to proceed in a timely manner. The framework described below will allow States, on behalf of the assistance recipients, to apply for waivers of the AIS requirement directly to EPA Headquarters. Only waiver requests received from states will be considered. Pursuant to the Act, EPA has the responsibility to make findings as to the issuance of waivers to the AIS requirements.

Definitions

The following terms are critical to the interpretation and implementation of the AIS requirements and apply to the process described in this memorandum:

Reasonably Available Quantity: The quantity of iron or steel products is available or will be available at the time needed and place needed, and in the proper form or specification as specified in the project plans and design.

Satisfactory Quality: The quality of iron or steel products, as specified in the project plans and designs.

Assistance Recipient: A borrower or grantee that receives funding from a State CWSRF or DWSRF program.

Step-By-Step Waiver Process

Application by Assistance Recipient

Each local entity that receives SRF water infrastructure financial assistance is required by section 436 of the Act to use American made iron and steel products in the construction of its project. However, the recipient may request a waiver. Until a waiver is granted by EPA, the AIS requirement stands, except as noted above with respect to municipalities covered by international agreements.

The waiver process begins with the SRF assistance recipient. In order to fulfill the AIS requirement, the assistance recipient must in good faith design the project (where applicable) and solicit bids for construction with American made iron and steel products. It is essential that the assistance recipient include the AIS terms in any request for proposals or solicitations for bids, and in all contracts (see Appendix 3 for sample construction contract language). The assistance recipient may receive a waiver at any point before, during, or after the bid process, if one or more of three conditions is met:

1. Applying the American Iron and Steel requirements of the Act would be inconsistent with the public interest;
2. Iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or
3. Inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

Proper and sufficient documentation must be provided by the assistance recipient. A checklist detailing the types of information required for a waiver to be processed is attached as Appendix 1.

Additionally, it is strongly encouraged that assistance recipients hold pre-bid conferences with potential bidders. A pre-bid conference can help to identify iron and steel products needed to complete the project as described in the plans and specifications that may not be available from domestic sources. It may also identify the need to seek a waiver prior to bid, and can help inform the recipient on compliance options.

In order to apply for a project waiver, the assistance recipient should email the request in the form of a Word document (.doc) to the State SRF program. It is strongly recommended that the State designate a single person for all AIS communications. The State SRF designee will review the application for the waiver and determine whether the necessary information has been included. Once the waiver application is complete, the State designee will forward the application to the EPA for review.

Evaluation by EPA

After receiving an application for waiver of the AIS requirements, EPA Headquarters will publish the request on its website for 15 days and receive informal comment. EPA Headquarters will then use the checklist in Appendix 2 to determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver – that it is quantitatively and qualitatively sufficient – and to

determine whether or not to grant the waiver.

In the event that EPA finds that adequate documentation and justification has been submitted, the Administrator may grant a waiver to the assistance recipient. EPA will notify the State designee that a waiver request has been approved or denied as soon as such a decision has been made. Granting such a waiver is a three-step process:

1. Posting – After receiving an application for a waiver, EPA is required to publish the application and all material submitted with the application on EPA’s website for 15 days. During that period, the public will have the opportunity to review the request and provide informal comment to EPA. The website can be found at: http://water.epa.gov/grants_funding/aisrequirement.cfm
2. Evaluation – After receiving an application for waiver of the AIS requirements, EPA Headquarters will use the checklist in Appendix 2 to determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver – that it is quantitatively and qualitatively sufficient – and to determine whether or not to grant the waiver.
3. Signature of waiver approval by the Administrator or another agency official with delegated authority – As soon as the waiver is signed and dated, EPA will notify the State SRF program, and post the signed waiver on our website. The assistance recipient should keep a copy of the signed waiver in its project files.

Public Interest Waivers

EPA has the authority to issue public interest waivers. Evaluation of a public interest waiver request may be more complicated than that of other waiver requests so they may take more time than other waiver requests for a decision to be made. An example of a public interest waiver that might be issued could be for a community that has standardized on a particular type or manufacturer of a valve because of its performance to meet their specifications. Switching to an alternative valve may require staff to be trained on the new equipment and additional spare parts would need to be purchased and stocked, existing valves may need to be unnecessarily replaced, and portions of the system may need to be redesigned. Therefore, requiring the community to install an alternative valve would be inconsistent with public interest.

EPA also has the authority to issue a public interest waiver that covers categories of products that might apply to all projects.

EPA reserves the right to issue national waivers that may apply to particular classes of assistance recipients, particular classes of projects, or particular categories of iron or steel products. EPA may develop national or (US geographic) regional categorical waivers through the identification of similar circumstances in the detailed justifications presented to EPA in a waiver request or requests. EPA may issue a national waiver based on policy decisions regarding the public's interest or a determination that a particular item is not produced domestically in reasonably available quantities or of a sufficient quality. In such cases, EPA may determine it is necessary to issue a national waiver.

If you have any questions concerning the contents of this memorandum, you may contact us, or have your staff contact Jordan Dorfman, Attorney-Advisor, State Revolving Fund Branch, Municipal Support Division, at dorfman.jordan@epa.gov or (202) 564-0614 or Kiri Anderer, Environmental Engineer, Infrastructure Branch, Drinking Water Protection Division, at anderer.kirsten@epa.gov or (202) 564-3134.

Attachments

Appendix 1: Information Checklist for Waiver Request

The purpose of this checklist is to help ensure that all appropriate and necessary information is submitted to EPA. EPA recommends that States review this checklist carefully and provide all appropriate information to EPA. This checklist is for informational purposes only and does not need to be included as part of a waiver application.

Items	✓	Notes
<p>General</p> <ul style="list-style-type: none"> • Waiver request includes the following information: <ul style="list-style-type: none"> — Description of the foreign and domestic construction materials — Unit of measure — Quantity — Price — Time of delivery or availability — Location of the construction project — Name and address of the proposed supplier — A detailed justification for the use of foreign construction materials • Waiver request was submitted according to the instructions in the memorandum • Assistance recipient made a good faith effort to solicit bids for domestic iron and steel products, as demonstrated by language in requests for proposals, contracts, and communications with the prime contractor 		
<p>Cost Waiver Requests</p> <ul style="list-style-type: none"> • Waiver request includes the following information: <ul style="list-style-type: none"> — Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and steel products — Relevant excerpts from the bid documents used by the contractors to complete the comparison — Supporting documentation indicating that the contractor made a reasonable survey of the market, such as a description of the process for identifying suppliers and a list of contacted suppliers 		
<p>Availability Waiver Requests</p> <ul style="list-style-type: none"> • Waiver request includes the following supporting documentation necessary to demonstrate the availability, quantity, and/or quality of the materials for which the waiver is requested: <ul style="list-style-type: none"> — Supplier information or pricing information from a reasonable number of domestic suppliers indicating availability/delivery date for construction materials — Documentation of the assistance recipient's efforts to find available domestic sources, such as a description of the process for identifying suppliers and a list of contacted suppliers. — Project schedule — Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of construction materials • Waiver request includes a statement from the prime contractor and/or supplier confirming the non-availability of the domestic construction materials for which the waiver is sought • Has the State received other waiver requests for the materials described in this waiver request, for comparable projects? 		

Appendix 2: HQ Review Checklist for Waiver Request

Instructions: To be completed by EPA. Review all waiver requests using the questions in the checklist, and mark the appropriate box as Yes, No or N/A. Marks that fall inside the shaded boxes may be grounds for denying the waiver. If none of your review markings fall into a shaded box, the waiver is eligible for approval if it indicates that one or more of the following conditions applies to the domestic product for which the waiver is sought:

1. The iron and/or steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality.
2. The inclusion of iron and/or steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

Review Items	Yes	No	N/A	Comments
<p>Cost Waiver Requests</p> <ul style="list-style-type: none"> • Does the waiver request include the following information? <ul style="list-style-type: none"> — Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and steel products — Relevant excerpts from the bid documents used by the contractors to complete the comparison — A sufficient number of bid documents or pricing information from domestic sources to constitute a reasonable survey of the market • Does the Total Domestic Project exceed the Total Foreign Project Cost by more than 25%? 				
<p>Availability Waiver Requests</p> <ul style="list-style-type: none"> • Does the waiver request include supporting documentation sufficient to show the availability, quantity, and/or quality of the iron and/or steel product for which the waiver is requested? <ul style="list-style-type: none"> — Supplier information or other documentation indicating availability/delivery date for materials — Project schedule — Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of materials • Does supporting documentation provide sufficient evidence that the contractors made a reasonable effort to locate domestic suppliers of materials, such as a description of the process for identifying suppliers and a list of contacted suppliers? • Based on the materials delivery/availability date indicated in the supporting documentation, will the materials be unavailable when they are needed according to the project schedule? (By item, list schedule date and domestic delivery quote date or other relevant information) • Is EPA aware of any other evidence indicating the non-availability of the materials for which the waiver is requested? Examples include: <ul style="list-style-type: none"> — Multiple waiver requests for the materials described in this waiver request, for comparable projects in the same State — Multiple waiver requests for the materials described in this waiver request, for comparable projects in other States — Correspondence with construction trade associations indicating the non-availability of the materials • Are the available domestic materials indicated in the bid documents of inadequate quality compared those required by the project plans, specifications, and/or permits? 				

Appendix 3: Example Loan Agreement Language

ALL ASSISTANCE AGREEMENT MUST HAVE A CLAUSE REQUIRING COMPLIANCE WITH THE AIS REQUIREMENT. THIS IS AN EXAMPLE OF WHAT COULD BE INCLUDED IN SRF ASSISTANCE AGREEMENTS. EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THIS CLAUSE WITH RESPECT TO STATE LAW:

Comply with all federal requirements applicable to the Loan (including those imposed by the 2014 Appropriations Act and related SRF Policy Guidelines) which the Participant understands includes, among other, requirements that all of the iron and steel products used in the Project are to be produced in the United States (“American Iron and Steel Requirement”) unless (i) the Participant has requested and obtained a waiver from the Agency pertaining to the Project or (ii) the Finance Authority has otherwise advised the Participant in writing that the American Iron and Steel Requirement is not applicable to the Project.

Comply with all record keeping and reporting requirements under the Clean Water Act/Safe Drinking Water Act, including any reports required by a Federal agency or the Finance Authority such as performance indicators of program deliverables, information on costs and project progress. The Participant understands that (i) each contract and subcontract related to the Project is subject to audit by appropriate federal and state entities and (ii) failure to comply with the Clean Water Act/Safe Drinking Water Act and this Agreement may be a default hereunder that results in a repayment of the Loan in advance of the maturity of the Bonds and/or other remedial actions.

Appendix 4: Sample Construction Contract Language

ALL CONTRACTS MUST HAVE A CLAUSE REQUIRING COMPLIANCE WITH THE AIS REQUIREMENT. THIS IS AN EXAMPLE OF WHAT COULD BE INCLUDED IN ALL CONTRACTS IN PROJECTS THAT USE SRF FUNDS. EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THIS CLAUSE WITH RESPECT TO STATE OR LOCAL LAW:

The Contractor acknowledges to and for the benefit of the City of _ (“Purchaser”) and the

_(the “State”) that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund and/or Drinking Water State Revolving Fund that have statutory requirements commonly known as “American Iron and Steel;” that requires all of the iron and steel products used in the project to be produced in the United States (“American Iron and Steel Requirement”) including iron and steel products provided by the Contractor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser or State to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney’s fees) incurred by the Purchaser or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Purchaser). While the Contractor has no direct contractual privity with the State, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State.

Appendix 5: Sample Certifications

The following information is provided as a sample letter of **step** certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Step Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. XXXX
2. XXXX
3. XXXX

Such process took place at the following location:

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

The following information is provided as a sample letter of certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the following products and/or materials shipped/provided to the subject project are in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. XXXX
2. XXXX
3. XXXX

Such process took place at the following location:

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

**American Iron & Steel (AIS) Requirement of the Consolidated Appropriations Act of 2014
(Public Law 113-76)**

Q&A Part 2

PRODUCT QUESTIONS

1. Q: Do all fasteners qualify for de minimis exemption?

A: No. There is no broad exemption for fasteners from the American Iron and Steel (AIS) requirements. Significant fasteners used in SRF projects are not subject to the de minimis waiver for projects and must comply with the AIS requirements. Significant fasteners include fasteners produced to industry standards (e.g., ASTM standards) and/or project specifications, special ordered or those of high value. When bulk purchase of unknown-origin fasteners that are of incidental use and small value are used on a project, they may fall under the national de minimis waiver for projects. The list of potential items could be varied, such as big-box/hardware-store-variety screws, nails, and staples. The key characteristics of the items that may qualify for the de minimis waiver would be items that are incidental to the project purpose (such as drywall screws) and not significant in value or purpose (such as common nails or brads).

EPA also clarifies that minor components of two listed products – valves and hydrants -- may not need to meet the AIS requirements if the minor components compromise a very small quantity of minor, low-cost fasteners that are of unknown origin.

2. Q: Does PCCP pipe have to be domestically produced?

A: Yes. Pre-stressed concrete cylinder pipe (PCCP) or other similar concrete cylinder pipes would be comparable to pre-cast concrete which is specifically listed in the Consolidated Appropriations Act of 2014 as a product subject to the AIS requirement.

3. Q: If the iron or steel is made from recycled metals will the vendor/supplier have to provide a certification document certifying that the recycled metals are domestically produced?

A: No. Recycled source materials used in the production of iron and steel products do not have to come from the U.S. Iron or steel scrap, for instance, are considered raw materials that may come from anywhere. While certification is not required for the raw material, EPA does recommend that additional final processing of iron and steel be certified to have occurred in the U.S.

4. Q: Do tanks used for filtration systems, if delivered to the construction site separately and then filled with filtration media onsite, have to be domestically produced?

A: No. Tanks that are specifically designed to be filters, or as parts of a filtration system, do not have to be domestically produced because these parts are no longer simply tanks, even if the filter media has not been installed and will be installed at the project site, as is customary to do for shipping purposes. These parts have only one purpose which is to be housing for filters and cannot be used in another fashion.

5. Q: Can a recipient use non-domestic flanged pipe?

A: No. While the Consolidated Appropriations Act of 2014 does not specifically mention flanged pipe, since it does mention both pipe and flanges, both products would need to be domestically produced. Therefore, flanged pipe would also need to be domestically produced.

6. Q: Can a recipient use non-domestic couplings, expansion joints, and other similar pipe connectors?

A: No. These products would be considered specialty fittings, due to their additional functionality, but still categorized under the larger “fitting” categorization. Fittings are defined as a material that joins pipes together or connects to a pipe (AWWA, The Drinking Water Dictionary, 2000). Therefore, these products must comply with the AIS requirements and be produced domestically.

7. Q: Can a recipient use non-domestic service saddles and tapping sleeves?

A: No. These products are necessary for pipe repair, to tap a water main, or to install a service or house connection. Therefore, they are included under the larger “pipe restraint” category which is a specifically identified product subject to the domestic preference in the Consolidated Appropriations Act of 2014.

8. Q: The AIS guidance does not appear to cover reused items (i.e., existing pipe fittings, used storage tanks, reusing existing valves). How should reused items be addressed?

A: The AIS guidance does not address reuse of items. Reuse of items that would otherwise be covered by AIS is acceptable provided that the item(s) was originally purchased prior to January 17, 2014, the reused item(s) is not substantially altered from original form/function, and any restoration work that may be required does not include the replacement or addition of foreign iron or steel replacement parts. EPA recommends keeping a log of these reused items by including them on the assistance recipient’s de minimis list, and stating therein that these items are reused products. The donation of new items (such as a manufacturer waiving cost for certain delivered items because of concerns regarding the origin of a new product) is not, however, considered reuse.

9. Q: What does “time needed” mean in the AIS guidance, in reference to the definition of “Reasonably Available Quantity”?

A: For considering whether a product would meet reasonably available quantity, “time needed” is based on the construction schedule. If the item is delayed and there is substantial impact on the overall construction schedule, this would not be according to the “time needed.”

10. Q: If a product is not specifically included on the list of AIS covered products, must it comply with AIS?

A: Possibly. The AIS requirements include a list of specifically covered products, one of which is construction materials, a broad category of potential products. For construction materials, EPA’s AIS guidance includes a set of example items that it considers construction materials composed primarily of iron and steel and covered by the Act. This example list in the guidance is not an all-inclusive list of potential construction materials. However, the guidance also includes a list of items that EPA specifically does not consider construction materials, generally those of electrical or complex-mechanical nature. If a product is similar to the ones in the non-construction material list (and it is also not specifically listed by the Act), it is not a construction material. For all other items specifically included in the Act, coverage is generally self-evident.

11. Q: If a listed iron and steel product is used as a part for an assembled product that is non-domestic, do the AIS requirements apply?

A: AIS requirements only apply to the final product as delivered to the work site and incorporated into the project. Other assemblies, such as a pumping assembly or a reverse osmosis package plant, are distinct products not listed and do not need to be made in the U.S. or composed of all U.S. parts. Therefore, for the case of a non-covered product used in a larger non-domestic assembly, the components, even if specifically listed in the Consolidated Appropriations Act, do not have to be domestically produced.

12. Q: Is cast iron excluded from the AIS requirements?

A: No. Cast iron products that fall under the definition of iron and steel products must comply with the AIS requirements.

13. Q: The guidance states that “construction materials” do not include mechanical equipment, but then identifies ductwork as a construction material. Please clarify.

A: Ductwork is not mechanical equipment, therefore it is considered a “construction material” and must comply with the AIS requirements.

14. Q: Do “meters” mentioned in EPA’s guidance as non-construction materials include both flow meters and water meters?

A: Yes. “Meters” includes any type of meter, including: flow meters, wholesale meters, and water meters/service connections.

15. Q: Must coiled steel be domestic?

A: Yes. Coiled steel is an intermediate product used in the production of steel pipe and must come from a U.S. source or subject to a waiver in order to comply with the AIS requirements.

16. Q: Are pig iron, direct reduced iron (DRI), and ingot considered raw materials?

A: No. These are considered intermediate products used in the production of iron or steel and must come from a U.S. source or subject to a waiver in order to comply with the AIS requirements.

17. Q: Can assistance recipients rely on a marking that reads, “Made in the USA,” as evidence that all processes took place in the U.S.?

A: No. This designation is not consistent with our requirements that all manufacturing processes of iron and steel products must take place in the U.S.

18. Q: When determining what constitutes a product made “primarily” of iron or steel, who makes this determination?

A: The manufacturer will show if its product qualifies as primarily made of iron or steel. The recipient should expect the manufacturer to provide documentation/ certification that its product is AIS compliant.

19. Q: Do aerators need to be produced domestically in order to comply with AIS?

A: No. Aerators, similar to pumps, are mechanical equipment that do not need to meet the AIS requirements. “Blowers/aeration equipment, compressors” are listed in EPA’s guidance as non-construction materials.

20. Q: Are Sluice and Slide Gates considered valves?

A: No. Valves are products that are generally encased / enclosed with a body, bonnet, and stem. Examples include enclosed butterfly, ball, globe, piston, check, wedge, and gate valves. Furthermore, “gates” (meaning sluice, slide or weir gates) are listed in EPA’s guidance as non-construction materials.

AIS PROCESS QUESTIONS

21. Q: Will notices of waiver applications be published in the federal register?

A: No. Applications for waivers will be published on EPA’s website (http://water.epa.gov/grants_funding/aisrequirement.cfm). EPA will provide 15 days for open public comment, as noted on the website.

22. Q: Will states be collecting the step certification paper trail, as presented in the AIS guidance?

A. No. Assistance recipients must maintain documentation of compliance with AIS. EPA recommends use of the step certification process. This process is a best practice and traces all manufacturing of iron and steel products to the U.S. If the process is used, the state does not have to collect the documentation. The documents must be kept by the assistance recipient and reviewed by the state during project reviews.

23. Q: Why is it considered a best practice for states to conduct site visits, when it is the assistance recipient's responsibility to meet the AIS requirements?

A: It is both the assistance recipient's and the state's responsibility to ensure compliance with the AIS requirements. The state is the recipient of a federal grant and must comply with all grant conditions, including a condition requiring that the AIS requirements be adhered to. Therefore, it is recommended that states conduct site visits of projects during construction and review documentation demonstrating the assistance recipient's proof of compliance.

24. Q: Please further define the state's role in the waiver process.

A: The state's role in the waiver process is to review any waiver requests submitted to the state in order to ensure that all necessary information has been provided by the assistance recipient prior to forwarding the request to EPA. If a state finds the request lacking, the state should work with the assistance recipient to help obtain complete information.

25. Q: How much time does EPA have to evaluate the waiver during the evaluation step?

A: At a minimum, EPA is required to provide 15 days for open public comment. There is no specific deadline or time limit for EPA to review waiver requests. Each waiver request will come with its own specific details and circumstances and may require a different amount of time for review and analysis. For example, public interest waivers in general may take longer to review than availability waivers which are typically more straightforward. However, EPA understands that construction may be delayed while waiting for a waiver and will make every effort to review and issue decisions on waiver requests in a timely manner.

PROJECT QUESTIONS

26. Q: What if a project is funded by another funding entity (i.e., United States Department of Agriculture – Rural Development) where AIS is not required and begins construction after January 17, 2014 but then applies to the SRF to refinance the project? Are they ineligible?

A: The project is not ineligible. AIS requirements will apply to any construction that occurs after the assistance agreement is signed, through the end of construction. If construction is complete, there is no retroactive application of the AIS requirements.

27. Q: If the assistance recipient can demonstrate through market research that the AIS requirement will exceed the 25 percent cost threshold, is the entire project exempt from the AIS requirement?

A: If the waiver application shows that the inclusion of American iron and steel products causes the entire cost of the project to increase by more the 25 percent, a waiver may be granted for the entirety of the project.

28. Q: Can the recipient use non-SRF funds to pay for the non-compliant item.

A: No. It is not an acceptable to use non-SRF funds to pay for a non-compliant item. The Consolidated Appropriations Act of 2014 requires that all iron and steel products, no matter the source of funding, must be made in the U.S. if SRF funds are used in the project.

29. Q: What constitutes “satisfactory quality” as defined in the AIS guidance, in reference to the availability waiver process.

A: “Satisfactory quality” means the product meets the project design specifications. A waiver may be granted if a recipient determines that the project plans and design would be compromised because there are no American made products available that meet the project design specifications.

30. Q: The guidance states that the AIS requirement applies to any project “funded in whole or in part” by an SRF. Where is this in the Act?

A: The Act states that, “None of the funds made available by a ... [State SRF program] ... shall be used for a project for the construction, alteration, maintenance, or repair of a public water system or treatment works unless all of the iron and steel products used in the project are produced in the United States.” This sentence clearly states that no SRF program may use its funds for a project unless all of the iron and steel products used in the project are made in the U.S. This is true even if only \$1 of SRF funding is used in the project.

31. Q: There is always an expectation on the part of an assistance recipient that the construction phase of a planning and/or design only loan will be funded through the SRF. If the original planning and/or design only loan was executed prior to a January 17, 2014, does this mean the entire project will be exempt from the AIS requirement?

A: If the original loan includes construction, and was executed prior to January 17, 2014, then the AIS provision does not apply to the project. If the original loan was only for planning and/or design, then a written commitment or documented “expectation” is needed to show exemption from the

requirements. Appearance on a priority list in an Intended Use Plan along with written reasonable assurance from the state that the recipient will receive SRF funding for project construction could provide sufficient evidence of “expectation of funding”.

- 32. Q: What if there has been a change order or redesign requiring new plans and specifications to be approved and they were approved after January 17, 2014: does the project now have to comply with AIS?**

A: In most cases, no. Change orders are typically small enough changes that the original plan and specification date will still hold true. For example, if a pipe alignment has to be changed for a block or two due to unforeseen conditions, but new plans and specifications had to be submitted for this section of the project, then that could be considered a minor change. However, if there has been a major redesign, perhaps the whole project had to be redesigned starting from scratch, then the new plans and specification approval date would apply.

- 33. Q: What if the bids on a project with plans and specifications approved before January 17, 2014 but the loan is signed after January 17, 2014 come in low, and there is significant funding remaining in the loan agreement, so the community designs a second project with the remaining funds: does that project have to comply with the AIS requirements?**

A: If the second project is closely related in purpose, place and time to the first project, then the second project would be exempt from the AIS requirements. It is the assistance recipient’s responsibility (with state oversight) to show that a project is closely related, or not, in purpose, place and time.

- 34. Q: What if the assistance agreement was signed after January 17, 2014, state approval of plans for the first phase of the project was in place prior to January 17, 2014, but state approval of the plans for the second phase of the project was received after January 17, 2014?**

A: In such a case, the AIS provision would not apply to the first phase of the project. If the second phase of the project is considered the same project as the first phase, due to its close relation in purpose, place and time, the entire project may be exempt. It is the assistance recipient’s responsibility (with state oversight) to show that phases of a project is closely related, or not, in purpose, place and time.

- 35. Q: Do products purchased through procurement-only contracts have to be comply with AIS?**

A: Yes. For projects funded by SRF, the products procured under any form of contract must comply with AIS. A procurement-only contract generally involves the bulk purchase of common items (such as pipe, concrete, and/or pumps) of independent timing from a set of planned projects. If products which are purchased through a procurement-only contract are being installed under another contract, the procurement-only contract would probably not be considered a separate project in purpose, place and time; and therefore, would have to comply with the AIS requirements.

March 2015

American Iron & Steel Requirement for the Clean Water and Drinking Water State Revolving Funds

Q&A Part 3

*For CWSRF and DWSRF: On **January 17, 2014**, Public Law 113-76, the "Consolidated Appropriations Act, 2014," was enacted and included an American Iron and Steel requirement for the Clean Water and Drinking Water State Revolving Fund programs through the end of fiscal year 2014. Since then, the AIS requirement has continued for both programs, but through different statutes, with a few changes as described in the questions and answers provided below.*

*For CWSRF: On **June 10, 2014**, the Water Resources Reform and Development Act amended the Clean Water Act to include permanent requirements for the use of AIS products in CWSRF assistance agreements. Section 608 of the CWA now contains requirements for AIS that repeat those of the Consolidated Appropriations Act, 2014. All CWSRF assistance agreements must comply with Section 608 of the CWA for implementation of the permanent AIS requirement.*

*For DWSRF: On **December 16, 2014**, the President signed Public Law 113-235, the "Consolidated and Further Continuing Appropriations Act, 2015," which provides fiscal year 2015 full-year appropriations through September 30, 2015. This law continues the requirement for the use of AIS products in DWSRF assistance agreements through September 30, 2015.*

CWSRF PROGRAM

- 1. Q: The Water Resources Reform and Development Act amended the Clean Water Act to include permanent requirements for the use of AIS for CWSRF funded assistance agreements. Does the CWA include an exemption for plans and specifications approved prior to the enactment of the legislation similar to the exemption included in the Consolidated Appropriations Act (CAA) 2014?**

A: Yes. The WRRDA amendment to the CWA, which included AIS requirements, included a similar exemption as the CAA 2014. For any CWSRF assistance agreement signed on or after October 1, 2014, if the plans and specifications were approved prior to June 10, 2014 (the enactment of WRRDA), then the project is exempt from AIS requirements. For assistance agreements signed prior to October 1, 2014, the previous dates in the CAA 2014 apply (see March 20, 2014, AIS guidance document).

If a project does not require approved engineering plans and specifications, the bid advertisement date will count in lieu of the plans and specifications approval date for purposes of this exemption in Section 608 (f).

The following table summarizes AIS exemptions based on the plans and specifications approval date for CWSRF funded projects.

CWSRF AIS Project Exemption Based on Plans and Specifications Approval Date		
<u>Assistance Agreement Signed:</u>	<u>Exempt from AIS if Plans and Specifications Were Approved Before:</u>	<u>Basis for Exemption:</u>
1/17/2014 through 9/30/2014	4/15/2014	<ul style="list-style-type: none"> Consolidated Appropriations Act 2014 National waiver signed 4/15/2014*
On or after 10/1/2014	6/10/2014	<ul style="list-style-type: none"> Clean Water Act Section 608

** To be covered by the national waiver, the plans and specifications had to be submitted to the state prior to 1/17/2014*

2. Q: Does the AIS requirement apply to refinanced CWSRF projects?

A: Yes, in some cases. If a project began construction, financed from a non-CWSRF source prior to June 10, 2014, but is refinanced through a CWSRF assistance agreement executed on or after October 1, 2014, AIS requirements will apply to all construction that occurs on or after June 10, 2014, through completion of construction, unless engineering plans and specifications were approved by the responsible state agency prior to June 10, 2014. For CWSRF projects funded on or after October 1, 2014, there is no retroactive application of the AIS requirements where a refinancing occurs for a project that has completed construction prior to June 10, 2014.

DWSRF PROGRAM

3. Q: The Consolidated and Further Continuing Appropriations Act 2015 continues the AIS requirements for DWSRF funded assistance agreements. Does the Act include an exemption for plans and specifications approved prior to the enactment of the legislation, similar to the exemption included in the Consolidated Appropriations Act (CAA) 2014?

A: Yes. The Consolidated and Further Continuing Appropriations Act 2015 includes a similar exemption as the CAA 2014. For any assistance agreement signed on or after December 16, 2014 (the enactment of the Act), if the plans and specifications were approved prior to December 16, 2014, then the project is exempt from the AIS requirements. For assistance agreements signed prior to December 16, 2014, the previous dates in the CAA 2014 apply (see March 20, 2014 AIS guidance document).

If a project does not require approved engineering plans and specifications, the bid advertisement date will count in lieu of the plans and specifications approval date for purposes of the exemption in Section 424(f).

4. Q: Do DWSRF assistance agreements signed during the time period between September 30, 2014, and December 16, 2014, still have to comply with the AIS requirements?

A: Yes. The Continuing Appropriations Resolution 2015 was signed on September 19, 2014, which extended funding for the DWSRF with the same conditions that were made applicable by the language in the Fiscal Year 2014 appropriations, including the requirement for the use of American Iron and Steel products in projects receiving financial assistance from the DWSRF. Therefore, all assistance agreements starting October 1, 2014, through the enactment of the Consolidated and Further Continuing Appropriations Act 2015 (signed December 16, 2014), must include the AIS requirements. However, if the plans and specifications for any of these projects were approved prior to April 15, 2014 (the date the national waiver was signed), then the project is exempt from the AIS requirements.

The following table summarizes AIS exemptions based on the plans and specifications approval date for DWSRF funded projects.

DWSRF AIS Project Exemption Based on Plans and Specifications Approval Date		
<u>Assistance Agreement Signed:</u>	<u>Exempt from AIS if Plans and Specifications Were Approved Before:</u>	<u>Basis for Exemption:</u>
1/17/2014 through 9/30/2014	4/15/2014	<ul style="list-style-type: none"> Consolidated Appropriations Act 2014 National waiver signed 4/15/2014*
10/1/2014 through 12/15/2014	4/15/2014	<ul style="list-style-type: none"> Continuing Appropriations Resolution 2015 (continued CAA 2014 requirements)** National waiver signed 4/15/2014*
12/16/2014 through 9/30/2015	12/16/2014	<ul style="list-style-type: none"> Consolidated and Further Continuing Appropriations Act 2015

* To be covered by the national waiver, the plans and specifications had to be submitted to the state prior to 1/17/2014

** Following the first continuing resolution, there were two additional CRs to fill the gap between 12/11/2014 and 12/16/2014

5. Q: Does the AIS requirement apply to refinanced DWSRF projects?

A: Yes, in some cases. If a project began construction, financed from a non-DWSRF source prior to December 16, 2014, but is refinanced through a DWSRF assistance agreement executed on or after December 16, 2014, AIS requirements will apply to all construction that occurs on or after December 16, 2014, through completion of construction, unless engineering plans and

specifications were approved by the responsible state agency prior to December 16, 2014. For DWSRF projects funded on or after December 16, 2014, there is no retroactive application of the AIS requirements where a refinancing occurs for a project that has completed construction prior to December 16, 2014.

BOTH CWSRF AND DWSRF PROGRAMS

6. **Q: If a coating is applied to the external surface of a domestic iron or steel component, and the application takes place outside of the United States, would the product be compliant under the AIS requirements?**

A: Yes. The product would still be considered a compliant product under AIS requirements. Any coating processes that are applied to the external surface of iron and steel components that would otherwise be AIS compliant would not disqualify the product from meeting the AIS requirements regardless of where the coating processes occur, provided that final assembly of the product occurs in the United States.

The exemption above only applies to coatings on the *external surface* of iron and steel components. It does not apply to coatings or linings on internal surfaces of iron and steel products, such as the lining of lined pipes. All manufacturing processes for lined pipes, including the application of pipe lining, must occur in the United States for the product to be compliant with AIS requirements.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF WATER

DECISION MEMORANDUM

SUBJECT: De Minimis Waiver of Section 436 of P.L. 113-76, Consolidated Appropriations Act (CAA), 2014

FROM: Nancy K. Stoner
Acting Assistant Administrator

The EPA is hereby granting a nationwide waiver pursuant to the "American Iron and Steel (AIS)" requirements of P.L. 113-76, Consolidated Appropriations Act, 2014 (Act), section 436 under the authority of Section 436(b)(1) (public interest waiver) for de minimis incidental components of eligible water infrastructure projects. This action permits the use of products when they occur in de minimis incidental components of such projects funded by the Act that may otherwise be prohibited under section 436(a). Funds used for such de minimis incidental components cumulatively may comprise no more than a total of 5 percent of the total cost of the materials used in and incorporated into a project; the cost of an individual item may not exceed 1 percent of the total cost of the materials used in and incorporated into a project.

P.L. 113-76, Consolidated Appropriations Act, 2014 (Act), includes an "American Iron and Steel" (AIS) requirement in section 436 that requires Clean Water State Revolving Loan Fund (CWSRF) and Drinking Water State Revolving Loan Fund (DWSRF) assistance recipients to use specific domestic iron and steel products that are produced in the United States if the project is funded through an assistance agreement executed beginning January 17, 2014 (enactment of the Act), through the end of Fiscal Year 2014, unless the agency determines it necessary to waive this requirement based on findings set forth in Section 436(b). The Act states, "[the requirements] shall not apply in any case or category of cases in which the Administrator of the Environmental Protection Agency...finds that- (1) applying subsection (a) would be inconsistent with the public interest" 436(b)(1).

In implementing section 436 of the Act, the EPA must ensure that the section's requirements are applied consistent with congressional intent in adopting this section and in the broader context of the purposes, objectives, and other provisions applicable to projects funded under the SRF. Water infrastructure projects typically contain a relatively small number of high-cost components incorporated into the project. In bid solicitations for a project, these high-cost components are generally described in detail via project specific technical specifications. For these major components, utility owners and their contractors are generally familiar with the conditions of availability, the potential alternatives for each detailed specification, the approximate cost, and the country of manufacture of the available components.

Every water infrastructure project also involves the use of thousands of miscellaneous, generally low-cost components that are essential for, but incidental to, the construction and are incorporated into the physical structure of the project. For many of these incidental components, the country of manufacture and the availability of alternatives is not always readily or reasonably identifiable prior to procurement in the normal course of business; for other incidental components, the country of manufacture may be known but the miscellaneous character in conjunction with the low cost, individually and (in total) as typically procured in bulk, mark them as properly incidental. Examples of incidental components could include small washers, screws, fasteners (i.e., nuts and bolts), miscellaneous wire, corner bead, ancillary tube, etc. Examples of items that are clearly not incidental include significant process fittings (i.e., tees, elbows, flanges, and brackets), distribution system fittings and valves, force main valves, pipes for sewer collection and/or water distribution, treatment and storage tanks, large structural support structures, etc.

The EPA undertook multiple inquiries to identify the approximate scope of de minimis incidental components within water infrastructure projects during the implementation of the American Reinvestment and Recovery Act (ARRA) and its requirements (Buy American provisions, specifically). The inquiries and research conducted in 2009 applies suitably for the case today. In 2009, the EPA consulted informally with many major associations representing equipment manufacturers and suppliers, construction contractors, consulting engineers, and water and wastewater utilities, and performed targeted interviews with several well-established water infrastructure contractors and firms who work in a variety of project sizes, and regional and demographic settings to ask the following questions:

- What percentage of total project costs were consumables or incidental costs?
- What percentage of materials costs were consumables or incidental costs?
- Did these percentages vary by type of project (drinking water vs. wastewater treatment plant vs. pipe)?

The responses were consistent across the variety of settings and project types, and indicated that the percentage of total costs for drinking water or wastewater infrastructure projects represented by these incidental components is generally not in excess of 5 percent of the total cost of the materials used in and incorporated into a project. In drafting this waiver, the EPA has considered the de minimis proportion of project costs generally represented by each individual type of these incidental components within the many types of such components comprising those percentages, the fact that these types of incidental components are obtained by contractors in many different ways from many different sources, and the disproportionate cost and delay that would be imposed on projects if the EPA did not issue this waiver.

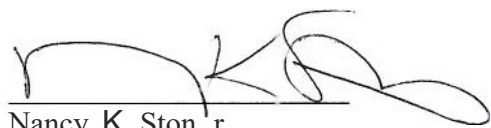
Assistance recipients who wish to use this waiver should in consultation with their contractors determine the items to be covered by this waiver and must retain relevant documentation (i.e., invoices) as to those items in their project files.

If you have any questions concerning the contents of this memorandum, please contact Timothy Connor, Chemical Engineer, Municipal Support Division, at connor.timothy@epa.gov or (202) 566-1059 or Kirsten Anderer, Environmental Engineer, Drinking Water Protection Division, at anderer.kirsten@epa.gov or (202) 564-3134.

A?R t5 2014

Issued on: _____

Approved by: _____


Nancy K. Stoner
Acting Assistant Administrator

Ohio Water Pollution Control Loan Fund
Use of American Iron and Steel - De Minimis Final Utilization and Certification Form

The Consolidated Appropriations Act of 2014 (P.L. 113-76) Section 436 requires the use of American & Steel in SRF-funded projects. Under the authority of Section 436(b)(1), the EPA has issued a public interest waiver for De Minimis incidental components. The assistance recipient wishing to use this waiver should consult with their contractor(s) to maintain an itemized list of components covered under De Minimis. At the conclusion of the project, this form must be completed and retained in the assistance recipient's project files and a copy provided to DEFA. Please print clearly or type.

Project Name: _____ Loan Agrmt #: _____

NOTE: The De Minimis waiver is only applicable to the cost of materials for the entire project. Do not include other project costs (labor, installation costs, etc.) in the "Total Cost of Materials". The cost of a material must include delivery to the site and any applicable tax. Must have sufficient documentation to support all costs included in this calculation.

Funds used for de minimis incidental components cumulatively may comprise no more than a total of 5 percent of the total cost of the materials used in and incorporated into a project; the cost of an individual item may not exceed 1 percent of the total cost of the materials used in and incorporated into a project.

Total Cost of Materials: 5% Limit: 1% limit:

Manufacturer & Component Description	Part/Model #	Quantity (if applicable)	Cost per Unit (if applicable)	Component's Total Cost	How is Cost Documented?*

Use additional sheets as necessary

Total De Minimis Cost of Components:

If approaching the 5% or 1% limits, contact DEFA immediately

* Documentation must demonstrate confirmation of the components' actual costs (invoice, etc.).

Completed by:

Name: _____

Title: _____

Signature: _____

Date: _____

Violating Facilities Clause
(Required Contract Provision)

Language prohibiting this use of equipment or services from anyone on the EPA List of Violating Facilities must be included in the contract documents.

Violating Facilities:

The Contractor agrees to comply with all applicable standards, orders or requirements under Section 306 of the Clean Air Act, 42 USC 1857 (h), Section 508 of the Clean Water Act, 33 USC 1368, Executive Order 11738, and EPA regulations, 40 CFR Part 32, which prohibits the use under non-exempt Federal contracts, grants, or loans of facilities included on the EPA List of Violating Facilities.

NOTE: THE CONTRACT LANGUAGE SAMPLES PROVIDED HEREIN ARE EXAMPLES OF WHAT COULD BE INCLUDED IN ALL CONTRACTS THAT USE WPCLF OR WSRLA FUNDS. OHIO EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THESE CLAUSES WITH RESPECT TO STATE OR LOCAL LAW. IT IS IMPERATIVE THAT ANY PARTY INSERTING THESE CLAUSES INTO A CONTRACT VERIFY THAT THEY ARE LEGAL AND ENFORCEABLE ACCORDING TO STATE AND LOCAL LAWS, REGULATIONS, AND ORDINANCES.

Requirement For Utilization Of Small Businesses In Rural Areas (SBRA)

(Required Contract Provision)

The following policy should be added to the “Instructions to Bidders” section and referenced in the Table of Contents for the contract documents:

This procurement is subject to the EPA policy of encouraging the participation of small businesses in rural areas. It is EPA policy that recipients of EPA financial assistance awards utilize the services of small businesses in rural areas (SBRAs), to the maximum extent practicable. The objective is to assure that such small business entities are afforded the maximum practicable opportunity to participate as subcontractors, suppliers and otherwise in EPA-awarded financial assistance programs. This policy applies to all contracts and subcontracts for supplies, construction, and services under EPA grants or cooperative agreements. Small purchases are also subject to this policy.

If possible, also add the following language to the “Advertisement for Bids”:

This procurement is subject to the EPA policy of encouraging the participation of small business in rural areas (SBRAs).

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Insurance Provisions
(Required Contract Provision)

Section 3.5 of the WPCLF/WSRLA Loan Agreement contains specific requirements regarding insurance for all contractors and all subcontractors for the life of the contract. These insurance requirements must be reflected in the contract documents. Adjust the following language as needed to meet the specifics of the construction project and local requirements while still meeting the provisions of the Loan Agreement.

The Contractor shall, at his expense, furnish and maintain insurance in the form and amounts specified in subparagraphs 1 through 7 inclusive, of this section. Policies shall be with acceptable insurance companies authorized to do business in the State of Ohio.

The Contractor shall not commence Work nor shall he permit any of his Sub-contractors to commence Work until the insurance policies specified hereinafter, or otherwise required, have been submitted to, and approved by the Owner. Such insurance policies shall be kept in force until the Contractor receives final payment.

Insurance shall be endorsed so that it cannot be changed or canceled in less than ten (10) days after receipt by the Contractor and the Owner of written notice of such proposed action from the Insurer.

The insurance specified in Subparagraphs 1, 2, 3 and 4 shall be written under the comprehensive general form of liability insurance contracts.

The Contractor shall furnish three (3) certificates or, whenever specifically requested by the Owner, three (3) certified copies of the insurance policies themselves and a receipt evidencing full payment of the premiums.

In addition to the insurance described hereinafter, the Contractor shall secure and maintain such other insurance as may be designated elsewhere in the Contract document.

If the Contractor is required to repair or perform Work after the completion of the Work involved under this Contract or obtain new policies in accordance with the requirements in this section.

1. *Builders Risk:* In addition to such fire and other physical damage insurance as the Contractor elects to carry for his own protection, he shall also secure and maintain in the name of the Owner, the government agency sponsoring the Project, Subcontractors, the Consulting Engineer and any other parties having an interest in the Project, as named insured as their interest may appear; a builders' risk policy for fire, extended coverage, vandalism and malicious mischief in the amount of one hundred (100) percent of the value of the complete parts of the Project and Materials in storage, except that such coverage shall not be required in connection with sewer, water main or paving construction. Pump or lift station construction shall not be considered sewer or water main construction for purposes of this paragraph.

2. *Workers Compensation:* The Contractor shall provide Workers Compensation Insurance for all employees engaged in Work who may come within the protection of the workers compensation law, and, where applicable, employer's General Liability Insurances for employees not so protected and shall require all Subcontractors to provide corresponding insurance.

The Contractor shall indemnify the Owner and the Consulting Engineer against any and all liabilities, cost and expenses due to accidents or other occurrences covered by the workers compensation law.

3. *Contractor's Motor Vehicle Bodily Injury and Property Damage Liability Insurance*: Insurance to cover liability arising from the use and operation of motor vehicles in connection with the performance of the Contract (as customarily defined in liability insurance policies), whether they be owned, hired or non-owned by the Contractor, as follows:

- a. Bodily Injury Liability: \$500,000 for each person; limit of \$1,000,000 for each occurrence.
- b. Property Damage Liability: \$500,000 for each occurrence.

4. *Contractor's Public Liability and Property Damage Liability Insurance*: Contractor's Public Liability Insurance providing a limit of not less than \$500,000 for all damages arising out of bodily injuries, including accidental death to one person, and a total limit of \$1,000,000 for all damages arising out of bodily injuries, including accidental death, to two or more persons in any one occurrence. Contractor's Property Damage Liability Insurance providing for a limit on not less than \$500,000 for all damages to or destruction of property.

Coverage under this policy shall include, to the limits indicated above, the collapse or damage to any structure, building or its contents, public or private utility, or pavement during construction and for two (2) years thereafter.

Whenever Work under the Contract is to be done in the vicinity of existing underground utilities or structures, coverage under the policy shall also include, to the limits indicated, all damages to said underground utilities or structures during construction and for a period of two (2) years thereafter. Whenever Work under the Contract is to be done by blasting, coverage under the policy shall also include, to the limits indicated above, all damages of any kind whatsoever caused by blasting.

5. *Contractor's Protective Public Liability and Property Damage Liability Insurance*: Contractor's Protective Public Liability and Property Damage Liability Insurance for operations performed by Subcontractors providing for coverage and limits corresponding to those described in subparagraph 4.

6. *Owner's Protective Public Liability and Property Damage Liability Insurance*: Regular Owner's Protective Public Liability and Property Damage Liability Insurance for operations performed by the Contractor or any Sub-contractor providing for coverage and limits corresponding to those described in subparagraph 4.

This policy shall be written in the name of the Owner as a separate policy from those specified elsewhere herein.

7. *Railroad Protective Liability Insurance*: In any of the Work under this Contract is on railroad R/W, the Contractor shall at its sole cost and expense, procure and provide, for and in behalf of each railroad company. Protective Liability Insurance (AARAASHO form) with minimum limits per occurrence of not less than \$2,000,000 for bodily injury, death and/or property damage, subject to an aggregate limit of \$6,000,000 per annum. The policy shall name each railroad company as the insured and be issued to the Contractor. Each railroad company shall be provided with a copy of each policy of insurance prior to commencement of any work.

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Materials Testing
(Required Contract Provision)

In addition to the details included with specific equipment testing in the specifications, include an overall statement regarding testing for the project. Adjust the following language as needed to meet the specifics of the construction project

Testing Services

1. Contractor shall appoint, employ, and pay for specified services of an independent firm to perform testing.
2. The independent firm will perform tests and other services specified in individual specification sections and as required by the Architect/Engineer.
3. Testing and source quality control may occur on or off the project site. Perform offsite testing as required by the Architect/Engineer or the Owner.
4. Reports will be submitted by the independent firm to the Architect/Engineer and Contractor, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
5. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - a. Notify Architect/Engineer and independent firm 24 hours prior to expected time for operations requiring services.
 - b. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
6. Testing does not relieve Contractor to perform Work to contract requirements.
7. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect/Engineer. Payment for re-testing will be charged to the Contractor by deducting testing charges from the Contract Sum/Price.

NOTE: THE CONTRACT LANGUAGE SAMPLES PROVIDED HEREIN ARE EXAMPLES OF WHAT COULD BE INCLUDED IN ALL CONTRACTS THAT USE WPCLF OR WSRLA FUNDS. OHIO EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THESE CLAUSES WITH RESPECT TO STATE OR LOCAL LAW. IT IS IMPERATIVE THAT ANY PARTY INSERTING THESE CLAUSES INTO A CONTRACT VERIFY THAT THEY ARE LEGAL AND ENFORCEABLE ACCORDING TO STATE AND LOCAL LAWS, REGULATIONS, AND ORDINANCES.

Continuous Treatment Provisions

(Required Contract Provision)

It is important that construction activities not result in any temporary violations of NPDES permit requirements (for permitted facilities) and construction activities should interrupt wastewater service to the individual resident as little as possible. For drinking water projects, it is important that construction activities not result in any disruption of service. Any disruption of service must be immediately reported to the Ohio EPA, Drinking Water Section of the appropriate district office.

The following example language is a sample of what might be appropriate for construction work occurring at an existing wastewater treatment plant. The language actually incorporated into the contract documents must be adjusted to meet the specifics of the construction project.

Continuous Treatment (wastewater projects)

Federal regulations prohibit by-passing of any sewage during construction operations. The Contractor will be responsible for providing any required temporary pumping facilities piping, etc., necessary to complete the project without any plant by-passing and continuous treatment must be provided at the same level during construction as existed prior to construction.

Unless otherwise previously or subsequently specified, the Contractor shall procure and pay for all permits, licenses, and approvals necessary for the execution of his Contract.

The Contractor shall comply with all laws, ordinances, rules, orders, and regulations relating to the performance of the work required to complete their Contract.

The following example language is a sample of what might be appropriate for construction work occurring at an existing drinking water treatment plant. The language actually incorporated into the contract documents must be adjusted to meet the specifics of the construction project.

Continuous Treatment (drinking water projects)

The Contractor will be responsible for obtaining approval from Ohio EPA for use of temporary pumping facilities, piping and other items in order to complete the project without any plant by-passing. Continuous treatment must be provided at the same level during construction as existed prior to construction.

Unless otherwise previously or subsequently specified, the Contractor shall procure and pay for all permits, licenses, and approvals necessary for the execution of his Contract.

The Contractor shall comply with all laws, ordinances, rules, orders, and regulations relating to the performance of the work required to complete their Contract.

NOTE: THE CONTRACT LANGUAGE SAMPLES PROVIDED HEREIN ARE EXAMPLES OF WHAT COULD BE INCLUDED IN ALL CONTRACTS THAT USE WPCLF OR WSRLA FUNDS. OHIO EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THESE CLAUSES WITH RESPECT TO STATE OR LOCAL LAW. IT IS IMPERATIVE THAT ANY PARTY INSERTING THESE CLAUSES INTO A CONTRACT VERIFY THAT THEY ARE LEGAL AND ENFORCEABLE ACCORDING TO STATE AND LOCAL LAWS, REGULATIONS, AND ORDINANCES.

CONTRACT CHANGE ORDER

RECIPIENT _____ CHANGE ORDER NBR _____
 LOAN NUMBER _____ CONTRACT _____
 OWDA PROJECT No. _____ DATE _____
 Description of Change: _____

The time provided for completion in the contract for the above items is (increased/decreased) by ____ calendar days.

RECOMMENDED BY: _____ DATE: _____
 (Engineer)

APPROVED BY: _____ DATE: _____
 (Recipient)

ACCEPTED BY: _____ DATE: _____
 (Contractor)

 (Company)

Original Contract Amt		<p style="text-align: center;">OWDA APPROVAL</p> <p>The above proposal is hereby accepted and I recommend that it be approved and made a part of the contract noted above. The approval does not constitute an increase in the total loan amount, but represents approval for the work.</p>
Previous Changes (+ / --)		
This Change (+ / --)		
Adjusted Contract Amt		
Ohio EPA Acceptance		Chief Engineer
Date		Date

CHANGE ORDER INSTRUCTIONS:

All Change Orders for this work, regardless of costs and whether Water Pollution Control Loan Fund (WPCLF) or Water Supply Revolving Loan Account (WSRLA) funding will be used to finance the changes, must be submitted to Ohio EPA for review.

Changes Requiring Prior Approval

Any change which substantially modifies the Project Facilities as specified in the Ohio EPA approved Facilities Plan and Final Permit to Install or Final Plan Approval (when applicable) or alters the direct or indirect impact of the Project Facilities upon the environment must be incorporated into a Change Order. One copy of the Change Order prior to execution is to be submitted to Ohio EPA for review and prior approval of the acceptability of the change. "Prior to execution" means before the Change Order is signed by the Owner.

Ohio EPA will review the Change Order and inform the Owner of the technical, environmental and operational acceptability of the change, and give the Owner permission to proceed with the proposed work.

All Other Changes

Change Orders not requiring prior approval as described above must be submitted to Ohio EPA within one (1) month of the time at which they are approved by the Owner. All change orders must be submitted electronically to dedicated change order email addresses for WPCLF and WSRLA projects.

Change Order Approval Process

After the Change Order is executed, one (1) copy of the Change Order, including the supporting documentation, is to be sent electronically to Ohio EPA for final review.

The dedicated e-mail address for the electronic submittal of WPCLF Change Orders is EPAWPCLFCO@epa.ohio.gov.

The dedicated e-mail address for the electronic submittal of WSRLA Change Orders is EPAWSRLACO@epa.ohio.gov.

After the Change Order is accepted and eligible costs determined, Ohio EPA will issue a letter informing the Owner and authorizing OWDA to disburse funds from Project Contingency for the work. The OEPA letter will be sent electronically along with a PDF of the WPCLF/WSRLA Change Order form which will be signed by all parties including Ohio EPA and OWDA.

Payments for Change Order Work

The Owner is precluded from submitting to the OWDA payment requests for Eligible Project Costs associated with the Change Orders until such time as the Ohio EPA's approval of the Change Orders has been obtained.

Local Protest Procedure

(suggested contract provision)

Some statement as to when a valid protest must be filed, in what form it must be filed and who it must be filed with should be included. ORC 153.12 has some default procedures for handling WPCLF and disputes. If the owner wants more control than provided in ORC, a procedure needs to be spelled out in the Contract Documents.

The following example language is a sample of language that could be included. Review all local procedures and requirements and adjust the language to meet the specifics of the project.

Protests

A protest based upon an alleged violation of the procurement requirement may be filed against the OWNER's procurement action by a party with an adversely affected direct financial interest. The protest shall be filed with the Mayor. The OWNER shall determine the protest. The OWNER may request additional information or a hearing in order to resolve the protest.

A protest shall be filed as early as possible during the procurement process, but must be received by the OWNER no later than one week after the basis of the protest is known or should have been known, whichever is earlier. If the protest is mailed, the protester bears the risk of nondelivery with in the required time period.

A protest must clearly present the procurement requirement being protested, the facts which support the protest, and any other information necessary to support the protest.

NOTE: THE CONTRACT LANGUAGE SAMPLES PROVIDED HEREIN ARE EXAMPLES OF WHAT COULD BE INCLUDED IN ALL CONTRACTS THAT USE WPCLF OR WSRLA FUNDS. OHIO EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THESE CLAUSES WITH RESPECT TO STATE OR LOCAL LAW. IT IS IMPERATIVE THAT ANY PARTY INSERTING THESE CLAUSES INTO A CONTRACT VERIFY THAT THEY ARE LEGAL AND ENFORCEABLE ACCORDING TO STATE AND LOCAL LAWS, REGULATIONS, AND ORDINANCES.

Basis And Method For Award

(suggested contract
provision)

The contract documents should include some language that clearly states what the Owner will consider when determining the successful bidder and to provide a clear basis for the Owner when they have a need to reject the low bidder and go with a different bidder.

The following example language is a sample of language that could be included. Review all local procedures and requirements and adjust the language to meet the specifics of the project.

Basis for Award

1. Owner reserves the right to reject any and all Bids, to waive any and all informalities and to negotiate contract terms with the successful Bidder, and the right to disregard all nonconforming, nonresponsive or conditional bids. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.
2. In evaluating Bids, Owners shall consider the qualifications of the Bidder, whether or not the Bids comply with the prescribed requirements and alternates and unit prices if requested in the Bid forms. The Owner intends to accept alternates (if any are accepted) in the order in which they are listed in the Bid Form but Owner may accept them in any order or combination.
3. Owner may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principle items of material or equipment) proposed for those portions of the work as to which the identity of Subcontractors and other persons and organizations must submitted as provided in the Supplementary Conditions. Operating costs, maintenance considerations, performance data and guarantees of materials and equipment may also be considered by Owner.
4. Owner may conduct investigations he deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the Bidders, proposed Subcontractors, and other persons and organizations to do the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.
5. Owner reserves the right to reject the Bid of any Bidder who does not pass investigation of evaluation to Owner's satisfaction. Owner may reject any Proposal where the unit price or individual lump sum prices are unbalanced and/or unfavorable to the Owner's interest.
6. Owner will not make any award or permit any award at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in Federal assistance programs under Executive Order 12549 "Debarment and Suspension." Each Contractor and supplier (over \$25,000) shall complete the Certification Regarding Debarment, Suspension, and Other Responsibility Matters.
7. If Contract is awarded, it will be awarded to the lowest responsive responsible Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interest of the Project.
8. If the contract is awarded, Owner will give the Successful Bidder a Notice of Award within the time stated in the Advertisement after the day of the Bid opening.

9. When owner gives a Notice of Award to the Successful Bidder, it will be accompanied by at least three unsigned counterparts of the Agreement and three copies of all other Contract Documents. Within ten days thereafter, Contractor shall sign and deliver at least three counterparts of the Agreement to Owner with three copies of all other Contract Documents attached. Within fifteen days thereafter, Owner will deliver one copy of all fully signed counterparts to Contractor.

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Payment Methods

(suggested contract provision)

To minimize uncertainty and arguments that can slow down the progress of construction it is useful to provide language stating how and when the Contractor will get paid. In addition to ORC and other local requirements, the involvement of public funding Agencies such as the WPCLF, Ohio Public Works Commission and Community Development Block Grant impact the process and timing for payments.

The following example language is a sample of language that could be included. Review all local procedures and requirements and adjust the language to meet the specifics of the project.

1. At least ten (10) days before each progress payment falls due (but not more often than once a month), the Contractor will submit to the Engineer a partial payment estimated filled out and signed by the Contractor covering the work performed during the period covered by the partial payment estimate and supported by such data as the Engineer may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitable stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the Owner as will establish the Owner's title to the material and equipment and protect his interest therein, including applicable insurance. The Engineer will, with ten (10) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the Owner, or return the partial payment estimate to the Contractor indicating in writing his reason for refusing to approve payment.

In the latter case, the Contractor may make the necessary corrections and resubmit the partial payment estimate. The Owner will, within 30 days of presentation to him of an approved partial payment estimate, pay Contractor for labor performed and material incorporated in the Work, at the rate of 92 percent of the amount of the estimate as approved by the Engineer until 50 percent of the Work is completed. All labor performed and material incorporated in the Work after the job is 50 percent of completed shall be paid for at the rate of 100 percent of the amount of additional labor and material furnished and approved and the amount labor and material furnished and approved the amount previously retained shall be deposited in an escrow account. The funds in the escrow account with accumulated interest are to be paid the Contractor at the same time and in the same manner as specified for payment of the of the retained amount in Section 5.

Payment for material and equipment delivered and not incorporated shall be based on the scheduled of quantities and cost submitted. Any money due from Owner shall, on the day that it is due, be paid to Contractor, or deposited in an escrow account, whichever is applicable, with one or more banks or building and loan associations in the state selected by mutual agreement between the Contractor and the Owner. The agreement shall contain the following provisions:

- A. The money shall be deposited in a savings account or the escrow agent shall properly invest the entire escrow principal in obligations selected by the escrow agent, as stipulated in the agreement.
- B. The escrow agent shall hold the escrow principal and income until receipt of notice from the Owner and the Contractor, of until receipt of an arbitration order specifying the amount of escrow principal to be released and the person to whom it is to be released. Upon receipt of the notice or order, the agent shall properly pay such amount of principal and the portion of amount of the escrow income to the person indicated.

- C. The escrow agent shall be compensated for its services as agreed to by the Owner and the Contractor from the income from the escrow account.
- 2. The request for payment may also include an allowance for the cost of such major material and equipment which are suitably stored either at the site or near the site.

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Prohibition on Telecommunications and Video Surveillance

§ 200.216 Prohibition on certain telecommunications and video surveillance services or equipment.

- (a) Recipients and subrecipients are prohibited from obligating or expending loan or grant funds to:
 - (1) Procure or obtain;
 - (2) Extend or renew a contract to procure or obtain; or
 - (3) Enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. As described in [Public Law 115–232](#), section 889, covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).
 - (i) For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).
 - (ii) Telecommunications or video surveillance services provided by such entities or using such equipment.
 - (iii) Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.
- (b) In implementing the prohibition under [Public Law 115–232](#), section 889, subsection (f), paragraph (1), heads of executive agencies administering loan, grant, or subsidy programs shall prioritize available funding and technical support to assist affected businesses, institutions and organizations as is reasonably necessary for those affected entities to transition from covered communications equipment and services, to procure replacement equipment and services, and to ensure that communications service to users and customers is sustained.
- (c) See [Public Law 115–232](#), section 889 for additional information.
- (d) See also [§ 200.471](#).

Resources:

[2 CRF 200.216](#)

FAQ's: [Sec. 889 of 2019 NDAA FAQ_20201124.pdf \(performance.gov\)](#)

[Public Law 115-232, Section 889](#)

[§ 200.471](#)

WPCLF/WSRLA CONTRACT DOCUMENTS REVIEW

Funding Applicant:	
Project Name:	Project Number:
Date Bid Advertisement will start:	Date Bids will be opened:
Engineer's estimate of construction cost:	
Time of completion for work (e.g., 9 months):	

Please provide the Section/Page number from the contract documents that corresponds with each item below.

Program Requirements -Any item checked as "No" must be explained on a separate sheet

<input type="checkbox"/> Yes <input type="checkbox"/> No	EEO Certification	Section/Page # _____
<input type="checkbox"/> Yes <input type="checkbox"/> No	Certification Regarding Debarment & Suspension	Section/Page # _____
<input type="checkbox"/> Yes <input type="checkbox"/> No	Prohibition on telecommunications and video surveillance equipment	Section/Page # _____
<input type="checkbox"/> Yes <input type="checkbox"/> No	Contract provisions describing DBE requirements	Section/Page # _____
<input type="checkbox"/> Yes <input type="checkbox"/> No	DBE Forms 6100-3, 6100-4 and 6100- 2	Section/Page # _____
<input type="checkbox"/> Yes <input type="checkbox"/> No	Davis-Bacon wage rate requirements	Section/Page # _____
<input type="checkbox"/> Yes <input type="checkbox"/> No	Build America, Buy America Acknowledgement Form	Section/Page # _____
<input type="checkbox"/> Yes <input type="checkbox"/> No	American Iron and Steel Acknowledgement Form	Section/Page # _____
<input type="checkbox"/> Yes <input type="checkbox"/> No	BIL Signage Requirement	Section/Page # _____
<input type="checkbox"/> Yes <input type="checkbox"/> No	Violating Facilities clause	Section/Page # _____
<input type="checkbox"/> Yes <input type="checkbox"/> No	Small Businesses in Rural Areas (SBRA)	Section/Page # _____
<input type="checkbox"/> Yes <input type="checkbox"/> No	Insurance for both the contractor and all subcontractors:	Section/Page # _____
	<input type="checkbox"/> Yes <input type="checkbox"/> No Workers' Compensation	<input type="checkbox"/> Yes <input type="checkbox"/> No Vehicle Liability
	<input type="checkbox"/> Yes <input type="checkbox"/> No Public Liability	<input type="checkbox"/> Yes <input type="checkbox"/> No Flood (if appropriate)
	<input type="checkbox"/> Yes <input type="checkbox"/> No Property Damage	<input type="checkbox"/> Yes <input type="checkbox"/> No Builders Risk (can be held by owner instead)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Material Testing (statement regarding testing for specifications)	Section/Page # _____
<input type="checkbox"/> Yes <input type="checkbox"/> No	Project-specific continuous service/treatment provisions	Section/Page # _____
<input type="checkbox"/> Yes <input type="checkbox"/> No	WPCLF/WSRLA Change Order form & instructions	Section/Page # _____
<input type="checkbox"/> Yes <input type="checkbox"/> No	Bid proposal forms (necessary for determining loan eligibility)	Section/Page # _____

Other Contract Requirements

<input type="checkbox"/> N/A - superseded by local requirements	
<input type="checkbox"/> Yes <input type="checkbox"/> No	Text of the bid advertisement
<input type="checkbox"/> Yes <input type="checkbox"/> No	Engineer's estimate of cost for construction
<input type="checkbox"/> Yes <input type="checkbox"/> No	Description of how the bid price, including any alternates, is determined
<input type="checkbox"/> Yes <input type="checkbox"/> No	Notice to Proceed form
<input type="checkbox"/> Yes <input type="checkbox"/> No	Any material or equipment designated from a "sole source?"
	If <u>yes</u> , attach a description and justification for each item.
<input type="checkbox"/> Yes <input type="checkbox"/> No	Bid includes a dedicated contract contingency/allowance amount
	Contract contingency is <input type="checkbox"/> a fixed dollar amount <input type="checkbox"/> a fixed percentage of the contract total

Ohio Revised Code Requirements - The following are required for municipalities (cities, villages, counties, sewer districts) but may be superseded by local charter or other local requirements.

<input type="checkbox"/> N/A - superseded by local requirements	<input type="checkbox"/> N/A - not a municipality
<input type="checkbox"/> Yes <input type="checkbox"/> No	Bid Guarantee in the form required by ORC
<input type="checkbox"/> Yes <input type="checkbox"/> No	Payment and Performance Bonds in the form required by ORC
<input type="checkbox"/> Yes <input type="checkbox"/> No	Provisions for payment retention in conformance with ORC
<input type="checkbox"/> Yes <input type="checkbox"/> No	A specific time for completion of the work

Checklist Prepared by: _____

Phone or E-mail _____

Bid Package Submittals

The following documents must be submitted to Ohio EPA – DEFA within one week after bids are received, or sooner dependent on your individual project schedule.

1. One copy of all addenda when they are issued.
2. A complete copy of the successful bidder's proposal(s).
3. A bid tabulation (a list of all bidders and their line item amounts) in the same format as the proposal.
4. The engineer's bid evaluation and recommendation.
5. A signed copy of the Contractor's EEO Certification Form
6. A signed copy of the Certification Regarding Debarment, Suspension, and Other Responsibility Matters.
7. Completed copies of Form 6100-3 Individual DBE Subcontractor Proposed Performance Form and Form 6100-4 DBE Subcontractor Utilization Summary that were provided by the successful bidder(s), as well as any alternate "good faith efforts" documentation.
8. A resolution from the loan recipient's governing body tentatively awarding the contract to the successful bidder.
9. A copy of the site title opinion stating that all sites, easements and / or right-of-way necessary to construct the project have been acquired.
- ~~10. Signed Build America, Buy America Acknowledgement Form, if applicable.~~
11. Signed American Iron and Steel Acknowledgement Form.
12. Useful Life Worksheet (must be completed for loan requests greater than 20 years)
 - WPCLF Useful Life Worksheet: <https://epa.ohio.gov/static/Portals/29/documents/ofa/CW-Useful-Life-Worksheet.xlsx?ver=2019-10-31-153519-907>
 - WSRLA Useful Life Worksheet: <https://epa.ohio.gov/static/Portals/29/documents/ofa/DW-Useful-Life-Worksheet.xlsx?ver=2019-10-31-153519-907>



**CITY OF CANTON
WATER DEPARTMENT**

SERVICE SHOP ADDITION AND RENOVATIONS

**2664 HARRISBURG ROAD NE
CANTON, OHIO 44705**

TECHNICAL SPECIFICATIONS

FEBRUARY 1, 2024

PR WHU#) #PHGR ZV#
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SECTION 01 10 00 – SUMMARY OF WORK

A. GENERAL INTENT STATEMENT

1. The following scope of work is intended to be general in nature. The intention is to have the successful General Contractor perform all related work shown on the Contract Documents other than those items specifically indicated below to be excluded. The General Contractor and subcontractors shall be responsible for portions of work contained within Division 1 General Requirements as applicable to the scope of work for that respective package.

B. GENERAL DESCRIPTION

1. The Project consists of providing all material, labor, equipment, and supervision to complete all construction related services as detailed within project drawings and specifications.
2. The Owner is The City of Canton, 218 Cleveland Avenue SW, Canton, Ohio 44702.
3. The Architect is Motter & Meadows Architects, 600 Market Avenue North, Canton, Ohio 44702.
4. The Project will be administrated under a single General Contract arrangement direct with the Owner. All bids should be based upon LUMP SUM proposals, excluding all exempt taxes, unless specifically indicated otherwise.

C. CONTRACT REFERENCES

1. All drawings and specifications by Motter & Meadows Architects dated February 1, 2024, Legal Notice, Bid Form, Addenda, Instructions to Bidders, Owner-Contractor Agreement, and General Conditions of the Contract.
2. All Division 1 – Requirements
3. All bids must conform with the requirements of the Instructions to Bidders.
4. A Bid Guaranty and Contract Bond is required from all General Contract bidders.
5. In the event of failure to perform the Work in accordance with the requirements, the work of the General Contract is subject to liquidated damages in accordance with the Owner-Contractor Agreement, or other Contract as determined by the City.

D. PROJECT REQUIREMENTS

1. All items listed below are the absolute responsibility of the General Contractor as it relates to the complete scope of work.
 - a. Review all drawings and all specifications, including those drawings and specifications not directly pertaining to his immediate scope of work, to ensure that the General Contractor has completely included all elements of the work in his bid. This will insure that the sum of all bids will provide a complete Project.
 - b. Comply with all federal, state, local, and company safety regulations to insure a safe working environment for all workers.
 - c. All labor rates used for bidding purposes shall include all taxes, fringes, etc. and shall be firm during the entire construction period.
 - d. Limit use of the premises to work areas indicated. Confine operations to areas within contract limits indicated, unless the Work is specifically called out beyond those limits. Do not disturb portions of the site beyond the areas in which the Work is indicated. Restore any disturbed conditions to the satisfaction of the Architect.
 - e. Keep existing streets, driveways, parking and entrances serving the premises clear at all times. Do not use these areas for parking or storage of materials.
 - f. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated and or directed by the Architect/Owner. If additional storage is necessary, obtain and pay for such storage off site. Lock automotive type vehicles, such as passenger cars and trucks and other mechanized or motorized construction equipment, when parked and unattended, so as to prevent unauthorized use. Do not leave such

vehicles or equipment unattended with the motor running or the ignition key in place. Do not bring or store unnecessary vehicles on site.

- g. In compliance with the Ohio Revised Code, the General Contractor and subcontractors shall give proper notice to affected Utilities indicating when and where excavation shall take place. This notice shall occur at least two working days, excluding Saturdays, Sundays and legal holidays, prior to commencing work. Each Contractor shall immediately alert occupants of nearby premises as to any emergency that may be created or discovered on or near the underground work. Any damage, break or leak on any utility line shall be immediately reported to the appropriate Utility.
- h. Reviewing Specification Section 01 23 00 Alternates to incorporate information into bid. All alternates should be filled in on the bid form. If an alternate does not apply, or has no cost, a zero should be filled in on the bid form. Failure to make an entry or an entry of "No Bid," or "N/A," or similar entry for any Alternate may cause the Bidder to be rejected as non-responsible only if the Alternate is selected.
- i. Complete and functional installation. This includes any permits and testing required by local or state building codes to complete the system.
- j. Timely completion of the work, and coordination and timely submission of needed decisions, submittals, samples, mock-ups, coordination drawings, material deliveries, sufficient equipment and manpower so as not to delay any Project activity.
- k. Coordination of site layout will accommodate requirements of trailers, materials or other necessary items that will also occupy the site. All movement of temporary items on site will occur only following consultation with and approval from the Architect/Owner.
- l. Provide all layouts required for all work included within their respective sub-contract. The Contractor must verify existing conditions and make the necessary adjustments. The Contractor can utilize points established by others, however must verify and accept these control points.
- m. Coordination of all inspection required by the City, County, State and Local authorities as mandated. In addition, this contractor shall secure and pay for all permits, governmental fees, licenses, and inspections necessary for proper execution of the Contract OR AS REQUIRED TO PERFORM WORK IN CITY OF CANTON, STARK COUNTY, OHIO.
- n. Have a responsible supervisor onsite at all times when work is being performed.
- o. Clean (and polish) all products installed under this contract for final project completion and inspection. Should this not be performed to the fullest extent, Owner will hire an outside source to perform this work and this cost will be billed to the General Contractor.
- p. Coordination of all trades for proper sequencing and installation of material supplied under this Contract to ensure the Master Construction Schedule is not jeopardized.
- q. Provide all as-builts, project record documents, and warranties as required per the Specifications no later than 2 weeks after work is complete.
- r. Ensure 100% safety requirements relative to the performance of its work.
- s. Dewatering any excavations required by its own work, and is to install pumps as required with sufficient hose to divert water to site drainage outlets. Generators necessary to power capacity is to be provided to prevent lost time due to flooding of the excavation. See Specification 01 51 00.
- t. Provide daily clean up of construction debris and disposal of materials into on-site dumpsters. Any materials not cleaned-up during the day's operations will be performed later that evening, on an overtime bases by others, at this Contractor's expense. Advanced notice will not be given.
- u. Provide and maintain all hoisting and OSHA approved scaffolds as necessary to install work.
- v. Coordinate the need for testing and inspections with the Architect at least twenty-four (24) hours prior to covering of work.
- w. Responsible for all materials required by the Work, to include but not limited to: providing, delivery, storage, handling, erection and protection of all materials within this scope of work. All major deliveries must be coordinated with the Architect/Owner to ensure allowable space for placement of materials.
- x. Include re-mobilization costs and out-of sequence work, which may be required due to temporary facilities, access for long lead mechanical and electrical items, and/or scheduling constraints.

- y. Dust control, traffic control and roadway cleaning. Each general trade contractor is responsible to clean streets of any debris or spillage of material as a result of and during the performance of their own work.
- z. Removal of snow and ice as required for the performance of their own work.

END OF SECTION 01 10 00

SECTION 01 21 00 - ALLOWANCES

A. SUMMARY

1. All allowances shall be Lump Sum Allowances.

B. RELATED DOCUMENTS

1. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specifications Sections, apply to work of this Section.

C. SUBMITTALS

1. Submit proposal for the purchase of products or system included in allowances as specified for Change Orders.
2. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

E. PROCEDURES

1. Amount of allowance includes:
 - a. Net cost of product.
 - b. Delivery to the site.
 - c. Handling at the site including unloading, uncrating, maintenance and storage.
 - d. Protection from elements, from damage.
 - e. Labor, installation and finishing.
 - f. Fuel costs.
 - g. Other expenses (i.e. testing, adjusting, and balancing) required for complete installation.
 - h. Overhead and profit is included in the Base Bid amount.
2. Use the allowance only as directed by the Architect. All labor requests will require time tickets signed by the Architect to process for payment.
3. Change orders authorizing use of funds from an allowance will include Contractor's related costs and overhead and profit margins as provided for under the General Conditions.
4. At the Project closeout, credit unused amounts remaining in allowances by the use of established unit prices. A change order will be prepared to adjust the Contract Sum accordingly.

F. LUMP SUM ALLOWANCES

1. General Contractor shall include in the Base Bid, the following allowance for work beyond the scope indicated in the Contract Documents. Use of Allowance to be authorized by Architect in writing. Unused portion to be credited to Owner.
 - a. General Purpose Construction Allowance \$ 80,000.00

G. ADJUSTMENT OF CASH ALLOWANCES

1. Unused amounts of monies included under allowances shall be credited to the Owner by deduct Change Order prior to approval of Final Application for Payment.

END OF SECTION 01 21 00

SECTION 01 29 73 – SCHEDULE OF VALUES

A. SUMMARY

1. This Section specifies administrative and procedural requirements governing the General Contractor's Schedule of Values.
 1. Coordinate the Schedule of Values (Contract Cost Breakdown) with the Applications for Payment, Project Schedule, Submittal Schedule, and List of Subcontracts.
2. Progress payments will not be processed without an approved Schedule of Values on file.

B. SCHEDULE OF VALUES (CONTRACT COST BREAKDOWN)

1. Coordination: The General Contractor shall coordinate preparation of its Schedule of Values for its part of the Work with the Master Construction Schedule.
 - a. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
 1. Master Construction Schedule.
 2. Application for Payment forms, including Continuation Sheets.
 3. List of subcontractors.
 4. Schedule of allowances.
 5. Schedule of alternates.
 6. List of products.
 7. List of principal suppliers and fabricators.
 8. Schedule of submittals.
 - b. Within 10 days of award of Contract, each the General Contractor shall submit to the Architect a Schedule of Values, for approval, showing accurate costs for the items of work assigned to the Contractor, defined under Section 01 10 00 – Summary of the Work.
2. Format and Content: The Schedule of Values shall include at a minimum a line item for labor and material costs for each unit of Work, and shall further divide the work into a sufficient number of individual work items to serve as an accurate basis for Contractor's Application for Payment. Each work item shall receive its prorated share of profit and overhead, including a line item for closeout. The Schedule of Values shall consist of a complete breakdown of the Contractor's contract sum showing the various items of work, divided so as to facilitate the approval of payments to the Contractor for Work completed. Each item of Work shall have indicated a separate cost of labor and material. This schedule when reviewed by the Architect and Owner shall be used as the basis of approving payments along with establishing percentages of Work complete.
 - a. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications of Payment and progress reports. Break principal subcontract amounts down into several line items.
 - b. Arrange the Schedule of Values in tabular form with separate columns to indicate the following of each item listed.
 1. Related Specification Section or Division.
 2. Description of Work.
 3. Name of subcontractor.
 4. Name of manufacturer or fabricator.
 5. Name of supplier.
 6. Change Order (numbers) that affect value.
 7. Dollar value.
 8. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - c. Round amounts of nearest whole dollar; the total shall equal the Contract Sum.

- d. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.
 1. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance bonded warehousing, if required.
 - e. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of the part of the Work.
 - f. Unit-Cost Allowances: Show the line-item value of unit-cost allowances, as a product of the unit cost, multiplied by the measured quantity. Estimate quantities from the best indication in the Contract Documents.
 - g. Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.
 1. At the contractor's option, Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.
 - h. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.
3. Should the Schedule of Values be "rejected, resubmit", resubmittal is due within 5 days of receipt of rejected schedule.
- C. CONTRACTORS CONTRACT COST BREAKDOWN / SCHEDULE OF VALUES
1. Within 10 days after Notice to Proceed, the General Contractor's Contract Cost Breakdown shall be submitted to the Architect on the contractor's letterhead.
 2. The Contract Cost Breakdown is to be presented in tabular format with four columns consisting of:
 - a. Item description.
 - b. Labor value.
 - c. Material value.
 - d. Total value.
 3. The Contract Cost Breakdown must be approved by the Architect prior to receipt of any progress payments.

END OF SECTION 01 29 73

SECTION 01 29 76 – APPLICATIONS FOR PAYMENT & CHANGE ORDER

A. SUMMARY

1. This Section specifies administrative and procedural requirements governing the General Contractor's Applications for Payment.
 - a. Coordinate the applications for Payment with the Schedule of Values, Project Schedule, Submittal Schedule, and List of Subcontracts.
2. Change Order Pricing

B. APPLICATION FOR PAYMENT PROCEDURES

1. Submit request for each calendar month, not later than 20th day of the month. Use form acceptable to the Architect/Engineer, fully completed and executed; including attachment of waivers and similar documentation.
2. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect/Engineer and paid for by the Owner.
3. Application Preparation: Complete every entry on the form. Include notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. Incomplete applications will be returned, without action.
 - a. Entries shall match data on the Schedule of Values and the Project Schedule. Use updated schedules, if revisions were made.
 - b. Include amounts of fully executed Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
4. Transmittal: Submit signed originals of each Application for Payment by a method ensuring receipt within 24 hours.
5. Waivers of Mechanics Lien: With each application for Payment, submit waivers of mechanics lien from every entity who is lawfully entitled to file a mechanics lien arising out of the Contract and related to the Work covered by the payment.
 - a. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
 - b. When an application shows completion of an item, submit final or full waivers.
 - c. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to the Owner.
6. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:
 - a. Executed Contract.
 - b. List of subcontractors.
 - c. List of principal suppliers and fabricators.
 - d. Contract Cost Breakdown and Schedule of Values.
 - e. Master Project Schedule.
 - f. Copies of building permits.
 - g. Copies of authorizations and licenses from governing authorities for performance of the Work.
 - h. Certificates of insurance and insurance policies.
7. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.
 - a. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
 - b. Administrative actions and submittals that shall precede or coincide with this application include:
 1. Occupancy permits and similar approvals.
 2. Warranties (guarantees) and maintenance agreements.
 3. Test/adjust/balance records and startup performance reports.
 4. Meter readings.
 5. Changeover information related to Owner's occupancy, use, operation, and maintenance.

6. Final cleaning.
 7. Advise on shifting insurance coverage's.
 8. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
8. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:
- a. Completion of Project closeout requirements.
 - b. Completion of items specified for completion after Substantial Completion.
 - c. Ensure that unsettled claims will be settled.
 - d. Ensure that incomplete Work is not accepted and will be completed without undue delay.
 - e. Transmittal or required Project construction records to the Owner.
 - f. Proof that taxes, fees, and similar obligations were paid.
 - g. Removal of temporary facilities and services.
 - h. Removal of surplus materials, rubbish, and similar elements.
- C. CHANGE ORDER REQUESTS
1. All Requests for Change Order shall be submitted on the General Contractor's Letterhead.
 2. Supplemental instructions authorizing minor changes in the Work, not involving an adjustment to the Contract Sum or Contract Time, will be issued by the Architect.
 3. Change Order Proposal Requests.
 - a. Owner Initiated Proposal Requests: Proposed changes in the Work that will require adjustment to the Contract Sum or Contract time, will be issued by the Architect with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary. This process shall include the following:
 1. Detailed description of the change, products and location of the change in the Project.
 2. Supplementary or revised Drawings and Specifications.
 3. The duration for implementing the change.
 4. Such request is for information only, and is not an instruction to execute the changes, not to stop Work in progress.
 6. Unless otherwise indicated in the proposal request, within 14 days of receipt of the proposal requires, submit to the Architect, an estimate of cost necessary to execute the proposed change.
 - b. The General Contractor may initiate proposed changes by submitting a written notice to the Architect containing:
 1. Description of the proposed change.
 2. Statement of the reason for making the changes.
 3. Statement of the effect on the Contract Sum and the Contract Time.
 4. State of the effect on the work of other Contractors.
 5. Documentation supporting any change in Contract Sum and the Contract Time, as appropriate.
- D. CONSTRUCTION CHANGE DIRECTIVE
1. Construction Change Directive: When the Owner and General Contractor are not in total agreement on the terms of a Change Order Proposal Request, the Architect may issue a Construction Change Directive Document, instructing the General Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - a. At completion of the change, the General Contractor shall submit itemized accounting and supporting data as provided in this Section.
 - b. Architect will determine the allowable cost of such work, as provided by in the General and Supplementary Conditions.

END OF SECTION 01 29 76

SECTION 01 31 19 – PROJECT MEETINGS

A. SUMMARY

1. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:
 1. Pre-construction conferences.
 2. Pre-installation conferences.
 3. Progress meetings.

B. RELATED REQUIREMENTS

1. Section 01 32 16 – Schedules and Reports
2. Section 01 33 00 – Submittal Procedures
3. Individual Specification Sections: Pre-Installation Meetings

C. DESCRIPTION

1. To enable orderly review during progress of the Work and to provide for systematic discussion of construction issues, the Architect will conduct Project Meetings throughout the construction period.
2. The General Contractor and principal subcontractors shall be required to have present at each of the following project meetings a representative acceptable to the Architect and Owner. The designated representative shall have sufficient authority and knowledge to make decisions for the Contractor he is representing on matters affecting this Project.
3. Contractors or representative unable to attend a specified meeting shall have an acceptable alternate representative designated or shall notify the Architect not less than 7 days prior to date of meeting.

D. PRE-CONSTRUCTION CONFERENCE

1. The purpose of this meeting is to review submittals that will be required by the Contractors and to review the project procedures that are to be followed during the progress of construction.
2. The Architect will send advance written notice of the Pre-Construction Conference date, time, and place to the various successful bidders. General Contractor shall require principal subcontractors to attend.
3. Architect will schedule and administer the Pre-Construction Conference for exchange of preliminary submittals, clarification of Owner, Architect and Contractor responsibilities, and for review of administrative procedures.
4. Architect shall prepare minutes and record significant discussions and agreements of each conference, and distribute the record of the meeting to everyone concerned.

E. PRE-INSTALLATION CONFERENCES

1. Conduct a pre-installation conference at the project site before each construction activity that requires coordination with other construction, as outlined in the technical sections.
2. The Architect will schedule a pre-installation conference, upon Contractor notification, at the project site before each construction activity that requires coordination with other construction.
3. Review conditions of installation, preparation, and coordination with related work.
4. Attendees: The Authorized representative of the Owner, Architect and their consultants; General Contractor, appropriate subcontractor(s), installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting.
5. Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

F. JOB PROGRESS MEETINGS

1. Job Progress meetings will be established on a weekly basis, or more frequent as determined by the Architect, to review the progress of construction, possible delays, problems, and projected construction activity. The General Contractor and principal subcontractors are required to attend progress meetings. Noted participants failing to be represented at project meetings, when specifically requested, will be taken into consideration when payment applications are being considered for approval by the Architect/Engineer.
 - a. Architect shall initiate and schedule Progress Meetings.
 - b. General Contractor shall require principal sub-contractors to attend.
 - c. The progress and schedule of the General Contractor and principal subcontractors shall be coordinated at this meeting. The representatives of the General Contractor and subcontractors present shall have the authority to change the Contractor's work schedule or authorize work with the consent of the Architect. If the noted participants fail to attend this meeting, it shall be his responsibility to obtain the information discussed at the meeting. Attendance at the meetings is required for Contractors' payment.
2. The Architect will schedule and administer Project progress meetings regularly throughout the project. Times and dates shall be agreed upon by the Architect, Owner and General Contractor.
3. Project meetings shall be held at the job site in a location designated by the Owner and Architect.
4. The Architect will prepare agenda with copies for participants, preside all meetings, record minutes and distribute copies to the participants and those affected by decisions made at meetings.
5. Attendance: General Contractor's Project Manager and Project Superintendent, Owner and Architect. All as appropriate to address agenda topics for each meeting. Major subcontractors and suppliers shall attend when requested by the Architect or General Contractor.
6. At each Progress Meeting, the General Contractor shall present to Owner and Architect any questions that have arisen as a result of carefully examining the Drawings and Specifications. Architect shall present any guides and advice or administrative procedures they wish to have followed for orderly and expeditious prosecution and administration of the Work. Agenda shall include at least the following:
 - a. Review and correct or approve minutes of the previous Progress Meeting.
 - b. Review other items of significance that could affect progress.
 - c. Include topics for discussion as appropriate to the current status of the Project.
 - d. Master Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Master Construction Schedule, whether on time, ahead or behind schedule. Determine how activities behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities shall be completed within the Contract time.

END OF SECTION 01 31 19

SECTION 01 32 16 – SCHEDULES AND REPORTS

A. GENERAL REQUIREMENTS

1. The Work under this Contract shall be planned, scheduled, executed, reported and accomplished using the Critical Path Method (hereinafter referred to as CPM), in workdays, unless otherwise specifically provided in the Contract Documents.
2. The primary objectives of the CPM Scheduling requirements are: (1) to insure adequate planning and execution of the Work by contractor; (2) to assist Owner and Architect in evaluating progress of the Work; (3) to provide the optimum coordination by Contractor of his trades, Subcontracts and Suppliers, and of his Work with the work or services provided by any separate contractors; (4) to permit the timely or detection of events or occurrences which may affect the timely prosecution of the Work; and (5) to provide a mechanism or tool for use by the Owner, Architect and Contractor in determining and monitoring any actions of the Contractor which may be required in order to comply with the requirements of the Contract Documents relating to the completion of the various portions of the Work by the Specific Dates specified in the Contract Documents.
3. The General Contractor is responsible for determining the sequence of activities, the time estimates of the detailed construction activities and the means, methods, techniques and procedures to be employed. The Master Construction Schedule shall represent each of the Milestone Dates indicated in Specification Section 01 15 00, and include the General Contractor's best judgment of how he will execute the Work in compliance with the Contract requirements. General Contractor shall ensure that the Master Construction Schedule is current and accurate and is properly and timely monitored, updated and revised as Project conditions and the Contract Documents may require.
4. General Contractor shall consult with all other Contractors, principal Subcontractors and Suppliers relating to the preparation of the construction plan and Master Construction Schedule. All principal subcontractors shall receive copies of the Master Construction Schedule, which relates to their work and shall be continually advised of any updates or revisions to the Master Construction Schedule as the work progresses. When the General Contractor submits the Master Construction Schedule to the Architect or makes any proposed updates or revisions to such Schedule, he shall consult with and have the concurrence of all principal Subcontractors, and Suppliers. General Contractor shall be solely responsible for ensuring that all Subcontractors and Suppliers comply with the requirements of the Master Construction Schedule for their portions of the Work.
5. The Master Construction Schedule shall provide the basic data relating to activities, durations and sequences. This data shall reflect the actual construction plan for the Project, and shall fully comply with all requirements of the Contract Documents.
6. When there are separate contractors working concurrently on the Project whose work must interface or be coordinated, the General Contractor shall coordinate his activities with the activities of the other subcontractors, and shall, prior to the submission of the Master Construction Schedule to the Architect, obtain written approval of the Master Construction Schedule by the separate contractors. If the General Contractor is unable to obtain such written approval by the separate contractors after his best efforts to do so, or if a conflict occurs that cannot be resolved by mutual agreement between any subcontractors, the Architect and Owner shall make a determination of the schedule, which shall be binding upon all Contractors; or, Owner reserves the right to seek other qualified responsible Contractors capable of achieving and committing to the proposed Master Construction Schedule.
7. The General Contractor shall be responsible for the drafting and computerization of principal Subcontractor's data for the Master Construction Schedule. The Master Construction Schedule shall be developed utilizing a current version of one of the following planning programs:
 - a. Primavera Project Planner.
 - b. Microsoft Project Works.

8. It is understood and agreed that the Master Construction Schedule is to represent the General Contractor's best plan and estimate for the Work; however, the General Contractor acknowledges that the Construction Schedule may have to be revised from time-to-time as progress proceeds. Any changes, modifications or adjustments made by the General Contractor to the Master Construction Schedule shall be in full compliance with all requirements of the Contract Documents.
9. The General Contractor acknowledges and agrees that the Master Construction Schedule must be flexible in order to accommodate and allow for coordination with the operations of the Owner and the work of separate contractors relating to the Project. The Owner and Architect will review the Master Construction Schedule for compatibility with Owner operations and the work of separate contractors. The General Contractor agrees to hold meetings with the Owner, Architect and separate contractors to resolve any conflicts between Master Construction Schedule and the operations of the Owner or work of separate contractors. Contractor agrees to fully cooperate with the Owner, Architect and separate Contractors to resolve such conflicts and to revise the Master Construction Schedule as reasonably required.
10. In order to maintain the orderly progress of the work performed on the Project, the Architect reserves the right to determine, in his sole discretion, the priority between the Work performed by the General Contractor and the work of any separate contractors or Owner's operations; this decision shall be final and binding upon the General Contractor and shall not be a cause for extra compensation or an extension of time, except where an extension of time is granted because or delay for which Contractor is otherwise entitled to an extension under the Contract Documents. Provided, however, that this right shall not be exercised by the Architect unless: (1) the determination is necessary, in the opinion of the Architect, because of Project conditions; and (2) General Contractor and any separate Contractors cannot otherwise agree upon such priority of schedule construed as relieving the Contractor of his obligation to cooperate with any separate contractors on the Project.
11. If the Master Construction Schedule indicates that the Owner or a separate contractor is to complete an activity or perform certain preceding work by a particular date, or within a certain duration, Owner and Architect, or any separate contractor shall not be bound to said date or duration unless Owner expressly and specifically agrees in writing to same. The review and approval or acceptance by Owner or Architect of the Master Construction Schedule, does not constitute an agreement by Owner or Architect of any start or finish date in the schedule or specific durations or sequences for activities of the Owner or any separate contractor; provided, however, that noting herein shall be construed as modifying or changing, or excusing the performance of Contractor or required portions of the Work by the Specific Dates as set forth in the Contract Documents.
12. The Specific Dates or Milestones Dates set forth in the Contract Documents represent only the major items of Work and may include interface dates with the operations of the Owner, the work of separate contractor or others. Milestone Dates are Contract requirements and are of the essence to this Contract and to the coordination of the Work by Contractor. Milestone Dates represent the latest allowable start or completion time for those portions of the Work to which each Specific Date relates. The Milestone Dates are not intended to be complete listing of all Work under this Contract or of all interfaces with work performed by other separate contractors, the Owner or others. The General Contractors shall determine the time requirements for all such interfaces and shall be responsible for planning, scheduling and coordinating the Work in order to complete in accordance with those requirements.
13. Approval or acceptance by the Owner or Architect of the Master Construction Schedule, or any revisions or updates thereto, is advisory only and shall not relieve the General Contractor of the responsibility for accomplishing each portion of the Work within each and every applicable Milestone Date. Omissions and errors in the approved or accepted Construction Schedule, or any revisions or updates shall not excuse performance, which is not in compliance with the Contract. Approval by the Owner or Architect in no way makes the Owner or Architect an insurer of the reliability, accuracy or feasibility of the Master Construction Schedule nor liable for time or cost overruns flowing from such omissions or errors. It is understood and agreed that the General Contractor cannot rely upon any informal or constructive

acquiescence or approval of the Master Construction Schedule by Owner or Architect has any right or power to agree to any schedule commitment or obligation on the part of the Owner or Architect except as set forth expressly in the Contract Documents.

14. Should the General Contractor intend or plan to complete the Work, or any portion thereof, earlier than any applicable Specific Date or the Contract Time, Contractor shall give timely and reasonable notice of this fact to the Architect. Architect shall have the sole discretion to agree to or reject such early completion plan by any Contractor. Owner and Architect shall have no duty or obligation to agree to, or to cooperate with contractor regarding any early completion plan or proposal by Contractor and shall not be liable for any damages of Contractor because of the rejection by Owner of said plan.
15. Unless otherwise specifically provided in the Contract Documents, Contractor acknowledges that Owner and Architect have contemplated in their planning and initial scheduling of the Project, and their budgeting for professional services, that the Work will be performed on a 5-day work week basis, utilizing a single 8-hour shift per day. Owner and Architect shall have the sole discretion of approving or rejecting a variance in the workweek, number of shifts, or shift length. Unless otherwise agreed by Owner or Architect, the General Contractor shall bear the cost of, and pay the Owner, for additional staff and supervisory personnel, including but not limited to the services of Architect and the Design Consultant necessary to support any variance in the contemplated work week, number of shifts or shift length.

B. PRE- AWARD ACTIVITIES

1. Upon receipt by the General Contractor of the Intent to Award, and until the Master Construction Schedule is approved by Owner and Architect, the General Contractor and principal subcontractors shall proceed with the Work in accordance with the Contract Documents.
2. Pre-Award Meetings: The General Contractor shall, upon notification from the Architect, attend all pre-award meetings relating to the Schedules and Reports requirements for this Project. The pre-award meeting is designed to assist the General Contractor in planning the Work and in developing the Master Construction Schedule.
3. Among other things, the Owner and Architect will review: The objectives of the Schedules and Reports requirements; the procedures and requirements for the preparation of the Master Construction Schedule and the Contract Cost Breakdown by Contractor; how the Requirements of the Contract Documents will be monitored and enforced by the Owner and Architect; long-lead items and time requirements for work by Subcontractors will be identified.
4. Should the General Contractor or principal subcontractors and suppliers fail or refuse to attend pre-award meeting(s), Owner shall have the right to terminate Contractor for default pursuant to the provisions of the General Contracts.

C. CONTRACT COST BREAKDOWN

1. Within ten (10) calendar days after Notice to Proceed, the General Contractor shall submit to the Architect a Contract Cost Breakdown for review, allocating a dollar value for the activities on the Master Construction Schedule in accordance with the requirements of the General Conditions. The dollar value for the activities shall be the cost of the work of the activity including labor, materials and pro rata contribution of General Conditions requirements, overhead and profit. The sum of all activity costs shall equal the total Contract Sum. The Contractor shall revise the Contract Cost Breakdown as necessary to gain the approval of the Architect and the Owner.

D. MASTER CONSTRUCTION SCHEDULE

1. Prior to awarding Contracts, a Master Construction Schedule, including Contract Milestone dates shall be established. The General Contractor shall be responsible for the overall coordination and development of the Master Project Schedule, with complete signed agreement by all principal subcontractors. The Master Construction Schedule shall represent all of the General Contractor's best

judgment of how to execute and complete the work in compliance with the Contract Milestone Dates and any specific dates stipulated in the Contract Documents.

The Master Construction Schedule shall be developed utilizing a current version of one of the following scheduling software:

- a. Primavera Project Planner
- b. Microsoft Project Works.

E. CONSTRUCTION SCHEDULE CONTENT

1. The Master Construction Schedule shall consist of a time-scaled, detailed graphical logic network representation identifying all of the activities which are part of the Work under the General Contractor's construction plan.
2. The graphic logical network shall include, but not be limited to, the following information:
 - a. Each activity will be coded with sufficient detail so as to distinguish the type of work or specification section.
3. The network diagram will show the interdependencies of the work activities and the major points of interface or interrelation with the activities of other contracts.
4. Outage schedules for exiting utility services that will be interrupted during the performance of the work. Allow a seven (7) workday window for each service shutdown that may affect other buildings on campus. All shutdowns will require an approved outage required that must be submitted at least seventy-two (72) hours in advance.
5. Acquisition and installation of equipment and materials, supplies and/or installed by the Owner or separate contractors:
 - a. Material to be stored on site; and
 - b. Milestone Dates.
 - c. For all major equipment and materials to be fabricated or supplied for the Project, the Master Construction Schedule shall show a sequence of activities including:
 - d. Preparation of Shop Drawings, sample submissions, and O&M manuals:
 - e. A reasonable time for review of Shop Drawings and samples or such time as specified in the Contract Documents;
 - f. Shop fabrication, delivery and storage;
 - g. Erection or installation; and
 - h. Testing of equipment and materials.
6. The Master Construction Schedule shall include completion dates for the Work that are no later than the required Milestone Dates.
7. All activity durations shall be given in workdays.

F. UPDATING OF CONSTRUCTION SCHEDULE/PROGRESS REPORTS

1. On a periodic basis, the General Contractor shall meet at the Project Site with the Architect to review status of actual progress. Said report shall set forth up-to-date and accurate progress data, shall be based upon the General Contractor's best judgment and shall be prepared by the General Contractor in consultation with all principal subcontractors and Suppliers.
2. The progress report shall show the activities or portions of activities, started and/or completed during the reporting period, the actual start, finish dates and percent completes for these activities, remaining durations and/or estimated completion dates for activities currently in progress.
3. The General Contractor shall submit a narrative report with the updated progress analysis which shall include, but not be limited to, a description of problem areas, current and anticipated delaying factors and their impact, explanations of corrective actions taken or planned, and newly planned activities or changes in sequence, and proposed logic for a Recovery Schedule, if required, as further described herein. The report shall also include:
 - a. A narrative describing actual work accomplished during the reporting period;

- b. A list of major construction equipment used and the total number of men by craft actually engaged in the Work during the reporting period;
 - c. A manpower and equipment forecast for the succeeding thirty (30) days;
 - d. A list of contractor-supplied materials and equipment, indicating current availability and anticipated jobsite delivery dates;
 - e. Schedule Reports: Initial and subsequent Schedule Reports will contain the following minimum information for each activity;
 - 1. Activity number, description and estimated duration in workdays;
 - 2. Early and late finish dates;
 - 3. Percentage of each activity completed as of each report;
 - 4. Remaining days ahead or behind schedule;
 - 5. Responsibility for activity. Actual start and finish dates shall be indicated for each activity, as appropriate.
 - f. Cost Reports: Initial and subsequent Cost Reports will include the following information for each activity, sorted by trade activity:
 - 1. Activity number and description;
 - 2. Percentage of value of Work in place against total value;
 - 3. Total cost of each activity;
 - 4. Value of Work in place since last report;
 - g. Value of Work in place to date;
 - h. Value of uncompleted Work.
4. The General Contractor shall be solely responsible for expediting the delivery of all materials and equipment to be furnished, so that the progress of construction shall be maintained according to the approved Master Construction Schedule. The General Contractor shall notify the Architect in writing, and in a timely and reasonable manner, whenever Contractor determines or anticipates that the delivery date of any material or equipment to be furnished by subcontractor will be later than the delivery date indicated by the Master Construction Schedule, or required consistent with the completion requirements of this Contract, subject to schedule updates as herein provided.

G. RECOVERY SCHEDULE

- 1. Should the Master Construction Schedule show at any time during the General Contractor's performance, in the sole opinion of the Architect, that the General Contractor is fourteen (14) or more workdays behind schedule for any Milestone Date, the General Contractor shall prepare a Recovery Schedule at no additional cost to the Owner, explaining and displaying how to reschedule his Work in order to regain compliance with the Master Construction Schedule during the immediate subsequent pay period.
- 2. If the Contractor believes that all of the time can be recovered during the subsequent pay period the Contractor will be permitted to prepare a Recovery Schedule. However, if the Contractor believes it will take more than thirty (30) workdays to recover all of the lost time, he shall prepare and submit a request for revision to the Master Construction Schedule and comply with all of the requirements for a Schedule Revision.

H. SCHEDULE REVISIONS

- 1. Should the General Contractor desire to or otherwise be required under the Contract Documents to make modifications or changes in his method of operation, his sequence of Work or the durations of the activities in his Construction Schedule, he shall do so in accordance with the requirements of the Contract Documents. The Architect must approve revisions to the approved Master Construction Schedule in writing.
- 2. The General Contractor shall submit requests for revisions to the Master Construction Schedule to the Architect, together with written rationale for revisions and description of logic for rescheduling work and

maintaining the Specific Dates listed in the Contract Documents. Proposed revisions acceptable to the Architect and Owner will be incorporated into next update of the Master Construction Schedule.

3. Prior to the submission by the General Contractor of his proposed schedule revisions, he shall meet with and gain written approval of all other subcontractors to make the revisions.

I. LIST OF SUBCONTRACTORS, SUPPLIERS AND MANUFACTURERS

1. The General Contractor shall submit to the Architect, prior to award of Contract, a list of subcontractors, suppliers and manufacturers participating on the Project. The list shall be complete with names and addresses.

J. COORDINATION

1. The General Contractor shall coordinate the Work with that of all sucontactors and shall cooperate fully with the Architect and Owner in maintaining orderly progress toward completion of work as scheduled. The General Contractor's decisions regarding priority of the Work of all contractors at the site shall be final and shall not be cause for extra compensation or extension of time, except where extension of time is granted because of delay for which the Contractor is otherwise entitled to an extension of time under the Contract Documents.

END OF SECTION 01 32 16

SECTION 01 33 00 – SUBMITTAL PROCEDURES

A. SUMMARY

1. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including the following:
 - a. Shop drawings.
 - b. Product data.
 - c. Samples.

B. SUBMITTAL PROCEDURE

1. Submittals, including those specified herein shall be submitted to the Architect for review.
2. Contractors on this Project shall provide all submittals in strict accordance with the requirements of this Section. Where a submittal is required by a Contractor but assistance needed from others, Contractors shall participate and cooperate to expedite each submittal.
3. Where submission of samples, shop drawings, or other items are required from suppliers or subcontractors, it shall be the responsibility of the Contractor for whom the subcontractor is executing the Work to see that the submittal items required are complete and properly submitted, and corrected and resubmitted at the time and in the order required so as not to delay the progress of the Work. All Submittals shall be made through the Prime Contractor.
4. The Contractor shall check shop drawings, samples, and other submittals and submit them to the Architect with a letter of transmittal giving his approval, comments, and suggestions. Each transmittal shall include the following information:
 - a. Date submitted.
 - b. Project title and number.
 - c. Contractor's name and address.
 - d. Identification by Specification Section and quantity submitted for each submittal including name of subcontractors, manufacture or supplier.
 - e. Notification of deviations from the Contract Documents for each submittal.
 - f. Contractor's written approval marked on each submittal.
5. The Contractor shall prepare, review and stamp with his approval and submit, with reasonable promptness or within the specified time periods and in orderly sequence so as to cause no delay in the Work or in the Work of another Contractor, submittals required by these Contract Documents or subsequently required by modifications.
6. The Architect shall review and take action on submittals with reasonable promptness, so as to cause no delay in the progress. A reasonable period of time in accordance with approved project schedule for review of and action taken on submittals shall be as specified herein, but in no case shall it be less than 10 calendar days from the time the submittal is received by the Architect until the time the submittal is marked and forwarded or returned. Contractors shall allow sufficient mailing time for submittals.

C. SHOP DRAWINGS

1. Submit newly prepared information drawn accurately to scale. Highlight, encircle or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
 - a. Auto-cad drawings may be available from the Architect. The Contractors requiring this service must contact the Architect to verify availability.
2. Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor or subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.
 - a. Advertising brochures will not be accepted as shop drawings.

- b. Erection and setting drawings as referred to in these Specifications will be considered as shop drawings and shall be submitted along with detailed shop drawings.
- c. Where schedules are required to indicate locations, they shall be submitted as part of the shop drawings package for that item.
- d. Shop drawings and schedules shall repeat the identification shown on the Contract Drawings.
- e. The Contractor shall check all shop drawings, samples and other submittals and submit them to the Architect, giving his approval and/or comments and suggestions.
- f. Include the following information:
 1. Dimensions and clearances required.
 2. Identification of products and materials included by sheet and detail number.
 3. Compliance with specified standards.
 4. Notation of coordination requirements.
 5. Notation of dimensions established by field measurements.
 6. Clearly mark each copy of identify pertinent materials.
 7. Show performance characteristics and capacities.
 8. Note variances from the Contract Documents including manufacturer's recommended changes to sequencing and to piping and control diagrams.
3. Preparation of Submittals: Provide permanent marking on each submittal to identify project, date, Contractor, Subcontractor, submittal name and similar information to distinguish it from other submittals. Show Contractor's executed review and approval marking and provide space for Architect's "action" marking. Package each submittal appropriately for transmittal and handling. Submittals that are received from sources other than the General Contractor may be returned "without action". Package each submittal according to applicable specification section. Use a separate transmittal for each submittal.
4. By approving and submitting shop drawings, the Contractor thereby represents that he has determined and verified field measurements, field construction criteria, materials, catalog numbers, and similar data, and that he has checked and coordinated each shop drawing with the requirements of the Work and of the Contract Documents prior to submitting to the Architect. Submittals that are received from sources other than the General Contractor will be returned without review, requiring re-submittal.
5. The Contractor shall make corrections required by the Architect and shall resubmit the required number of corrected copies of shop drawings until approved or accepted. The Contractor shall direct specific attention in writing or on resubmitted shop drawings to revisions other than the corrections requested by the Architect on previous submissions.
6. The Architect will review shop drawings only for conformance with the design concept of the Project and with the information given in the Contract Documents. The Architect's review of a separate item shall not indicate review of an assembly in which the item functions.
 - a. Only shop drawings, product data and samples marked "No Exceptions Taken" or "Note Marking/Confirm" shall be considered "final" and used in conjunction with the work of the Project.
7. The Architect's review of shop drawings shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has informed the Architect in writing of such deviation at the time of submission and the Architect has given written approval to the specific deviation, nor shall the Architect's action relieve the Contractor from responsibility for errors or omissions in the shop drawings.
 - a. The Architect's review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and qualities, or for substantiating instructions or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which it is a component.

8. Notations and remarks added to shop drawings by the Architect are to insure compliance to Contract Documents and do not imply a requested or approved change to contract cost.
9. Should deviations, discrepancies or conflicts between shop and contract drawings and Specifications be discovered, either prior to or after review, Contract Documents shall control and be followed.
10. Submit electronic PDF files of all shop drawings and product data submittals.
11. Shop drawings will be marked as follows: Contractor shall take the following action for each respective marking:
 - a. "APPROVED" or "NO EXCEPTIONS TAKEN" – Copies will be distributed as indicated under above schedule.
 - b. "APPROVED AS NOTED" or "NOTE MARKINGS/CONFIRM" – Final but Restricted Release; Contractor may proceed with fabrication, taking into account the necessary corrections on submittal and with Contract Documents. Corrected shop drawings shall be resubmitted before fabrication of this Work is completed or materials are delivered to the Project site.
 - c. "REVISE AND RESUBMIT" or "NOTE MARKINGS/RESUBMIT" – Contractor may proceed with fabrication, taking into account the necessary corrections. Corrected shop drawings shall be resubmitted before fabrication of this work is complete to obtain a different action marking. Do not follow drawings marked "Resubmit" to be used in connection with installation of the Work.
 - d. "REJECTED" – Contractor will be required to resubmit shop drawings in their entirety. No fabrication or installation shall be started until shop drawings so marked have been completely revised, resubmitted and marked by Architect according to preceding Paragraphs.

D. SCHEDULE OF VALUES

1. Contractor shall prepare and submit to the Architect a Schedule of Values for approval within 14 days after award of Contract. The contract breakdown shall be the same form as used in submitting request for Payments as covered in Applications for Payment of the General and Supplementary Conditions. Each item of work shall have indicated a separate cost for labor and material. Allowances shall be noted as separate line items.
2. Schedule of Values shall be coordinated with the Construction Schedule such that the percentages of work completed closely relates to the values for the work shown on the request for payments.
3. At the beginning of the project, the Contractor shall prepare a schedule of monthly payments showing the amount the Contractor may require for Work proposed to be completed.

E. PRODUCT DATA

1. Collect Product Data into a single submittal for each element of construction or system. Product data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves.
 - a. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
 1. Manufacturer's printed recommendations.
 2. Compliance with trade association standards.
 3. Compliance with recognized testing agency standards.
 4. Application of testing agency labels and seals.
 5. Notation of dimensions verified by field measurement.
 6. Notation of coordination requirements.
 - b. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
 1. Preliminary Submittal: Submit a preliminary single copy of Product Data where selection of options is required.

- c. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators and others required for performance of construction activities. Show distribution on transmittal forms.
 - 1. Do not proceed with installation until a copy of Product Data is in the Installer's possession.
- 2. In compliance with the OSHA Hazard Communication Standard (1910, 1200, 08-24-1987) Contractors are required to submit to the Architect, MSDS (Material Safety Data Sheets) for ALL products classified as hazardous that their firm has knowledge that they will be furnishing, using or storing on the jobsite during the duration of this Project in accordance with OSHA standards.

F. SAMPLES

- 1. The Contractor shall submit to the Architect triplicate samples to illustrate materials or workmanship, colors and textures, and establish standards by which the Work will be judged.
 - a. Submit full size, fully fabricated samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.
 - 1. Mount or display samples in the manner to facilitate review of quantities indicated. Prepare samples to match the Architect's sample. Include the following:
 - a. Specification Section number and reference.
 - b. Generic description of the sample.
 - c. Sample Source.
 - d. Product name or name of the manufacturer.
 - e. Compliance with recognized standards.
 - f. Availability and delivery time.
 - 2. Submit samples for review of size, kind, color, pattern and texture. Submit samples for final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 - a. Where variation in color, pattern, texture and other characteristic is inherent in the materials or product represented, submit at least 3 multiple units that show approximate limits of the variations.
 - b. Refer to other Specification sections for requirements for samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
- 2. By approving and submitting samples, the Contractor thereby represents that he has determined and verified materials, catalog numbers and similar data, and that he has checked and coordinated each sample with the requirements of the Work and of the Contract Documents prior to submitting to the Architect.
- 3. The Contractor shall resubmit the required number of correct or new samples until approved. The Contractor shall direct specific attention in writing or on resubmitted samples to revisions other than the changes requested by the Architect on previous submissions.
- 4. The Architect will review samples but only for conformance with the design concept of the Project and with the information given in the Contract Documents. The Architect's review of a separate item shall not indicate approval of an assembly in which the item functions.
- 5. The Architect's action shall not relieve the Contractor of responsibility for deviations from the requirements of the Contract Documents unless the Contractor has informed the Architect in writing of the deviation at the time of submission and the Architect has given written approval to the specific deviation, nor shall the Architect's action relieve the Contractor from responsibility for errors or omissions in the samples.

6. Unless otherwise specified, samples shall be in triplicate and of adequate size to show function, equality, type, color, range, finish and texture of material. When requested full technical information and certified test data shall be supplied.
 - a. Each sample shall be labeled, bearing material name and quality, the Contractor's name, date, project name and other pertinent data.
 - b. Transportation charges to and from the Architect's office must be prepaid on samples forwarded.
The Architect shall retain samples until the Work for which they were submitted has been accepted.
7. Materials shall not be ordered until final review is received in writing from the Architect. Materials shall be furnished, equal in every respect to reviewed samples. Where color or shade cannot be guaranteed, the manufacturer shall indicate the maximum deviation. Work shall be in accordance with the final reviewed samples.

END OF SECTION 01 33 00

SECTION 01 45 00 – QUALITY CONTROL

A. SUMMARY

1. This Section includes Contractors' responsibilities of quality control services and extent of quality control sources to be performed.
2. Related Work Specified Elsewhere
 - a. Section 01 45 29 – Testing Laboratory Service.
 - b. Section 01 71 23 – Field Engineering.
3. Definitions: Quality control services include inspections and tests, and actions related thereto, including reports, but do not include contract enforcement activities performed directly by Architect/Engineer. Quality control services include those inspections and tests and related actions performed by independent agencies and governing actions performed by independent agencies and governing authorities, as well as directly by Contractor.
 - a. Testing service is required to immediately notify Architect of discrepancies observed in the Work performed and to be performed to the Contract Documents.
4. Inspections, tests and related actions specified in this Section and elsewhere in Contract Documents are not intended to limit Contractor's quality control procedures, which facilitate compliance with requirements of Contract Documents.
5. Requirements for quality control services by Contractor, as requested or to be requested by Architect/Engineer, Owner, governing authorities or other authorized entities are not limited by provisions of this section.
6. Contractors shall review and become familiar with the requirements of Tests and Inspections, of the General Conditions covering the provisions for testing the Work.

B. CONTRACTOR RESPONSIBILITIES

1. Contractor shall coordinate with independent testing agency performing inspections, test and quality control services.
 - a. General Contractor will schedule services of independent testing agency to perform services so specified.
 - b. Owner will engage and pay for services of independent agency to perform inspections and tests.
 - c. Except where specifically provided as indicated by another entity, inspections, tests, and similar quality control services, including those specified to be performed by independent agency are the Owner's responsibility, and costs thereof are not to be included in contract sum.
2. Retest Responsibility: Where results required inspection, test or similar service are unsatisfactory (do not indicate compliance of related work with requirements of Contract Documents), retests are responsibility of Contractor. Retesting of work revised or replaced by Contractor is Contractor's responsibility, where required tests were performed on original work.
3. Responsibility for Associated Services: Contractor is required to cooperate with independent agencies performing required inspections, tests and similar services. Provide auxiliary services as reasonably requested, including access to work, the taking of samples or assistance with the taking of samples, delivery of samples, delivery of samples to test laboratories, and security and protection for samples and test equipment at project site.
4. Coordination: Contractor and each engaged independent agency performing inspections, tests and similar services for project are required to coordinate and sequence activities so as to accommodate required services with minimum delay of work and without the need for removal/replacement of work to accommodate inspections and tests. Scheduling of times for inspections, tests taking of samples and similar activities is Contractor's responsibility.
5. Sampling and testing are required for the following Sections of Work and shall be performed by an independent testing lab and paid for (by the Owner).

- a. Section 31 00 00 – Earthwork: Soil testing and inspection service during earthwork operations for sub-grades and fill.
- b. Section 03 30 00 – Cast-In-Place Concrete: Inspection of reinforcing steel placement.
- c. Section 03 30 00 – Cast-In-Place Concrete: Field quality control of concrete.
- d. Section 03 30 00 – Cast-In-Place Concrete: Tests for concrete materials and mix design tests.
- e. Section 03 30 00 – Cast-In-Place Concrete: Testing of FF/FL floor tolerances.
- f. Section 04 20 00 – Masonry Mortar: Field quality control of mortar.
- g. Section 04 20 00 – Masonry Grout: Field quality control of grout.
- h. Section 04 20 00 – Masonry Units: Field quality control of unit masonry and masonry assemblies.
- i. Section 05 12 00 – Structural Metal Framing: Field quality control for welds and bolted connections.
- j. Section 05 12 00 – Structural Metal Framing: Field quality control for high strength steel torque bolted connections.
- k. Section 05 12 00 – Structural Metal Framing: Field quality control for structural steel alignment.

C. QUALIFICATION OF LABORATORY

- 1. Shall meet “Recommended Requirements of Independent Laboratory Qualifications,” published by American Council of Independent Laboratories. For concrete and steel the laboratory shall comply with the basic requirements of ASTM E 329, “Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction.”
- 2. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection; with memorandum of remedies of deficiencies reported by inspection.
- 3. Testing equipment shall be calibrated at maximum 12-month intervals by devices of accuracy traceable to either:
 - a. National Bureau of Standards.
 - b. Accepted values of natural physical constants.
 - c. Submit copy of certificate of calibration, made by accredited calibration agency.
- 4. Refer to Section 01 45 19 – Testing Laboratory Service for additional requirements.

D. SUBMITTALS

- 1. Submit two (3) copies of test reports directly to the Architect from the approved testing services.

E. SOIL COMPACTION TESTING

- 1. The Contractors for the Work of Section 31 00 00 – Earthwork, Site and Building shall cooperate and coordinate with the soil testing and inspection service for quality control testing during earthwork operations as specified under Section 31 00 00, as follows:
 - a. Field density test reports.
 - b. One optimum moisture-maximum density curve for each type of soil encountered.
 - c. The Contractor shall arrange for Soils Engineer to be on the site for observation and testing during times when the following operations are being performed.
 - 1. Compaction of sub grades and fill, including utility backfill. During compaction operations, the Soils Engineer shall carefully monitor existing foundations to detect possible foundation movements. If movement is detected, Work shall be stopped and the Architect immediately notified.
- 2. Excavation, Fill and Backfill Contractors shall cooperate and coordinated with the soil testing and inspection service to confirm soil-bearing adequacy prior to placement of reinforcing steel or concrete as specified.
- 3. Percentage of Maximum Density Requirements: See Specification Section 31 00 00.

4. Quality Control Testing during Construction: Testing service must inspect and approve sub grades and fill layers before further construction work is performed thereon. Tests of sub grades and fill layers will be taken as follows:
 - a. Footing Sub grade: For each strata of soil on which footings will be placed, conduct at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing sub grade may be based on a visual comparison of each sub grade with related tested strata, when acceptable to Architect, except that a minimum of one test shall be performed for each 15,000 sq. ft. of building area.
 - b. Paved Areas and Building Slab Sub grade: Make at least one field density test of sub grade for every 2,000 sq. ft. of paved area or building slab, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 2,000 sq. ft. of overlaying building slab or paved area, but in no case less than 3 tests.
 - c. Foundation and Retaining Wall Backfill: Take at least 2 field density tests, at locations and elevations as directed.
 - d. Trench Backfill: For each compacted backfill layer make one field density test between each drainage structure.
5. Soil Bearing Adequacy: Refer to Structural Drawings for design bearing pressure assumed in the design of footings and foundations.
6. If, in the opinion of the Architect, based on reports of testing service and inspection, sub grade or fills which have been placed are below specified density, additional compaction work and testing shall be provided by the Contractor for the Section of Work involved at no additional expense, until sub grade or fills meet or exceed specified density.

F. INSPECTION OF REINFORCING STEEL PLACEMENT

1. The Contractor for the Work of Section 03 30 00 – Cast-In-Place Concrete, shall cooperate and coordinate with the testing laboratory to perform field inspection of the placement of reinforcing steel prior to, and in some specified instances during the placement of concrete in all reinforced concrete structures, unless specifically noted otherwise.
2. Inspection shall include the following:
 - a. All structures:
 1. Size of all reinforcing bars.
 2. Measurement of bar laps.
 3. Spacing of reinforcing bars.
 4. Measurement of reinforcing concrete cover.
 5. Adequacy of reinforcement ties to prevent movement during concrete placement.
 6. Placement of reinforcing chairs, bolsters, and concrete blocks supporting reinforcement.
 7. Condition of reinforcing free of corrosion scale, grease, oil, and other foreign materials which would reduce bond of concrete to reinforcement.
 - b. Slabs-on-Grade:
 1. Nominal size of welded wire fabric.
 2. Measurement of fabric lap.
 3. Type, size and spacing of supports for welded wire fabric.
 4. Adequacy of maintaining welded wire fabric in correct position during the concrete placement. If concrete workers walk on fabric during concrete placement, is fabric lifted back in to correct position prior to set of concrete. (THE TESTING AGENCY SHALL BE PRESENT DURING THE PLACEMENT OF SLABS-ON-GRADE, WHICH USE WELDED WIRE FABRIC OR REINFORCING STEEL BARS).
 5. Slabs-on-grade with fibrous reinforcement do not require this inspection.

3. Report inspection results in writing to the Architect and Contractor the same day that tests are made. Reports shall indicate the specific structural items inspected and the location, with column grid references, where possible to clearly identify the inspected items.
4. Additional Inspections: Where inspections indicate deficiencies and concrete placement is made prior the correction and retesting of these deficiencies or where concrete placement of any structural item is made without this required inspection, the testing laboratory shall conduct additional tests, including concrete coring, magnetic detection devices, sonic testing devices and other methods as required to verify the conformance of the reinforcing steel placement to the Contract Documents. The Contractor shall pay for such inspections conducted and other additional inspections as may be required when unacceptable or uninspected reinforcing steel placement is verified.

G. CONCRETE TESTING

1. The Contractor for the Work of 03 30 00 – Cast-in-Place Concrete, shall cooperate and coordinate with the testing laboratory to perform field quality control testing during concrete work. Refer to applicable specification sections for concrete testing requirements for cast-in-place concrete testing requirements.
2. Quality Control Testing During Construction: Perform sampling and testing for field quality control during the placement of concrete, as follows:
 - a. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.
 - b. Slump: ASTM C143, one test for each concrete load at point of discharge, and one for each set of compressive strength test specimens.
 - c. Air Content: ASTM C231, pressure method; one for every other concrete load at point of discharge or when the indication of change requires.
 - d. Compression Test Specimens: ASTM C31, one set of 6 standard cylinders for each compressive strength test, unless otherwise directed.
 1. Cast and store 3 cylinders for laboratory cured test specimens and 3 field-cured test specimens as specified in ASTM C31.
 - e. Concrete Temperature: Test hourly when air temperature is 40 degrees F. and below and when 80 degrees F. and above; and each time a set of compressive test specimens is made.
 - f. Compressive Strength Tests: ASTM C39, one set for each 100 cu. yds. Or fraction thereof, of each mix design placed in a day or for each 5,000 sq. ft. of surface area placed; 2 specimens (one field cured and one lab cured) tested at 7 days, and 2 specimens (one field cured and one lab cured) tested at 28 days, and 2 specimens (one field cured and one lab cured) retained in reserve for later testing if required.
 1. When the frequency of testing will provide less than 5 strength tests for a given mix design, conduct testing strength tests for a given mix design, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 2. When the total quantity of a given mix design of concrete is less than 50 cu. yds., the strength tests may be waived by the Architect if, in his judgment, adequate evidence of satisfactory strength is provided.
 3. When the strength of field-cured cylinders is less than 85 percent of companion laboratory cured cylinders, evaluate current operations and provide corrective procedures for protection and curing the in-place concrete.
3. Report test results in writing to the Architect and ready-mix supplier on the same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of Contractor, name of concrete supplier and truck number, name of concrete testing service, concrete type and class, location of concrete batch in the structure, design compressive strength at 28 days, concrete mix proportions and materials, type and amount of fibrous reinforcement, compressive breaking strength, and type of break for both 7 day tests and 28 day tests.

4. Additional Tests: The testing service will make additional tests of in-place concrete, as directed by the Architect, when test results indicate the specified concrete strengths and other characteristics have not been attained in the structure. The testing service shall conduct tests to determine the strength and other characteristics of the in-place concrete by compression test on cored cylinders complying with ASTM C42 or by load testing specified in ACI 318 or other acceptable nondestructive testing methods, as directed. The Contractor shall pay for such tests conducted and other additional testing as may be required, when unacceptable concrete is verified.
5. Evaluation of Quality Control Tests: Do not use concrete delivered to the final point of placement which has slump of total air content outside the specified values.
 - a. Compressive strength tests for laboratory-cured cylinders will be considered satisfactory if the averages of all sets of 3 consecutive compressive strength tests results equal or exceed the 28 day design compressive strength of the type of class of concrete; and no individual strength test falls below the required compressive strength by more than 500 psi.
 - b. Strength test of specimens cured under field conditions may be required by the Architect to check the adequacy of curing and protecting of the concrete placed. Specimens shall be molded by the field quality control laboratory at the same time and from the same samples as the laboratory cured specimens.
 1. Provide improved means and procedures for protecting concrete when the 28-day compressive strength of field-cured cylinders is less than 85 percent of companion laboratory cured cylinders.
 2. When laboratory cured cylinder strengths are appreciably higher than the minimum required compressive strength, field cured cylinder strength need not exceed the minimum required compressive strength by more than 500 psi even though the 85 percent criterion is not met.
 3. If individual tests of laboratory cured specimen produce strengths more than 500 psi below the required minimum compressive strength or if tests of field cured cylinders indicates deficiencies in protection and curing, provide additional measures to assure that the load-bearing capacity of the structure is not jeopardized. If the likelihood of low-strength concrete is confirmed and computations indicate the load-bearing capacity may have been significantly reduced, tests of cores drilled from the area in question may be required.
 - c. If the compressive strength tests fail to meet the minimum requirements specified, the concrete represented by such tests will be considered deficient in strength.
6. Deficient concrete shall be removed and replaced by the Contractor without additional cost to the Owner.

H. CONCRETE MATERIALS AND MIX DESIGN

1. Concrete Materials and Mix Design: The contractor(s) for Section 03 30 00 – Cast-In-Place Concrete shall provide the following in conformance with the requirements of Section 03 30 00 – Cast-In-Place concrete.
 - a. Ready-mixed concrete shall be mixed and delivered in accordance with ASTM C94.
 - b. Product Data: Submit 2 copies of manufacturer's specifications with application and installation instructions for proprietary materials and items, including admixtures, bonding agents, water stops, joint systems, chemical floor hardeners and dry shake finish materials.
 - c. Laboratory Test Reports: Submit 2 copies of laboratory test reports for concrete materials and mix design tests. The Architect's review will be for general information only. Production of concrete to comply with specified requirements is the Contractor's responsibility.
 - d. Mix Design: Submit 6 copies of concrete mix designs for each type of mix required by the Concrete Schedule indicating the amount of each ingredient (by weight) in one cubic yard of concrete, the calculated water/cement ratio, and the slump.
2. Tests for Concrete Materials.
 - a. For normal weight concrete, test aggregates by the methods of sampling and testing of ASTM C33.
 - b. For lightweight concrete, test aggregates by the methods of sampling and testing of ASTM C330.

1. For Portland cement, sample the cement and determine the properties by the methods of test of ASTM C33.
- c. Submit written reports for each material sampled and tested, prior to the start of Work. Provide the project identification name and number, date of report, name of Contractor, name of concrete testing service, source of concrete aggregates, materials manufacturer and brand name for manufactured materials values specified in the referenced specification for each material, and test results. Indicate whether or not material is acceptable for intended use.
3. Submit signed statement from ready-mix plant that concrete furnished for the Project will exactly conform to the approved design mixes.

I. TESTS FOR FF/FL:

1. Refer to Section 03 30 00 – Cast-In-Place Concrete.

J. TESTS FOR MORTAR

1. The Contractor for the Work Section 04 20 00 – Masonry Units, shall cooperate with a separate testing laboratory to perform field quality control testing during the masonry work under Section 04 20 00 – Masonry Mortar, unless specifically noted otherwise.
2. For colored and non-colored mortars test for compressive strength by the methods of sampling and testing of ASTM C109 and ASTM C780.
3. Provide a minimum of one set of cubes for testing per 5,000 sq. ft. of masonry wall construction and as directed by Architect.
4. Submit written reports for each material sampled and tested. Provide the project identification name and number, date of report, name of contractor, name of testing service, source of aggregates, material manufacturer and brand name for manufactured materials, values specified in the referenced specification for each material and test results. Indicate whether or not material is acceptable for intended use.
5. If compressive strength tests fail to meet the minimum requirements specified, the mortar represented by such tests will be considered deficient in strength.
6. Deficient mortar shall be removed and replaced by the contractor without additional cost to the Owner.

K. TESTS FOR GROUT

1. The Contractor for the Work of Section 04 20 00 – Unit Masonry, shall cooperate with a separate testing laboratory to perform field quality control testing during the masonry work under Section 04 20 00, unless specifically noted otherwise.
2. Grout for filling reinforced or un-reinforced concrete masonry cores or brick cavities test for compressive strength by methods as described in Section 04 20 00.
 - a. Provide a minimum of one set of 3 test specimens for testing per 5,000 square feet of masonry wall construction or for each ready mix truck load of grout and as directed by the Architect.
3. Submit written reports for each material sampled and tested. Provide the project identification name and number, date of report, name of Contractor, name of testing service, source of aggregates, material manufacturer and brand name for manufactured materials, values specified in the referenced specification for each material, specific location where material represented by sample is used, slump and compression test results. Indicate whether or not material is acceptable for intended use.
4. If the compressive strength tests fail to meet the minimum requirements specified, the grout represented by such tests shall be considered deficient in strength.
5. Deficient grout shall be removed by the Contractor without additional cost to the Owner.

L. TESTS OF CONCRETE MASONRY PRISMS

1. The Contractor for the Work of Section 04 20 00 – Unit Masonry, shall cooperate with a separate testing laboratory to perform field quality control testing during the masonry work under Section 04 20 00.

2. When required by the Masonry Plan, construct a set of 3 masonry prisms using mortar and concrete masonry units to be used in the masonry work. Unless otherwise noted, construct prisms 8 inches by 8 inches by 16 inches high (nominal) in compliance with ASTM E447, Method B.
3. When prism tests are required to establish the strength of masonry in lieu of Masonry Inspections, provide a minimum of one set of 3 masonry prisms for testing for each 5,000 sq. ft. (gross) of masonry wall construction.
4. Submit written reports for each prism tested. Provide the project identification name and number, date of report, name of Contractor, name of testing service, name of material suppliers, specific location where masonry represented by the prism is used, compressive test strength results and specified required strength.
5. If the compressive strength tests fail to meet the minimum strength specified in the Plans, the masonry represented by the tests shall be considered deficient.
6. When tests indicating deficient masonry represent masonry already constructed, such masonry shall be moved and replaced by the Contractor without additional cost to the Owner. In lieu of removal and replacement, additional cores may be grouted as required and directed by the Architect without additional cost to the Owner.

M. MASONRY INSPECTION

1. Provide masonry construction inspection of concrete or brick masonry walls indicated as requiring inspection on the Masonry Plans to insure that masonry construction is in conformance with the Contract Documents. Masonry inspection is required for those masonry elements which must be constructed to attain high design strengths.
2. Qualification of Inspection Agency: Refer to Section 01 45 29 – Testing Laboratory Service. Individual inspector shall be certified as a masonry construction inspector by the National Concrete Masonry Association or by a qualified state Masonry Institute or Association.
3. Inspection shall use NCMA-TEK 18-3 Quality Assurance as a guideline.
4. The individual or individuals who will perform the masonry inspection shall be present for the Pre-masonry Conference.
5. The masonry inspector shall prepare a written report or reports for each day of inspection.
6. The masonry inspector shall be present and observe all masonry construction operations in walls requiring inspection. The masonry inspector shall be present at the project site within sufficient time, in advance of grouting operations, to inspect the construction to insure its conformance to the Contract Documents and that grouting may proceed. No grouting shall be permitted unless the masonry inspector is present and has indicated that the masonry construction is properly prepared for the grouting operation.

N. WELDING QUALITY CONTROL

1. Refer to Structural Drawings and Section 05 12 00 for structural steel testing requirements.
2. Welding operators shall be qualified under the provisions of the AWS Structural Welding Code on test pieces in positions and with clearances equivalent to those actually to be encountered in construction. Welders shall make only those types of welds for which they are specifically certified.
3. Welds requiring inspection shall be so indicated in the Drawings.
 - a. Welds indicated as requiring visual inspection shall be visually inspected by an independent inspector, acceptable to the Architect, pre-qualified to make the weld being inspected. Welders and inspectors shall be pre-qualified by the American Welding Society Qualifications Test.
4. The Contractor performing the welding requiring visual inspection shall coordinate with an independent testing service, acceptable to Architect to perform weld testing.
5. Submit written reports for each weld tested. Provide project identification and number, date of report, name of Welding Contractor, name of testing service, location of weld type of weld, and test results.

Indicate whether or not weld is acceptable for intended use. Written reports shall be submitted for each weld tested and shall indicate whether or not weld is acceptable for intended use.

6. If by inspection welds fail to meet minimum acceptable criteria, the welds shall be cut out and replaced.

O. BOLTED STRUCTURAL CONNECTIONS QUALITY CONTROL

1. The Contractor to the Work of Section 05 12 00 – Structural Steel, shall cooperate with a separate testing laboratory, to perform field quality control inspection of slip-critical and snug-tight bolted connections.
2. Inspection of slip-critical connections shall be visual. The inspector shall be present at the beginning of steel erection to insure that the erector is conforming to the Contract Documents and AISC Specifications. The inspector shall verify that the erector is marking the bolts and nuts prior to the turn-of-nut procedure. Ten percent of all slip-critical bolted connections shall be observed as they are installed. Any connections which, in the opinion of the inspector, do not meet the tightening requirements of the Contract Documents shall be corrected by the erector.
 - a. Inspection of snug-tight connections shall be made by use of a spud wrench. Ten percent of all snug-tight bolted connections selected randomly over the entire limits of the building structure shall be tested to verify tightness. If more than 20 percent of the bolts tested do not meet the General Requirements of the Contract Documents, the erector shall be required to retighten all snug-tight bolted connections on the Project.

P. STRUCTURAL STEEL ALIGNMENT QUALITY CONTROL

1. The Contractor for the Work of Section 05 12 00 – Structural Steel, shall cooperate with the separate testing laboratory, to perform field measurement of structural steel beams, columns, joist and deck alignment.
2. Alignment shall be measured and compared to AISC “Code of Standard Practice for Steel Buildings and Bridges”.
3. The Testing Agency shall submit, to the Architect, a written report summarizing the measurements performed and the equipment used in the fieldwork. Where alignment fails to meet AISC requirements, the Contractor for the work in Section 05 12 00 shall make the required correction.

Q. COLD-FORMED METAL FRAMING QUALITY CONTROL

1. The Contractor for the Work of Section 05 40 00 – Cold-Formed Metal Framing, shall cooperate with the separate testing laboratory, to perform field inspections of the cold-formed metal framing and light gauge steel trusses installed on this project.
2. Refer to Specification Section 05 40 00 for testing requirements. Testing, in general shall consist of visual inspections for connections consisting of: truss-to-truss, truss-to-base (masonry walls), truss-to-structural steel, etc.; and, connections of structural cold-formed framing of exterior wall systems.
3. Testing may also include destructive testing of the connections for analysis of anchoring loads, as well as any weld connections.
4. The Testing Agency shall submit, to the Architect, a written report summarizing the inspections performed and the equipment used in the field work. Where failures occur in the connections, the Contractor for the work in Section 05 40 00 shall make the required correction(s).

R. THERMAL SCAN

1. Owner reserves the right to obtain, at its sole expense, an independent thermal scan of the building during the first winter season following occupancy of the Project. The agency retained by the Owner will perform a sufficient number of infrared scans of the interior and exterior of the building envelope to evaluate the following:

- a. Any portions of the building envelope with excessive heat loss.
 - b. Any portion of the building envelope with excessive infiltration or exfiltration and their sources.
 - c. Any portions of the building with abnormally low insulation values.
2. Thermo grams of all problem areas will be provided for comparison with color real life photo grams. All work will be recorded on video.
 3. Breaks and/or voids in the specified insulation systems may be considered defective and or non-conforming work. In such case, the Contractor may be required to remedy the condition(s) without additional compensation.

S. REPAIR AND PROTECTION

1. General: Upon completion of inspection, testing, sample-taking, and similar services performed on Work, repair damaged Work and restore substrates and finishes to eliminate deficiencies including defects in visual qualities of exposed finishes. Except as otherwise indicated, comply with requirements of Contract Documents for "Cutting and Patching." Protect Work exposed by or for service activities and project repaired Work. Repair and protection is Contractor's responsibility for inspection, testing or similar service.

END OF SECTION 01 45 00

SECTION 01 45 29 – TESTING LABORATORY SERVICE

A. SUMMARY

1. The Owner, through the Architect, may employ and pay for services of an independent testing laboratory to perform specified inspection, testing and sampling for concrete and masonry services. Testing shall be at the direction of the Owner or Architect, as required.
2. Inspections and testing required by laws, ordinances, rules, regulations, or orders of public authorities and General Conditions and applicable Sections of the technical specifications.
3. Inspection, sampling and testing of concrete: As required by applicable specification Sections.

B. QUALIFICATIONS OF LABORATORY AND SUBMITTALS

1. Met requirements of ASTM E329, current edition “Standards of Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as used in Construction.”
2. All testing and inspection performed by the testing laboratory shall be under the direct supervision of a professional engineer licensed in the state of the construction activities.

C. LABORATORY DUTIES, LIMITATIONS OF AUTHORITY

1. Provide qualified personnel promptly on notice.
2. Perform specified inspections, sampling, and testing of materials and methods of construction.
 - a. Comply with specified standards; ASTM, other recognized authorities and as specified.
 - b. Ascertain compliance with requirements of Contract Documents.
3. Promptly notify the Architect and Contractor of irregularities in the Work to be performed with the Documents and Deficiencies of Work performed which are observed during performance of services.
4. Laboratory is not authorized to:
 - a. Release, revoke, alter, or enlarge on requirements of Contract Documents.
 - b. Approve or accept portion of Work.
 - c. Perform duties of the Contractor.

D. CONTRACTOR’S RESPONSIBILITIES

1. Cooperate with laboratory personnel to provide access to Work and to manufacturer’s operations.
2. Assist laboratory personnel in obtaining samples at the site.
3. Notify laboratory sufficiently in advance of operations to allow for his assignment of personnel and scheduling of tests.
4. Should the Contractors fail to schedule laboratory services or fail to cancel laboratory services, if the need arises, all additional cost shall be borne by the Contractors.
5. Employ, and pay for, services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling, and testing required when initial tests indicate work does not comply with Contract Documents.
 - a. The Architect and Owner shall approve the separate laboratory.

END OF SECTION 01 45 29

SECTION 01 51 00 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

A. GENERAL REQUIREMENTS

1. Furnish labor materials, tools, equipment, and services for temporary facilities, including maintenance and their subsequent removal, in accordance with provisions of the Contract Documents and as required for the progress and completion of the Project.
2. Any Contractor requiring one of the temporary services before it can be provided as specified, or whose requirements with respect to a particular service differ from the service specified, shall provide such services as suits his needs at his own expense and in a manner satisfactory to the Architect.
3. Pay applicable costs unless specifically stated otherwise. Each Contractor to obtain and pay for all required permits and inspections for temporary services included under its Contract.
4. Coordinate temporary facilities work with other trades and the Owner/Architect. The responsible Contractor doing the Work, if the temporary work has not been coordinated with the other trades, shall pay rerouting or relocation expenses.
5. Repair, as required, Work that has been interfered with or damaged as a result of temporary facilities work, including holes in walls and/or floors from temporary partition anchorage. Pay for repair any damage to roofing resulting from installation of temporary protection.
6. Provide and maintain temporary facilities in compliance with governing rules, regulations, codes, ordinances and laws of municipalities, agencies and utilities having jurisdiction over work involved in the Project.

B. TEMPORARY ELECTRIC AND LIGHTING

1. Existing power receptacles and lighting are available within the vicinity of the Work.
2. The Contractor will be held responsible for reasonable and customary practices for the conservation of electrical energy.
3. Supplemental Temporary Lighting: Electrical Contractor shall provide temporary lighting to sustain a minimum level of 100-watt lamp for every 100 SF of floor area. The lighting shall be installed as soon as possible. The furnishing of all lamps, lamp guards and maintenance of the lighting will be by the Electrical Contractor. Suspend wiring as required to keep bottom of fixtures at approximately 10'-0" above floor. As interior partitions are constructed, Electrical Contractor to revise temporary lighting so that specified lighting level is provided in each room or space, including custodial areas and pipe chases. If temporary wiring interferes with construction, the removal and relocation of the wiring as required to avoid any interference will be provided by the Electrical Contractor at no additional cost to the Trade Contractor requiring relocation, or Owner.
 - a. Any temporary lighting or electrical service required beyond that specified above shall be provided by the party requiring the same at no additional cost to the Owner.
 - b. Each contractor or subcontractor to provide its own extension cords and necessary related items.
 - c. Electrical work constructed in connection with temporary service specified herein to conform with Federal safety requirements, Ohio Safety Code IC-3 and requirements of the National Electric Code as interpreted by the inspecting authority. Electrical Contractor to obtain and pay for required applications, permits and inspections pertaining to this work, and such costs shall be included in Electrical Contractors Base Bid proposal.
 - d. Temporary wiring is to be laid out, balanced and sized so as to produce a voltage drop of no more than five percent at extreme end of line when operation at full load.
4. Temporary wiring, fittings and devices are not to be used for permanent installations, but remain the property of the Contractor and are to be removed as soon as permitted by installation of permanent systems.

C. TEMPORARY WATER SERVICE

1. Temporary water service connection shall be made available on-site.

2. Contractors or Subcontractors requiring water to provide adequate hoses and fittings as required to meet their own needs.
3. Owner will pay for all water consumed during construction period.

D. TEMPORARY TOILETS

1. General Contractor shall be responsible for providing and maintaining temporary chemical toilet facility, to be used by work persons. Quantity of Units shall be per OSHA recommendations for total workforce. Location of the toilet shall be determined at pre-construction coordination meeting.
 - a. No toilet fixtures, drains, or other connections shall be used for the disposal of building refuse or waste materials.

E. DEWATERING

1. Should Contractor, in dewatering operations, notice excessive infiltration of ground water into pumped out area, Contractor shall notify Architect before continuing dewatering, otherwise Contractor shall be responsible for excessive dewatering and resulting damage to stability of foundations.
2. All water shall be removed prior to placement of concrete or laying of pipe, conduit, equipment, or any materials.
3. Each Contractor is responsible for any necessary or required pumping and dewatering required to complete or carry on its Work.
4. Contractors shall also be responsible for protection of foundation excavations, trenches and completed Work from rain, ground water or other flooding. Provide and operate sufficient pumping equipment to maintain excavations and other construction areas free of standing water. Water shall be pumped into storm drainage system and shall not be allowed to run onto the ground areas.
5. Each Contractor shall take every necessary precaution, including but not limited to, cleanup, to prevent floor and roof drains, being responsible for the costs of related damages.

F. PROTECTION OF INSTALLED WORK

1. Each Contractor and his subcontractor shall provide adequate protection of their related work and necessary repairs prior to Owner acceptance. See also section 01 60 00.
2. Protect installed Work and provide protection where specified in individual specification Sections.
3. Provide temporary and removable protection for installed Products.

G. ACCESS TO CONSTRUCTION OPERATIONS, TEMPORARY ROADS AND PARKING

1. All Contractors performing outside work must provide means to remove mud from vehicles before they enter street. Also means to clean street if required. Existing paved areas may be used under responsibility of Contractor which intends to use existing area only if such paved areas are adequate for weight of construction equipment. Any damage to paved area shall be repaired by Contractor.
2. Each contractor will be responsible to keep public roads adjacent to project site free of mud, debris and other foreign materials resulting from all project construction and vehicular traffic leaving site, to the satisfaction of governing public authorities regulating such conditions.
3. Do not interfere with normal use of roads in vicinity of Project site except as indicated or as absolutely necessary to execute required work, and then only after arrangements have been made with authorities having jurisdiction, including traffic control as applicable.
4. General Contractor shall maintain all construction entrances.
5. Each Contractor shall perform the installation and maintenance of all temporary, around site, access roads or ramps needed for work under their contract. Access to the building or around the building shall also be the responsibility of the Contractor requiring such.

H. FIRE SUPPRESSION

1. Fire suppression shall conform to OSHA, NFPA, and OBBC temporary suppression.
2. Absolutely NO open fires on site.

I. FIELD OFFICES

1. Each Contractor will be responsible to furnish trailers, if required, to perform their contracted work.
 - a. As project site space allows and as approved by the Architect, each contractor may provide a secure office of sufficient size and facilities to accommodate his field personnel and storage.
 - b. Costs associated with contractor's field office are the sole responsibility of each contractor providing an office.

J. MATERIALS STORAGE

1. Each Contractor shall manage location, size and sequencing of all material storage areas on site. It is highly recommended that each Contractor shall provide supplemental off site storage as required by progress of work.
2. Each Contractor and subcontractor shall provide adequate storage facilities for protection of materials and equipment they furnish. Materials and equipment shall be stored so as to ensure preservation of their quality and fitness of work. Perishable items and items affected by weather, rain, wind, dust, heat or cold shall be stored in temporary waterproof sheds or trailers with raised floors, and heated if necessary. Other materials and equipment shall be stored on platforms and not on ground.
3. Temporary storage of materials at the site shall not interfere with the work of other contractors. If necessary, stored materials shall be relocated or removed from the site.

K. BARRICADES

1. All Contractors shall provide perimeter type barricades encircling or containing various construction-excavated areas. Contractor for work requiring a barricade shall bear all cost associated with exterior barricades and night warning lights.
2. General Contractor shall provide, maintain and remove fall protection barricades, for general purpose areas to include, but not limited to stair openings, duct openings, interior shafts and elevator shaft openings.
3. Barricades:
 - a. 48" above ground level (horizontal members) and of standard length and construction.
 - b. Both sides of horizontal member shall be provided with alternate diagonal (45 degree) orange and white stripes, 6" wide.
 - c. Striping shall be reflective material, paint, or tape which will glow under artificial light.
 - d. Type of barricading (i.e., perimeter or line) required will be determined by size, location, or shape of areas removed or under construction.
 - e. All barricades and warning lights must meet local, state, and federal requirements for safety and hazard control. Obtain all permits and/or approvals prior to placement.
4. Night Warning Lights;
 - a. Battery operated, neon type, flashing lights, with 360-degree visibility and amber in color.
 - b. Night warning lights shall be securely bolted or locked in upright position to barricade.
 - c. Maximum spacing of night warning lights shall be 30'-0" on center for work areas.
 - d. Other barricaded hazardous areas shall have minimum of 2 each night warning lights, or more, if so directed by Owner's Representative to insure safety.
5. Preparation – Furnish, place, and maintain barricades and night danger lights as herein specified and as directed by Architect.
6. Call and notify Architect at least 72 hours prior to placing barricades or starting any work whereby traffic will be impended or hindered, especially fire trucks, police vehicles, and City Highway Department Vehicles.

7. Obtain prior approval of local authorities when work operations will result in street closures. When streets are approved for closure, establish and mark safe detours for vehicles to follow.

L. TRASH DUMPSTERS

1. General Contractor shall be responsible for arrangements and associated costs for trash dumpsters. Contractors are encouraged to coordinate and consolidate trash dumpsters.

END OF SECTION 01 51 00

SECTION 01 60 00 – PRODUCT REQUIREMENTS

A. SUMMARY

1. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.
 - a. Product standards and quality.
 - b. Manufacturer's directions.
 - c. Warranties.
 - d. Material delivery and responsibilities.
 - e. Protection.
 - f. Acceptance of equipment or systems.
2. It is the intent of the Contract Documents to accomplish a complete and first-grade installation in which there shall be installed new materials and products of the latest and best design and manufacturer. Workmanship shall be thoroughly first-class and complete, executed by competent and experienced workmen.
3. Equipment, specialties, and similar items shall be checked for compliance and fully approved prior to installation. Contractors are cautioned that work or equipment installed without approval is subject to condemnation, removal, and subsequent replacement with an approved item without extra cost to Owner.

B. DEFINITIONS

1. Definitions used in this Article are not intended to change the meaning of other terms use in the Contract Documents, such as "specialties," "system," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well recognized meanings in the construction industry.
 - a. "Products" are items purchased for incorporation in the Work, whether purchased for the project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - b. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
2. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined, or otherwise fabricated, processed, or installed to form a part of the Work.
3. "Equipments" is a product with operational parts, whether motorized or manually operated, that require service connections, such as wiring or piping.

C. QUALITY ASSURANCE

1. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
2. Compatibility of Options: When the Contractor is given the option of selecting between 2 or more products for use on the project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
 - a. Each prime contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other prime or separate contractors.

D. PRODUCT DELIVERY, STORAGE, AND HANDLING

1. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
 - a. Schedule delivery to minimize long term storage at the site and to prevent over crowding of construction spaces.
 - b. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged or sensitive to deterioration, theft and other losses.

- c. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
- d. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- e. Store products off the site in a manner that will facilitate inspection and measurement of quality or counting of units.
- f. Store heavy materials away from the project structure in a manner that will not endanger the supporting construction.
- g. Store products subject to damage by elements above ground, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

E. PRODUCT STANDARDS AND QUALITY

- 1. The Contract is based on the materials, equipment and methods described in the Contract Documents.
- 2. Where in the Drawings and Specifications certain products, manufacturer's trade names, or catalog numbers are given, it is done for the expressed purpose of establishing a basis of quality, durability, and efficiency of design for the work outlined and is not intended for the purpose of limiting competition.
- 3. The Architect will consider proposals for substitution of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Architect to evaluate the proposed substitution. Such proposals need to be submitted at least ten (10) days prior to the scheduled date for receipt of bids.
- 4. Do not substitute materials, equipment or methods unless such substitution has been specifically approved for this Work by the Architect as evidenced by the incorporation of such materials, equipment or methods into the Contract Documents by written Addendum.
- 5. "Or equal":
 - a. Where the phrase "or equal" or "or equal as approved by the Architect" occurs in the Contract Documents, do not assume that material, equipment, or methods will be approved as equal by the Architect unless the item has been specifically approved via submittal process.
- 6. Availability of Specified Items:
 - a. Verify prior to bidding that specified items will be available in time for installation during orderly and timely progress of the Work.
 - b. In the event specified item or items will not be so available, notify the Architect prior to bidding.
 - c. Costs of delays because of non-availability of specified items, when such delays could have been avoided by the Contractor, will be back charged as necessary and shall not be borne by the Owner.
- 7. The Architect reserves the right to refuse approval of substituted products proposed for those specified, if in his opinion the item to be substituted will not achieve the finished effect, appearance or performance desired, as portrayed in the Drawings and Specifications. The Architect's said refusal to approve, established by this paragraph, is final and not subject to arbitration.

F. MANUFACTURER'S DIRECTIONS

- 1. Products shall be applied, installed, erected, used, and cleaned in accordance with the manufacturer's printed direction, unless herein specified to the contrary. Where manufacturer's printed directions are available and where reference is made to manufacturer's directions in the contract documents, the Contractor shall submit copies of such directions to the Architect prior to the beginning of Work covered thereby.
- 2. Where specific installation instructions are not part of these Specifications and Drawings, equipment shall be installed in strict accordance with instructions from the respective manufacturers. Where installation instructions included in these Specifications or Drawings are at a variance with instructions

furnished by the equipment manufacturer, the Contractor shall make written request for clarification from the Architect.

3. In accepting or assenting to the use of apparatus or material, or make, or arrangement thereof, the Architect in no way waives the requirements of these Specifications or the warranty embodied therein.

G. WARRANTIES

1. Specific warranties called for in the Contract Documents, in addition to that falling under the general warranty as set forth in General Conditions, shall be furnished in accordance with the requirements of the Specifications.
 - a. Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.
 - b. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 1. Rejection of Warranties: The owner reserves the right to reject warranties and to limit selection to products with warranties not to conflict with requirements of the Contract Documents.
2. Each Contractor shall and does hereby agree to warrant for a period of one year, or for longer periods, where so provided in the Specifications, as evidenced by the date of Substantial Completion issued by the Architect, products installed under the Contract to be of good quality in every respect and to remain so for periods described herein.
3. Should defects develop in the Work within the specified periods, due to faults in products or their workmanship, the Contractor hereby agrees to make repairs and do necessary Work to correct defective Work to the Architect's satisfaction, in accordance with the General and Supplementary Conditions. Such repairs and corrective Work, including costs of making good other Work damaged by or otherwise affected by making repairs or corrective Work, shall be done without cost to the Owner and at the entire cost and expense of the Contractor within 14 days after written notice to the Contractor by the Owner.
 - a. Related Damages and Losses: When correcting failed or damaged warranted construction, removed and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
 - b. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
4. Where service on products is required under this Article, it shall be promptly provided when notified by the Owner and no additional charge shall be made, unless it can be established that the defect or malfunctioning was caused by abuse or accidental damage not to be expected under conditions or ordinary wear and tear.
5. The manufacturer and supplier expressly warrants that each item of equipment furnished by him and installed in this Project is suitable for the application shown and specified in the Contract Documents and includes features, accessories and performing characteristics listed in the manufacturer's catalog in force on the date bids are requested for the Work. This warranty is intended as an assurance by the manufacturer that his equipment is not being misapplied and is fit and sufficient for the services intended. This warranty is in addition to and not in limitation of other warranties or remedies required by law or by the contract Documents. It shall be the responsibility of the contractor for the particular equipment to obtain this warranty in writing.
6. In case the Contractor fails to do Work so ordered, the Owner may have work done and charge the cost thereof against monies retained as provided for in the Agreement and, if said retained monies shall be

insufficient to pay such cost or if no money is available, the Contractor and his Sureties shall agree to pay to the Owner the cost of such work.

H. MATERIAL DELIVERY AND RESPONSIBILITIES

1. Each Contractor shall be responsible for materials he orders for delivery to the jobsite. Responsibility includes, but is not limited to, receiving, unloading, storing, protecting and setting in place; ready for final connections.
2. Contractors shall insure that products are delivered to the Project in accordance with the Master Construction Schedule of the Project. In determining data of delivery, sufficient time shall be allowed for shop drawings and sample approvals, including the possibility of having to resubmit improperly prepared submittals or products other than those specified and the necessary fabrication or procurement time along with the delivery method and distance involved.

I. PROTECTION

1. Each Contractor shall protect building elements and products when subject to damage. Should workmen or other persons employed by one Contractor be responsible for damage, the entire cost of repairing said damage shall be assumed by said individual contractor. Should damage be done by a person or persons not employed by a Contractor, the respective Contractors shall make repairs.
2. Each Contractor shall protect their products prior to installation and final acceptance. Storage shall be dry, clean and safe. Materials or equipment damaged, deteriorated, rusted or defaced due to improper storage, shall be repaired, refined or replaced, as required by the Architect. Products lost through theft or mishandling shall be replaced by the Contractor without cost to the Owner.

J. ACCEPTANCE OF EQUIPMENT OR SYSTEMS

1. The Owner will not accept the start of the warranty period on systems or equipment until Substantial completion is issued to the respective Contractor(s) for Owner's occupancy of the building, in part or whole. Each Contractor shall make sure provisions as required to extend the manufacturer's warranty from time of initial operation of systems or equipment until Substantial Completion is given in writing.

END OF SECTION 01 60 00

SECTION 01 71 23 – FIELD ENGINEERING

A. SUMMARY

1. Section specifies administrative and procedural requirements for field engineering services including, but not limited to, the following:
 - a. Land survey work.
 - b. Anchor bolt layout survey.
 - c. Civil engineering services.

B. SUBMITTALS

1. Certificates: Submit a certificate signed by the land surveyor, certifying the location and elevation of improvements comply with the Contract Documents.

C. QUALITY ASSURANCE

1. Surveyor Qualifications: Engage a land surveyor registered in the State where the project is located, to perform required land surveying services.

D. EXAMINATION

1. Contractors to verify layout information shown on the Drawings, in relation to the control points on the property survey and existing benchmarks, before proceeding to lay out the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.
 - a. Should a benchmark or control point be lost, only the Land Surveyor or Professional Engineer shall establish new benchmarks or control points.
2. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction.
 - a. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer and water service piping.

E. PERFORMANCE

1. Work from lines and levels established by the property survey. Establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to locate each element of the project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.
 - a. As construction proceeds, check every major element for line, level, and plumb.
2. Surveyor's Log: Maintain a surveyor's log of control and other survey work. Make this log available for reference.
 - a. Record deviations from required lines and levels, and advise the Architect when deviations that exceed indicated or recognized tolerances are detected. On project record drawings, record deviations that are accepted and not corrected.
3. Site Improvements: Locate and lay out site improvements, stakes for grading, fill and utility slopes, and invert elevations.
4. Anchor Bolt Survey Layout: On completion of anchor bolt installation and prior to erecting steel, prepare a certified survey showing dimensions, locations, angles and elevation of anchor bolts.
5. Building Lines and Levels: Locate and lay out batter boards for structures, building foundations, columns grids and locations, floor levels, and control lines and levels required for mechanical and electrical work.
 - a. Establish benchmarks at each floor level giving the exact level at the floor or floors, in the event there is more than one level required, as the Work progresses.

- b. Establish benchmarks at each floor level accurate major lines sufficient for mechanical, electrical and other trades to properly locate their Work. Maintain lines until walls and other physical elements are defined. Contractors are responsible for the accuracy of the layout of their Work from the major lines and grades established. Each Contractor shall review and accept conditions installed by other Contractors prior to beginning their installation.
- 6. Existing Utilities: Furnish information necessary to adjust, move or relocate existing structures, utility poles, lines, services or other appurtenances located in or affected by construction. Coordinate with local authorities having jurisdiction.

END OF SECTION 01 71 23

SECTION 01 74 23 – CONSTRUCTION CLEANING

A. SUMMARY

1. The Contractor is responsible for cleaning his own Work and the work of their subcontractors.
2. Related Work Specified Elsewhere.
 - a. Section 01 78 00 – Closeout Procedures.
 - b. Special cleaning requirements for specific construction elements are included in appropriate sections of Divisions 2 through 32.

B. DAILY CLEANING

1. Define and emphasize the responsibility of each Contractor to remove his rubbish and debris from the construction site to guard against fire and safety hazards as well as to provide a more efficient construction operation for all Contractors.
2. Each Contractor and Subcontractor, at the end of each working day, shall collect and remove all waste materials and debris pertaining to its work. General Contractor, shall be responsible for all costs associated with dumpster fees. All Contractors and/or Subcontractors working on the Project site are encouraged to coordinate and consolidate dumpster orders. At no time shall rubbish be allowed to accumulate or cause a fire hazard, either within the building or on site.
3. If any Contractor or Subcontractor fails to remove rubbish and/or debris pertaining to its Work, the Owner will authorize and direct removal of the rubbish and/or debris. Cost of removal will be charged to delinquent Contractor at hourly cost plus fringe benefits, overhead and profit.

C. ROUTINE CLEANING

1. Near the end of each work week, and more often if necessary, the General Contractor shall perform an overall clean up of the entire site, including a broom cleaning of appropriate surfaces. The trades shall remove their rubbish and debris from the building site to the rubbish collection location promptly upon its accumulation.

D. RUBBISH CONTAINMENT

1. Refer to Section 01 51 00 – Temporary Facilities and Controls for requirements.

E. SAFETY REQUIREMENTS

1. Hazards Control
 - a. Store volatile wastes in covered metal containers, and remove from premises daily.
 - b. Prevent accumulation of wastes which create hazardous conditions.
 - c. Provide adequate ventilation during use of volatile or noxious substances.
2. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - a. Do not burn or bury rubbish and waste materials on project site.
 - b. Do not dispose of volatile wastes in storm or sanitary drains, streams or waterways.

F. MATERIALS

1. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
 - a. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finish surface.

G. FINAL CLEANING

1. General: Provide final cleaning operations when indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to the condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

2. Each Contractor shall perform his respective final clean up and shall leave the Work of the completed Project in clean, neat condition.
3. The following are examples, but not by way of limitation, of cleaning levels required:
 - a. Remove labels which are not required as permanent labels.
 - b. Clean transparent materials, including mirrors and window/door glass to a polished condition, removing substances which are noticeable as vision-obscuring materials. Replace broken glass and damaged transparent materials.
 - c. Clean exposed exterior and interior hard-surfaced finishes, to a dirt-free condition, free of dust, stains, films, and similar noticeable distracting substances. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.
 - d. Wipe surfaces of mechanical and electrical equipment clean, including elevator equipment and similar equipment; remove excess lubrication and other substances.
 - e. Remove debris and surface dust from limited-access spaces including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
 - f. Clean concrete floors in unoccupied spaces broom clean.
 - g. Vacuum clean carpeted surfaces and similar soft surfaces.
 - h. Clean plumbing fixtures to a sanitary condition, free of stains, including those resulting from water exposure.
 - i. Clean light fixtures and lamps so as to function with full efficiency.
 - j. Clean project site (yard and grounds), including landscape development areas of litter and foreign substances. Sweep paved areas to a broom-clean condition; remove stains, petrol-chemical spills, and other foreign deposits. Rake grounds, which are neither planted nor paved, to a smooth, even textured surface.
 - k. Sweep paved areas broom clean. Rake grounds that are neither planted nor paved to a smooth, even textured surface.
 - l. Remove petrochemical spills, stains and other foreign deposits.
 - m. Remove tools, construction equipment, machinery and surplus material from the site.
4. Removal of Protection: Remove temporary protection and facilities installed during construction to protect previously completed installations during the remainder of the construction period.
5. Compliances: Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from the site and dispose of lawfully.

END OF SECTION 01 74 23

SECTION 01 78 00 – CLOSEOUT PROCEDURES

A. RELATED DOCUMENTS

1. The Work of this Section shall be included as a part of the Contract Documents of each Contractor on this Project. Where such Work applies to only one Contractor, it shall be defined as to which Contractor the Work belongs.
2. Refer to the General and Supplementary Conditions of the Contract for Substantial Completion and final payment.

B. SUMMARY

1. Closeout is hereby defined to include general requirements near end of Contract Time. In preparation for final acceptance, final payment, normal termination of contract, occupancy by Owner, and similar actions evidencing completion of the Work. Specific requirements for individual units of Work are specified in Sections of Division 2 through 28. Time of closeout is directly related to “Substantial Completion.”
2. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
 - a. Prerequisites to substantial completion.
 - b. Prerequisites to final payment.
 - c. Project record documents.
 - d. Certification of code compliance.
 - e. Operation and maintenance manuals.
 - f. Instruction of Owner’s personnel.

C. PREREQUISITIES TO SUBSTANTIAL COMPLETION

1. General: Prior to requesting Architect/Engineer inspection for certification Substantial Completion (for either Work of portions thereof), complete the following and list known exceptions in request.
 - a. In the Application for Payment that coincides with, or first follows, the date of Substantial Completion is claimed, show 100 percent completion for the Work claimed as substantially complete.
 1. Include supporting documents for completion as indicated in those Contract Documents and a statement showing an accounting for changes to the Contract Sum.
 2. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - b. Advise Owner of pending insurance changeover requirements.
 - c. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, agreements, final certifications and similar documents.
 - d. Obtain and submit releases enabling Owner’s full and unrestricted use of the Work and access to services and utilities, including occupancy permits, operating certificate and similar releases.
 - e. Submit record drawings, maintenance manuals, damage or settlement surveys, property survey and similar final record information.
 - f. Delivery tools, spare parts, extra stocks of materials and similar physical items to Owner.
 - g. Make final changeover of locks and transmit keys to Owner and advise Owner’s personnel of changeover in security provisions.
 - h. Complete start-up testing of systems and instructions of Owner’s operating/maintenance personnel. Discontinue and remove from project site temporary facilities and services, along with construction tools, mock-ups and similar elements.
 - i. Complete final cleaning-up requirements. Refer to Section 01 74 23 – Construction Cleaning.
 - j. Touch up and otherwise repair and restore marred, exposed finishes.
2. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of

Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

- a. The Architect will repeat inspection when requested and assured that the Work is substantially complete.
- b. Results of the complete inspection will form the basis of requirements for final acceptance.

D. PREREQUISITES TO FINAL PAYMENT

1. General: Prior to requesting Architect/Engineer final inspection for certification of final payment, complete the following:
 - a. Refer to General Conditions.
 - b. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 - c. Submit final payment request, with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and complete operations where required.
 - d. Submit copy of Architect/Engineer final punch list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.
 - e. Submit record drawings, maintenance manuals, and similar final record information.
 - f. Certification of code compliance.
 - g. Submit certification stating that no materials containing asbestos were incorporated into the Work.
 - h. Plumbing Contractor shall submit certification stating no flux or solder used for drinking water piping contained more than 0.2 percent lead, and that no pipe or fittings used for drinking water piping contained more than 8.0 percent lead.
 - i. Fire stopping Contractor's letter of certification stating that all fire stopping systems have been installed in accordance with the Contract Documents.
 - j. Submit final meter readings for contractor paid utilities, and similar data as for the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the work.
 - k. Submit consent of surety to final payment.
 - l. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 - m. Submit a final liquidated damages settlement statement.
2. Re-inspection Procedure: The Architect will re-inspect the work upon receipt of notice that the work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Architect.
 - a. Upon completion of re-inspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

E. PROJECT RECORD DOCUMENTS

1. Project Record Documents include, drawings, project manual, product data and samples.
2. Each Contractor shall update "Project Record Drawings" on separate line prints set-aside especially for this purpose on the job. Drawings shall incorporate changes made in the Work of the respective trades during the construction period. Such change shall be indicated at the time they occur.
3. Each of these project record drawings shall be clearly marked "Project Record Documents", maintained in good condition; available for observation by the Architect. Mark these drawings to show the actual installation where the installation varies from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to, the following:
 - a. Significant changes and selections made during the construction process.
 - b. Dimensional changes to the Drawings.
 - c. Significant detail not shown in the original Contract documents including Change Orders or Construction Change Directives.

- d. The location of underground utilities and appurtenances dimensionally referenced to permanent surface improvements.
- e. The location of internal utilities and appurtenances concealed in building structures, referenced to visible and accessible features of the structures.
- f. Revisions to details shown on the Drawings.
- g. Depths of foundations below the first floor.
- h. Revisions to routing of piping and conduits.
- i. Revisions to electrical circuiting.
- j. Actual equipment locations.
- k. Duct size and routing.
- l. Changes made following the Architect's written orders.
- m. Details not on original Contract Drawings.
- n. Charts and locations of concealed work.
 - 1. The Plumbing and HVAC Contractors shall prepare a suitable chart identifying and locating each concealed control or other concealed item requiring repair, adjustment, and maintenance.
 - 2. Charts shall list each item, together with its function, item number and location.
 - 3. Locations throughout the building shall be identified on the wall or ceiling by permanent, non-obstructive plates, labels or other approved means secured in a permanent manner.
- 4. Keep project record documents current. Do not permanently conceal work until the required information has been recorded. Mark record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where shop drawings are marked, show cross-reference on Contract Drawings location.
 - a. Mark record sets with color that may be photo copied.
 - b. Note Construction Change Directive number, alternate numbers, change order numbers and similar identification.
- 5. During the construction period, maintain one copy of the Project Manual, including addenda and modifications issued, for Project Record Documents purposes.
 - a. Mark the Specifications to indicate the actual installation where the installation varies from that indicated in Specifications and modifications issued. Note related project record drawings information, where applicable. Give particular attention to substitutions, section of product options, and information on concealed installations that would be difficult to identify or measure and record later.
- 6. During the construction period, maintain 3 copies of each product data submittal for Project Record Document purposes.
 - a. Mark product data to indicate the actual product installation where the installation varies substantially from the indicated in project data submitted. Include significant changes in product delivered to the site and changes in manufacturer's instruction and recommendations for installation.
 - b. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - c. Note related Change Orders and markup of record drawings, where applicable.
 - d. Where record product data is required as a part of maintenance manuals, submit marked up product data as an insert in the manual instead of submittal as record product data.
- 7. Prior to final payment on the Project, submit to the Architect the "Project Record Documents" for changes recorded for the Work of Divisions 2 through 16.
 - a. Each drawing shall be labeled "Project Record," dated, and signed by the Contractor(s).

F. MAINTENANCE AND OPERATING MANUALS

- 1. Operating instructions shall include necessary printed directions for correct operations, adjustment, servicing and maintenance of movable parts. Also included shall be suitable parts lists, approved shop

drawings, diagrams showing parts location and assembly, information specified in individual Specification Sections and the following:

- a. Emergency instructions.
 - b. Copies of specific warranties.
 - c. Wiring diagrams.
 - d. Recommended maintenance procedures and turn around times.
 - e. Inspection and system test procedures.
 - f. Precautions against improper maintenance and exposure.
2. Prior to issuance of final payments, each Contractor shall submit 3 completed copies of maintenance manuals to the Architect.
 3. Finished manuals shall be loose-leaf type with hardboard covers and titled tabs identifying each particular portion or item of the Work.
 4. For each titled item or work portion, manual must provide the names, addresses, and phone numbers of the following parties:
 - a. Contractor/installer.
 - b. Manufacturer.
 - c. Nearest dealer/supplier and agency capable of supplying parts and service.
 5. For each manual label on front cover or spine shall indicate the following information:
 - a. Project name and address.
 - b. Owner's name.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Date of submission.

G. INSTRUCTION TO OWNER'S PERSONNEL

1. Arrange for each Installer of equipment that requires regular maintenance and noted in technical sections, to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if Installers are not experienced in operation and maintenance procedures. Include a detailed review of the following manuals.
 - a. Maintenance manuals.
 - b. Spare parts, materials or special tools.
 - c. Lubricants.
 - d. Fuels.
 - e. Identification systems.
 - f. Control sequences.
 - g. Hazards.
 - h. Cleaning.
 - i. Warranties and maintenance agreements and similar continuing commitments.
2. As part of instruction for operating equipment, demonstrate the following procedures:
 - a. Startup.
 - b. Shutdown.
 - c. Emergency operations.
 - d. Noise and vibration adjustments.
 - e. Safety procedures.
 - f. Economy and efficiency adjustments.
 - g. Effective energy utilization.

END OF SECTION 01 78 00

SECTION 02 41 19 – SELECTIVE DEMOLITION, CUTTING AND PATCHING

A. SUMMARY OF WORK

1. Requirements and limitations for selective demolition, cutting and patching of work.

B. RELATED SECTIONS

1. Section 01 01 00 – Summary of Work
2. Section 01 33 00 – Submittals.
3. Section 01 60 00 – Product Requirements: Product Options and Substitutions.
4. Individual Product Specification Sections:
 - a. Selective demolition, cutting and patching incidental to work of the Section.
 - b. Advance notification to other Sections of openings required in work of those Sections.
 - c. Limitations on cutting structural members.

C. SUBMITTALS

1. Submit written request in advance of patching or alteration which affects:
 - a. Structural integrity of any element of Project.
 - b. Integrity of weather-exposed or moisture-resistant element.
 - c. Efficiency, maintenance, or safety of any operational element.
 - d. Visual qualities of sight-exposed elements.
2. Include in request:
 - a. Identification of Project.
 - b. Location and description of affected work.
 - c. Description of proposed work, and products to be used.
 - d. Alternatives to patching.
 - e. Effect on work of Owner or separate contractor.
 - f. Written permission of affected separate contractor.
 - g. Date and time work will be executed.

D. MATERIALS

1. Primary Products: Those required for original installation.
2. Product Substitution: For any proposed change in materials, submit request for substitution under provision of Section 01 60 00.

E. EXECUTION

1. Inspect existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching.
2. After uncovering existing work, inspect conditions affecting performance of work.
3. Beginning of cutting or patching means acceptance of existing conditions.

F. PREPARATION

1. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.

G. SELECTIVE DEMOLITION

1. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete work within limitations of governing regulations and as follows:
 - a. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition work above each floor or tier before disturbing supporting members at lower levels.

- b. Neatly cut openings and holes plumb, square and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering or chopping. Temporarily cover openings to remain.
 - c. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - d. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct or pipe interiors, verify condition and content of hidden space before starting flame-cutting operations. Maintain portable fire extinguishing devices during flame cutting operations.
 - e. Maintain adequate ventilation when using cutting torches.
 - f. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off site.
 - g. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact and dust generation.
 - h. Locate selective demolition equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors or framing.
 - i. Dispose of demolished items and materials promptly. In-site storage or sale of removed items is prohibited.
 - j. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.
2. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain, using power driven masonry saw or hand tools; do not use power driven impact tools.

H. CUTTING AND PATCHING

1. Execute cutting, fitting, and patching including excavation and fill to complete work.
2. Fit products together, to integrate with other work.
3. Structural Work:
 - a. Do not cut-and-patch structural work in a manner resulting in a reduction of load-carrying capacity or load/deflection ratio. Submit proposal and request and obtain Architect's approval before proceeding with cut-and-patch of structural work.
4. Operational/Safety Limitations:
 - a. Do not cut-and-patch operational elements and safety components in a manner resulting in decreased performance, shortened useful life, or increased maintenance. Submit proposals and requests and obtain Architect's approvals before proceeding with cut-and-patch work.
5. Visual/Quality Limitations:
 - a. Do not cut-and-patch work exposed to view (exterior and interior) in a manner resulting in noticeable reduction of visual qualities and similar qualities, as judged by the Architect.

I. PERFORMANCE

1. Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
2. Employ original installer/fabricator, or if not available, an acceptable equivalent entity, to perform patching for all cut-and-patch materials and site-exposed surfaces.
3. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
4. Restore work with new products in accordance with requirements of Contract Documents.
5. Fit work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
6. At penetrations of fire-rated walls, partitions, ceiling, or floor construction, completely seal voids with fire-rated material to full thickness of the penetrated element.

7. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

J. LIMITATIONS OF APPROVALS

1. Architect's approval to proceed with cutting and patching does not waive the right to later require removal/replacement of work found to be cut-and-patched in an unsatisfactory manner, as judged by the Architect.

END OF SECTION 02 41 19

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
 - 1. Footings.
 - 2. Ramp walls.
 - 3. Slabs-on-grade (ground).
- B. Related Requirements:
 - 1. Section 321313 "Concrete Paving" for concrete pavement and walks.
- C. Coordination: Unless other satisfactory agreements are specifically entered into by contractors concerned, all miscellaneous iron and steel, sleeves, anchors, etc., required by work of other contractors will be furnished and installed by such other contractors with the cooperation of this contractor.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.

- c. Ready-mix concrete manufacturer.
 - d. Concrete Subcontractor.
 - e. Agency responsible for field quality control and special inspections.
 - f. Primary admixture manufacturers.
 - g. Special concrete finish Subcontractor.
2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, methods for achieving specified floor and slab flatness and levelness concrete repair procedures, and concrete protection.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
 2. Laboratory test reports for concrete mix design with the following data:
 - a. Method used to determine the proposed mix design per ACI 301, Article 4.2.3.
 - b. Gradation and quantity of fine and coarse aggregates.
 - c. Proportions of all ingredients including all admixtures added either at the time of batching or at the job site.
 - d. Water/cement ratio and water/cementitious ratio.
 - e. Slump - ASTM C143.
 - f. Certification and test results of the total water-soluble chloride ion content of the design mix - FHWA RD-77 or AASHTO T 260-84.
 - g. Air content of freshly mixed concrete by the pressure method, ASTM C231, or the volumetric method, ASTM C173.
 - h. Strength at 7 and 28 days - ASTM C39, and 3-day strength for post-tensioned concrete. Document strength on basis of previous field experience or trial mixtures per ACI 301 Article 4.2.3. Submit strength test records, mix design materials, conditions, and proportions for concrete used for record of tests, standard calculation, and determination of required average compressive strength.
- C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 1. Location of construction joints is subject to approval of the Architect.

- E. Samples: For vapor retarder.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, manufacturer, testing agency.
- B. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Form materials and form-release agents.
 - 4. Steel reinforcement and accessories.
 - 5. Fiber reinforcement.
 - 6. Curing compounds.
 - 7. Floor and slab treatments.
 - 8. Bonding agents.
 - 9. Adhesives.
 - 10. Vapor retarders.
 - 11. Semi-rigid joint filler.
 - 12. Joint-filler strips.
 - 13. Repair materials.
- C. Material Test Reports: For the following, from a qualified testing agency:
 - 1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- D. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- E. Field quality-control reports.
- F. Minutes of preinstallation conference.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for formwork and shoring and reshoring installations that are similar to those indicated for this Project in material, design, and extent.
- C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- D. Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field-Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.
- E. Special Inspector Qualifications: A qualified person employed or retained by an approved agency that has the recommended experience and certifications as summarized in Appendix C of the current International Code Council (ICC) Special Inspection Manual.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

1.10 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of

ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301.
2. ACI 117.

2.2 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
1. Plywood, metal, or other approved panel materials.
 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High-density overlay, Class 1 or better.
 - b. Medium-density overlay, Class 1 or better; mill-release agent-treated and edge sealed.
 - c. Structural 1, B-B or better; mill-oiled and edge sealed.
 - d. B-B (Concrete Form), Class 1 or better; mill-oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064, plain, fabricated from as-drawn steel wire into flat sheets.
- C. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064, flat sheet.

2.4 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view, where legs of wire bar support contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
 - 2. For slabs on ground, use supports with sand plates or horizontal runners where base material will not support chair legs.

2.5 CONCRETE MATERIALS

- A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- B. Cementitious Materials:
 - 1. Portland Cement: ASTM C 150, Type I/II.
 - 2. Fly Ash: ASTM C 618, Class F or C.
 - 3. Slag Cement: ASTM C 989, Grade 100 or 120.
 - 4. Blended Hydraulic Cement: ASTM C 595, Type IL, portland-limestone cement.
 - 5. Silica Fume: ASTM C 1240, amorphous silica.
- C. Normal-Weight Aggregates: ASTM C 33, Class 4S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
 - 1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494, Type A.
 - 2. Retarding Admixture: ASTM C 494, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

- F. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494, Type C.
- G. Water: ASTM C 94 and potable.

2.6 FIBER REINFORCEMENT

- A. Synthetic Macro-Fiber: Polyolefin macro-fibers engineered and designed for use in concrete, complying with ASTM C 1116, Type III, 1 to 2-1/4 inches long.

2.7 VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E 1745, Class A 15 mils. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.8 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.
 - 1. VOC Content: Liquid floor treatments shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. HARDENED CONCRETE FLOORS: For exposed concrete floor areas indicated to be hardened on Drawings (except as otherwise shown or specified): Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.
 - a. Seal-Hard by L&M Construction Chemicals, Inc.
 - b. Ashford Formula by Cure-Crete, Inc.
 - c. Euco Diamond Hard by Euclid Chemicals, Inc.
 - 3. MECHANICAL ROOM FLOORS: Penetrating Liquid Floor Treatment for Mechanical Room Floor Slabs:
 - a. SLX100 Water and Oil Repellent; ProSoCo, Inc.
 - b. PetroTex oil and water repellent; L&M Construction Chemicals.
 - c. Eucoguard Vox.
 - d. Liqui-Hard; W.R. Meadows
 - e. Baracade 244; Euclid Chemical Company
 - 4. SEALED FLOORS: Penetrating Liquid Floor Treatment for all other floor areas indicated to be sealed on drawings:
 - a. Chem-Trete BSM 40 manufactured by HULS America.
 - b. Iso-Flex 618 manufactured by the Harry S. Peterson Company.
 - c. Enviroseal 40 as manufactured by Hydrozo, Inc.

2.9 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

2.10 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, aromatic polyurea with a Type A shore durometer hardness range of 90 to 95 according to ASTM D 2240.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.11 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109.

- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109.

2.12 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash: 25 percent.
 - 2. Combined Fly Ash and Pozzolan: 25 percent.
 - 3. Do not use Fly Ash or Pozzolans, Slag Cement, or Silica Fume in concrete to receive a polished finish.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.
- E. Do not air entrain interior trowel-finished concrete slabs-on-grade and suspended slabs, including light-weight concrete. Do not allow entrapped air content to exceed 3 percent.

2.13 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Slump Limit: 4 inches plus or minus 1 inch.

B. Rampe walls and other exterior concrete exposed to weather: Proportion normal-weight concrete mix as follows:

1. Minimum Compressive Strength: 5000 psi air entrained.
2. Minimum Cementitious Materials Content: 610 lb./cu. yd.
3. Maximum Water-Cementitious Materials Ratio: 0.40.
4. Slump Limit: 4 inches. 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch.
5. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2 inches nominal maximum aggregate size.
6. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

C. Interior Slabs-on-Grade: Proportion normal-weight concrete mix as follows:

1. Minimum Compressive Strength: 4000 psi
2. Minimum Cementitious Materials Content: 540 lb./cu. yd.
3. Maximum Water-Cementitious Materials Ratio: 0.42.
4. Slump Limit: 4 inches. 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch.
5. Do not use Fly Ash or Pozzolans, Slag Cement, or Silica Fume in concrete to receive a polished finish.

2.14 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.15 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Earth cuts may be used as forms for footing vertical surfaces, if sides are sharp and true, and not exposed in finished structure.
- C. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- D. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class C, 1/2 inch for rough-formed finished surfaces.
- E. Construct forms tight enough to prevent loss of concrete mortar.
- F. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- I. Chamfer exterior corners and edges of permanently exposed concrete.
- J. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- K. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- L. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- M. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

1. Coat steel forms with a non-staining, rust-preventative material. Rust-stained steel formwork is not acceptable.
- N. Do not allow excess form-coating material to accumulate in forms or contact in-place concrete surfaces against which fresh concrete will be placed.

3.2 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 3. Install dovetail anchor slots in concrete structures as indicated.
 4. No aluminum conduit shall be installed in concrete.
 5. No sleeves, holes, or inserts shall be placed in or within 2'-0" of columns or beams without approval of the structural engineer.

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete is to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR-RETARDER INSTALLATION

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.
- B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder according to manufacturer's written instructions.
- C. Granular Course: For slabs on ground receiving moisture-sensitive floor covering place slab directly on vapor retarder. Place vapor retarder on granular fill or fine-graded granular material, moisten and compact with mechanical equipment to elevation tolerances of plus 0 inch or minus 3/4 inch.
 1. Place and compact a 1-inch-thick layer of fine-graded granular material over granular fill.
- D. Thickness of granular fill (including fine-graded) shall be 6 inch minimum unless noted otherwise in geotechnical report.

3.5 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

4. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
- B. No concrete shall be placed except when Architect's representative (or independent testing laboratory) is present unless this requirement is specifically waived by the Architect. Give adequate notice to the Architect, the testing laboratory, and all contractors affected before placing concrete.
- C. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified. Concrete delivery tickets shall show:
1. Batch number
 2. Mix by number with cement content in pounds and maximum size aggregate
 3. Admixtures
 4. Air content
 5. Slump
 6. Time of loading

7. Temperature of concrete for mass concrete elements
- D. Discharge concrete within 1-1/2 hours after water has been added to the cement unless a longer time has been authorized by the Architect/Engineer. During hot weather or other conditions contributing to a quick stiffening of the concrete, the Architect/Engineer may require discharge in less than 1-1/2 hours. If loss of slump occurs, HRWR may be re-dosed at the site as long as a "flash set" has not occurred. Re-dosage procedures must be discussed and approved by the Engineer and the manufacturer at the Pre-Concrete Conference.
- E. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- F. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- G. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- H. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- I. Place interior slabs on grade that will later receive floor coverings only after floor level or roof above has been placed. Also, protect the slab from any moisture infiltration until building is complete.

- J. Pumping Concrete: Grout used to prime a pump shall not be placed in the forms in any concrete exposed to view in the final structure.

3.8 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete Insert locations.
 - 2. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.9 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.
 - 1. Apply scratch finish to surfaces to receive concrete floor toppings or to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighen until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
 - a. For carpeted slabs: Specified overall values of flatness, SOF(F) 25; and of levelness, SOF(L) 20; with minimum local values of flatness, MLF(F) 17; and of levelness, MLF(L) 15.
 - b. For polished slabs: Specified overall values of flatness, SOF(F) 45; and of levelness, SOF(L) 35; with minimum local values of flatness, MLF(F) 30; and of levelness, MLF(L) 24.
 - c. For all other slabs: Specified overall values of flatness, SOF(F) 35; and of levelness, SOF(L) 25; with minimum local values of flatness, MLF(F) 24; and of levelness, MLF(L) 17.
 3. SOF(L) and MLF(L) levelness tolerances shall not apply to cambered or inclined surfaces.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom.
1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.10 MISCELLANEOUS CONCRETE ITEM INSTALLATION

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
3. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
4. Prior to pouring concrete, place, and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.11 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

- c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.
- 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
- 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.12 LIQUID FLOOR TREATMENT APPLICATION

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
 - 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 - 2. Do not apply to concrete that is less than 28 days' old.
 - 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry pack patching mortar, consisting of 1-part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 2. After concrete has cured at least 14 days, correct high areas by grinding.
 - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 - 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.

Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

- A. Special Inspections and field quality control testing: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
1. Refer to drawings for testing and special inspection requirements.
 2. Prepare and submit reports within 7 days of completing tests and inspections. Distribute reports to Architect, Engineer, Owner (or owner's representative), and Contractor. Clearly indicate non-compliance on reports.
- B. Non-Compliant Work:
1. The contractor shall remove and replace all non-compliant work, or, at the contractor's expense, perform additional testing to verify compliance. Contractor shall submit results of additional testing to Architect, Engineer, and Owner (or owner's representative) for review and approval.

3.16 PROTECTION OF LIQUID FLOOR TREATMENTS

- A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 033000

Mix Design Submittal Form

A copy of this form shall be completed for each type of concrete listed in the specification. Mix designs not submitted on this form will not be reviewed.

Part 1

CONCRETE SUPPLIER INFORMATION

Contact Person: _____

Telephone Number: _____

Company Name: _____

Address: _____

Main Plant Location: _____

Miles from Project Site: _____

PROJECT INFORMATION

Project Name: _____

Address: _____

General Contractor: _____

Concrete Type: _____

Specification Section Reference: _____

Intended Use: _____

Part 2

DETERMINE REQUIRED COMPRESSIVE STRENGTH (select one method)

☐ If field test data is available:

If a group of at least 15 consecutive compressive strength tests meeting the requirements of ACI 301-10 4.2.3.2 are available, calculate the standard deviation and required average compressive strength from ACI 301-10 Table 4.2.3.3.a

Number of Tests: _____

Standard Deviation: _____

K Factor: _____

f'_{cr} : _____

Recorded Field Test Data		
Test	Date	f'_c
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

☐ If field test data is not available:

If no field compressive strength tests are available, select required average compressive strength from ACI 301-10 Table 4.2.3.3.b

f'_{cr} : _____

Part 3

DOCUMENTATION OF AVERAGE COMPRESSIVE STRENGTH

Two methods of determining expected compressive strength are acceptable including Field Test Data Method and Trial Mix Method. Select **one** method and provide the data required as described.

Field Test Data Method:

Provide design Materials, Types, Specific Gravity, Weight and Volume for the concrete being tested. Utilize the following table. Mix #2 is not required when ten or more consecutive strength tests for one mixture are available. See ACI 301-10 4.2.3.4.a for additional information and requirements.

Materials	Type/Source		Specific Gravity		Weight (lbs.)		Absolute Volume (cu. ft.)	
	#1	#2	#1	#2	#1	#2	#1	#2
Mix								
Cement								
Fly Ash								
Microsilica								
Coarse Aggregate								
Fine Aggregate								
Water								
Air								
Other								
TOTAL							27.0 cu. ft.	

Mix #1, Water/Cement Ratio: _____

Mix #2, Water/Cement Ratio: _____

- ☐ If at least 10 strength tests represent one mixture, calculate average compressive strength and verify it is greater than required compressive strength.

Average Compressive Strength (f'_c): _____

Required Compressive Strength (f'_{cr}): _____

- ☐ If at least 10 strength tests represent two mixtures, calculate average compressive strength for each mixture and plot as a function of water/cement ratio. Using the required compressive strength from Part 2, determine the corresponding water/cement ratio.

Required Compressive Strength (f'_c): _____

Water/Cement Ratio From Plot: _____

Attach copy of average compressive strength vs. water cement ratio.

Establish mixture proportions based upon the required water cementitious ratio. Use the table below to show the actual mixture used on the project. (If one trial mix was used the mixture will match Mix #1)

Field Test Data					
Mix #1	Date	f'_c	Mix #2*	Date	f'_c
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		
16			16		
17			17		
18			18		
19			19		
20			20		
21			21		
22			22		
23			23		
24			24		
25			25		
26			26		
27			27		
28			28		
29			29		
30			30		
Average	-		Average	-	

Materials	Type/Source	Specific Gravity	Weight (lbs.)	Absolute Volume (cu. ft.)
Cement				
Fly Ash				
Microsilica				
Coarse Aggregate				
Fine Aggregate				
Water				
Air				
Other				
TOTAL				27.0 cu. ft.

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Trial Mixture Method:

Provide three design mixtures including: Materials, Types, Specific Gravity, Weight and Volume for the concrete being tested. See ACI 301-10 for additional information and requirements.

Materials	Type/Source			Specific Gravity			Weight (lbs.)			Absolute Volume (cu. ft.)		
	#1	#2	#3	#1	#2	#3	#1	#2	#3	#1	#2	#3
Trial Mixture												
Cement												
Fly Ash												
Microsilica												
Coarse Aggregate												
Fine Aggregate												
Water												
Air												
Other												
Total										27.0 cu. ft.		

Mix #1, Water/Cement Ratio: _____

Mix #2, Water/Cement Ratio: _____

Mix #3, Water/Cement Ratio: _____

Provide compressive test results from above mixtures.

Trial Mix Test Data								
Mix #1	Date	f'c	Mix #2	Date	f'c	Mix #3	Date	f'c
1			1			1		
2			2			2		
3			3			3		
Average	-		Average	-		Average	-	

Plot average compressive strength versus water cement ratio and determine the proper water-cementitious material ratio to meet the required compressive strength from Part 2.

Required Compressive Strength (f'cr): _____

Water/Cementitious Materials Ratio: _____

Establish the mixture proportions based upon the required water cementitious ratio. Use the table below to summarize mixture proportions used on the project.

Materials	Type/Source	Specific Gravity	Weight (lbs.)	Absolute Volume (cu. ft.)
Cement				
Fly Ash				
Microsilica				
Coarse Aggregate				
Fine Aggregate				
Water				
Air				
Other				
TOTAL				27.0 cu. ft.

Additional Requirements/Information:

Please provide the following attachments: (Initial if attached)

Coarse Aggregate Gradation Report	_____
Fine Aggregate Gradation Report	_____
Concrete Compressive Strength Data	_____
Admixture Compatibility Certification Letter	_____
Trial Mixture strength vs. water/cement ratio plots	_____

SECTION 04 20 00 - UNIT MASONRY

A. WORK INCLUDED

1. The work included under this section consists of furnishing all labor, materials, tools and equipment necessary to complete all unit masonry and related work as shown on the Drawings and specified herein.
2. The extent of each type of unit masonry is shown on the Drawings.

B. JOB CONDITIONS

1. Protect partially complete masonry against weather when work is not in progress by covering top of walls with strong, waterproof, nonstaining membrane. Extend membrane at least 2' down both sides of walls and anchor securely in place.

C. SUBMITTALS

1. Test report from independent laboratory indicating results for each of the following:
 - a. Concrete Masonry Units: Resultant weight, compressive strength, and water absorption properties, as well as adherence to the following standards:
 1. Test reports shall conform to ASTM C140, and shall include:
 - a. Name of Manufacturer.
 - b. Date of manufacturer of test specimen.
 - c. Dimension measurements.
 - d. Calculated gross and net areas.
 - e. Total load and net unit load.
 - f. Sample weight.
 - g. Dry, wet, and immersed weights.
 - h. Density.
 - i. Moisture content.
 - j. Absorption.
 - k. Linear shrinkage coefficient.
 - b. Submit compression test results from an independent testing laboratory showing the compressive strength of each type and size of concrete masonry units delivered to the construction site, for each 10,000 S.F. of concrete masonry wall construction. Units to be tested shall be selected at random from materials stockpiled at the project site.
 - c. Submit a test report from an independent testing laboratory showing compressive strength of concrete masonry prisms constructed from the concrete masonry units and mortar to be used in the masonry work as follows:
 1. Each proposed type and size of concrete masonry unit required.
 2. Each proposed type and size of grouted wall.
2. Letter from each approved manufacturer certifying that provided units will meet or exceed qualities of tested units for each type of masonry unit.
3. Masonry reinforcing steel shop drawings.
4. Written plan for masonry cleaning procedures.

D. QUALITY ASSURANCE

1. Codes and Standards: Comply with the provisions of the following codes, specifications and standards:
 - a. Comply with recommendations of National Concrete Masonry Association (NCMA).
 - b. ACI 530-99/ASCE 5-99 Building Code Requirements for Masonry Structures.
 - c. ACI 530.1-99/ASCE 6-99 Specifications for Masonry Structures.
 - d. National Concrete Masonry Association
 1. NCMA TEK Bulletin 3-1 "Cold Weather Concrete Masonry Construction".
 2. NCMA TEK Bulletin 3-2 "Grouting for Concrete Masonry Walls".

3. NCMA TEK Bulletin 7-1 "Fire Resistance Ratings for Concrete Masonry Assemblies".
5. NCMA TEK Bulletin 7-3 "Fire Safety for Concrete Masonry".
6. NCMA TEK Bulletin 10-1A "Crack Control in Concrete Masonry Walls".
7. NCMA TEK Bulletin 10-2A "Control Joints in Concrete Masonry Walls".
8. NCMA TEK Bulletin 14-2 "Reinforced Concrete Masonry".
9. NCMA TEK Bulletin 19-4 "Flashing Concrete Masonry".
10. NCMA TEK Bulletin 19-5 "Use of Flashing in Concrete Masonry".
11. Standard Practice for Bracing Masonry Walls Under Construction, July 1999.
- e. American Society for Testing and Materials (ASTM)
 1. ASTM C33-97 "Concrete Aggregates".
 2. ASTM C90-97a "Loadbearing Concrete Masonry Units".
 3. ASTM C140-75 (R-1988) "Standard Methods of Sampling and Testing Concrete Masonry Units".
 4. ASTM C426-06a "Testing for Drying Shrinkage of Concrete Block".
- f. International Masonry Industry All-Weather Council (IMIAWC)
 1. "Recommended Practices and Guide Specifications for Cold Weather Masonry Construction-1993".
2. Field Constructed Mock-Up Panels
 - a. The first 100 square feet of each masonry wall type or pattern type installed shall serve as a mock-up panel for Architect/Owner approval of workmanship, including installation of masonry, exposed and concealed, anchors, flashing, and control joints, including sealant. The sample area when accepted, shall become the project standard for quality of work, methods of installation and appearance. Protect accepted mock-up area of work throughout duration of project, to become part of completed work.

E. MATERIALS

1. Face Brick (Sign Base) Belden Brick Company – Modular 8530
2. Concrete Masonry Units (CMU):
 - a. Manufacturer: Shall be a member of the National Concrete Masonry Association.
 - b. Size: Manufacturer's standard units with nominal face dimensions of 16" long x 8" high, (15-5/8" x 7-5/8" actual), unless otherwise shown. See drawings for required wythe dimensions.
 - c. Special Shapes: Provide, where shown and where required, lintels, corners, jambs, sash, control joints, headers, bond beams, bullnose, and other special conditions. Provide (2) two core type units where required to receive vertical reinforcing.
 1. Provide one inch radius bullnose at external corners and edges unless otherwise noted.
 - d. Fire Resistance: Furnish units with specified fire resistance classification, where indicated on the Drawings.
 - e. Integral Water Repellent: Provide Integral Water Repellent at all exterior CMU, complying with ASTM E 514 wind driven rain permanence Class E rating.
 - f. Linear shrinkage: Not to exceed 0.065 percent, in accordance with ASTM C 426.
 - g. Hollow Load-Bearing Concrete Masonry Units:
 1. Provide units complying with ASTM C 90, Grade M or S.
 2. Compressive Strength: 2,000 psi average, 1,700 psi minimum.
 3. Weight Classification: Normal Weight.
 - h. Solid Load-Bearing Concrete Masonry Units:
 1. Provide units complying with ASTM C 90, Grade M or S.
 2. Compressive Strength: 2,000 psi average, 1,500 psi minimum.
 3. Weight Classification: Normal Weight.
 - i. Exposed Face:
 1. Manufacturer's standard color and texture, unless otherwise noted.
 2. Provide units with special finishes and textures where indicated.
 - a. Provide scored units where indicated.
 - b. Provide integral pigmented colors where indicated.

- j. Below grade units, (except interior partitions), and above grade load bearing units shall comply with ASTM C 90, Grade M or S.
- k. Curing: Cure units in a moisture - controlled atmosphere or in an autoclave at normal pressure and temperature to comply with ASTM C 90, Type 1.
- 3. Mortar & Grout Materials:
 - a. Portland Cement: ASTM C 150, Type I, except Type III may be used for cold weather protection.
 - b. Hydrated lime: ASTM C 207. Type S.
 - c. Sand: ASTM C 144, except for joints less than 1/4" use aggregate graded with 100% passing the #16 seive.
 - d. Color:
 - 1. Face Brick: Colored Mortar to match existing building.
 - 2. CMU: Natural Gray
- 4. Mortar Mixes:
 - a. Do not lower the freezing point of mortar by use of admixtures or anti-freeze agents.
 - b. Mortar for unit masonry: Comply with ASTM C 270, Proportion Specifications, except limit materials to those specified herein, and limit cement/lime ratio by volume as follows: Type S: (All Masonry work) - not more than 1/2 part lime per part of Portland Cement.
- 5. Grout Materials:
 - a. Grout for Unit Masonry
 - 1. Comply with ASTM C 476. Use grout of consistency (fine or course) at time of placement that will completely fill spaces intended to receive grout.
 - a. Use fine grout in spaces less than 2" in horizontal dimension.
 - b. Use course grout in spaces 2" or more in least horizontal dimension.
 - 2. Aggregate: ASTM C 404.
 - 3. Do not use calcium chloride.
 - 4. Placement:
 - a. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
 - b. Do not exceed the following pour heights for fine grout:
 - 1. For minimum widths of grout spaces of 3/4" or for minimum grout space of hollow unit cells of 1-1/2" by 2", pour height of 12".
 - 2. For minimum widths of grout spaces of 2" or for minimum grout space of hollow unit cells of 2" by 3", pour height of 60".
 - 3. For minimum widths of grout spaces of 2-1/2" or for minimum grout space of hollow unit cells of 2-1/2" by 3", pour height of 12 feet.
 - 4. For minimum widths of grout spaces of 3" or for minimum grout space of hollow unit cells of 3" by 3", pour height of 24 feet.
 - c. Do not exceed the following pour heights for course grout:
 - 1. For minimum widths of grout spaces of 1-1/2" or for minimum grout space of hollow unit cells of 1-1/2" by 3", pour height of 12".
 - 2. For minimum widths of grout spaces of 2" or for minimum grout space of hollow unit cells of 2-1/2" by 3", pour height of 60".
 - 3. For minimum widths of grout spaces of 2-1/2" or for minimum grout space of hollow unit cells of 3" by 3", pour height of 12 feet.
 - 4. For minimum widths of grout spaces of 3" or for minimum grout space of hollow unit cells of 3" by 4", pour height of 24 feet.
 - d. Provide cleanout holes at least 3" in least dimension for grout pours over 60" in height.
 - 1. Provide cleanout holes at each vertical reinforcing bar.
 - 2. At solid grouted masonry, provide cleanout holes at not more than 32" o.c.
 - e. Grout will be sampled and tested for compressive strength per ASTM C 1019.

- b. Non-Shrink Grout
 1. Pre-mixed metallic aggregate, complying with ASTM C 476.
 2. Acceptable manufacturer's and products:
 - a. Master Builders, Inc. – "Embeco".
 - b. Sonneborn Building Products – "Ferrolith G".
 - c. Chem Master – "Metox RM".
 - d. Euclid Chemical – "Firmes".
 3. Comply with applicable requirements of ANSI/NBS "Building Code Requirements for Reinforced Masonry"; and ACI 531 "Building Code Requirements for Concrete Masonry Structures".
6. Masonry Accessories:
 - a. Individual wire ties for masonry: Fabricate from 3/16" cold-drawn steel wire, ASTM A 82, unless otherwise indicated of the length required for proper embedment in wythes of masonry shown and crimped if used in cavity wall construction.
7. Flashings for masonry:
 - a. Thru-wall flashing: Provide concealed flashings shown to be built into masonry as follows: Vinyl Masonry Flashing: PVC with plasterizers and modifiers, formed into a 20-mil flexible sheet.
- F. INSTALLATION AND WORKMANSHIP
 1. Inspection: Masonry installer must examine the areas and conditions under which masonry is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to masonry installer.
 2. Chipped, cracked or otherwise damaged or imperfect CMU units shall not be installed. Exposed faces of CMU in exposed wall construction shall not exhibit chips, cracks or imperfections when viewed at a distance of not less than 10 feet under diffused lighting. Note: This requirement supersedes the tolerances listed in ASTM C90 Section 7.2. Installed CMU not meeting this criteria shall be rejected, and shall be replaced at no cost to the Owner.
 3. Installation - General
 - a. Build masonry construction to the full thickness shown, except build single wythe walls, if any, to the actual thickness of the masonry units using units of nominal thickness shown or specified.
 - b. Cut masonry units with motor-driven saw designed to cut masonry with clean, sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible. All cut units shall be placed at inside corners wherever possible.
 - c. Wet brick having ASTM C 67 absorption rate greater than 0.025 oz. per square inch per minute. Determine absorption by drawing a circle the size of a quarter on typical units and place 20 drops of water inside the circle. Wet brick units only if water absorbed within 1-1/2 minutes.
 - d. Do not wet concrete masonry units.
 - e. Frozen materials and work: Do not use frozen materials or material mixed or coated with ice or frost. For masonry which is specified to be wetted, comply with the BIA Recommendations. Do not build on frozen work. Remove and replace masonry work damaged by frost or freezing.
 - f. Do not lower the freezing point of mortar by use of admixtures, anti-freeze agents, or accelerating agents.
 - g. Do not use calcium chloride in mortar for any exposed brick.
 - h. Pattern Bond: Lay exposed masonry in the bond pattern shown, or if not shown, lay in 1/2 running bond. Lay concealed masonry with all units in a wythe bonded by lapping not less than 2". Bond and interlock each course of each wythe at corners, unless otherwise shown.
 - i. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to properly locate openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half-size units at corners, jambs, and wherever possible at other locations.
 - j. Lay up walls plumb and true, and with courses level, accurately spaced and coordinated with other work.

- k. Stopping and resuming work: Rake back 1/2 masonry unit length in each course, do not tooth. Clean exposed surfaces of set masonry, wet units lightly, if specified to be wetted, and remove loose masonry units and mortar prior to laying fresh masonry.
 - l. Built-in work: As the work progresses, build-in items specified under this and other sections of these Specifications. Fill space between hollow metal frames and masonry solidly with mortar. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
4. Mortar Bedding and Jointing
- a. Mortar mixes: ASTM C 270, Proportion Specification, and of the types herein before specified.
 - b. Mix mortar ingredients for a minimum of 5 minutes in a mechanical batch mixer. Use water clear and free of deleterious materials which would impair the work. Do not use mortar which has begun to set or if more than 2-1/2 hours has elapsed since initial mixing. Retemper mortar during 2-1/2 hour period as required to restore workability.
 - c. Lay brick and other solid masonry units with completely filled bed and head joints. Butter ends with sufficient mortar to fill head joint and shove into place. Do not slush head joints.
 - d. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells, also bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with concrete or grout.
 - e. Joints:
 - 1. All exposed CMU shall have 3/8" tooled joints. Variations of all joints shall not exceed 1/16".
Note: This requirement supersedes the tolerances listed in ACI 530.1-99/ASCE 6-99.
 - 2. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials.
 - 3. Rake out mortar in preparation for application of caulking or sealants where shown.
 - f. Remove masonry units disturbed after laying. Clean and re-lay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required remove units, clean off mortar, and reset in fresh mortar.
 - g. Fill joints between wythes solidly with mortar by parging either the back of the facing or the face of the backing and shove units solidly into parging.
5. Anchoring Masonry Work
- a. Provide anchoring devices of the type shown and as specified, if not shown, or specified, provide standard type for facing and back-up involved.
6. Control and Expansion Joints
- a. Provide vertical expansion, control and isolation joints in masonry where shown. Build in related masonry accessory items as the masonry work progresses. Rake out mortar in preparation for application of caulking and sealants. See Section 07 92 00 for Sealants and Caulking.
 - b. Control Joint locations in CMU: Provide vertical control joints in CMU where indicated, or if not indicated, in accordance with NCMA TEK Bulletins 10-1A and 10-2A, and at all offsets, returns, openings, and intersections with dissimilar materials, and as follows to prevent cracking:
 - 1. At change from wall bearing on foundation wall to wall bearing on floor slab.
 - 2. At change from exterior wall to interior wall.
 - 3. At walls setting on floors that cross floor construction.
 - 4. At columns within masonry walls.
 - 5. At changes in wall thickness.
 - 6. Stop joint reinforcement bars on either side of control joints. Extend reinforcing bars in bond beams continuously through control joints and sleeves for bond break 18 inches each side of joint.
 - 7. Install control joints in concrete masonry units with pre-fabricated shear key.
 - 8. At end of lintel bearing on one end of openings less than or equal to 6'-4", and at both ends of openings greater than 6'-4".
 - 9. Straight runs: Maximum 24 feet.

7. Flashing of Masonry Work

- a. Provide concealed flashings in masonry work as shown. Prepare masonry surfaces smooth and free from projections which might puncture flashing. Place through-wall flashing on bed of mortar and cover with mortar. Seal flashing penetrations with mastic before covering with mortar. Terminate flashing 1/2" from face of wall, unless otherwise shown. Extend flashing beyond edge of lintels and sills at least 4" and turn up edge on sides to form pan to direct moisture to exterior. Provide weep holes in the head joints of the first course of masonry immediately above concealed flashings spaced 24" o.c..
- b. Install flashings in accordance with manufacturer's instructions.

8. Repair, Pointing, and Cleaning

- a. Remove and replace masonry units which are loose, broken, stained, or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout pointed to eliminate evidence of replacement.
- b. During the tooling of joints, enlarge any voids, except weep holes and completely fill with mortar. Point-up all joints at corners, openings, and adjacent work to provide a neat uniform appearance, properly prepared for application of caulking or sealant compounds.
- c. After all holes have been pointed, all new masonry walls shall be cleaned with bristle brushes and clear water to remove stains and foreign materials. Cleaning compounds, acids, and other injurious cleaners are not permitted.
- d. Clean exposed CMU masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings.

END OF SECTION 04 20 00

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel.
2. Shrinkage-resistant grout.
3. Other Steel: loose lintels, beam lintels.

B. Related Requirements:

1. Section 053100 "Steel Decking" for field installation of shear stud connectors through deck.

1.2 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303, except as modified in this section.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
- C. Shop Drawings: Show fabrication of structural-steel components.
1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 2. Include embedment Drawings.
 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.

- 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
 - 5. Identify members not to be shop primed.
- D. Delegated Design Submittal: For structural-steel connections indicated on Drawings to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Submittal of structural analysis data is not required for typical AISC-recommended simple shear connections.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, fabricator, shop-painting applicators, and professional engineer.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Mill test reports for structural-steel materials, including chemical and physical properties.
- E. Product Test Reports: For the following:
 - 1. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
- F. Survey of existing conditions.
- G. Source quality-control reports.
- H. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).
- B. Installer Qualifications: A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.
- C. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.
- D. Special Inspector Qualifications: A qualified person employed or retained by an approved agency that has the recommended experience and certifications as summarized in Appendix C of the current International Code Council (ICC) Special Inspection Manual.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
 - 1. ANSI/AISC 303.
 - 2. ANSI/AISC 360.
 - 3. RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- B. Connection Design Information:
 - 1. For simple shear connections: Fabricator's experienced steel detailer shall select or complete connections in accordance with ANSI/AISC 303.
 - a. Select and complete connections using schematic details indicated and ANSI/AISC 360.
 - b. Use Allowable Stress Design; data are given at service-load level.
- C. Engineering Responsibility: Fabricator's responsibilities include using a qualified professional engineer to prepare structural analysis data for structural-steel connections.
- D. Moment Connections: Type FR, fully restrained.
- E. Construction: Braced frame.

2.2 STRUCTURAL-STEEL MATERIALS

- A. W- and WT- Shapes: ASTM A572/A572M, Grade 50.

- B. Channels, Angles, M-Shapes, S-Shapes: ASTM A36/A36M.
- C. Plate and Bar: ASTM A36/A36M.
- D. Steel Castings: ASTM A216/A216M, Grade WCB, with supplementary requirement S11.
- E. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

- A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

2.4 RODS

- A. Headed Anchor Rods: ASTM F1554, Grade 55, weldable, straight.
 - 1. Nuts: ASTM A563 heavy-hex carbon steel.
 - 2. Plate Washers: ASTM A36/A36M carbon steel.
 - 3. Washers: ASTM F436, Type 1, hardened carbon steel.
 - 4. Finish: Plain.
- B. Threaded Rods: ASTM A36/A36M.
 - 1. Nuts: ASTM A63 hex carbon steel.
 - 2. Washers: ASTM A36/A36M carbon steel.
 - 3. Finish: Plain.

2.5 PRIMER

- A. Steel Primer:
 - 1. Interior Steel Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

2.6 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.
 - 1. Mark and match-mark materials for field assembly.
 - 2. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.7 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.
 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
- C. Design of Connections: Typical AISC connections are to be used except where otherwise shown. Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.
- D. Fabricate length of diagonal bracing to provide nominal tension in member when erected.

2.8 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:
 1. Surfaces to be field welded.
 2. Surfaces of high-strength bolted, slip-critical connections.
- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
 1. For exterior steel, interior steel exposed to view, and AESS: SSPC-SP 6 (WAB)/NACE WAB-3.
- C. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness

of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.9 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.

1. Allow testing agency access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
2. Bolted Connections: Inspect shop-bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
3. Welded Connections: Visually inspect shop-welded connections in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E165/E165M.
 - b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - c. Ultrasonic Inspection: ASTM E164.
 - d. Radiographic Inspection: ASTM E94/E94M.
4. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.

- B. Baseplates, Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.
- C. Maintain erection tolerances of structural steel within ANSI/AISC 303.
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 - 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.

3.5 REPAIR

- A. Touchup Painting:

1. Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

3.6 FIELD QUALITY CONTROL

- A. Special Inspections and field quality control testing: Owner will engage a qualified special inspector to perform field tests and inspections and prepare test reports.
 1. Refer to drawings for testing and special inspection requirements.
 2. Prepare and submit reports within 7 days of completing tests and inspections. Distribute reports to Architect, Engineer, Owner (or owner's representative), and Contractor. Clearly indicate non-compliance on reports.
- B. Non-Compliant Work:
 1. The contractor shall remove and replace all non-compliant work, or, at the contractor's expense, perform additional testing to verify compliance. Contractor shall submit results of additional testing to Architect, Engineer, and Owner (or owner's representative) for review and approval.

END OF SECTION 051200

SECTION 052100 - STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. LH-series long-span steel joists.
 - 2. Steel joist accessories.
- B. Related Requirements:
 - 1. Section 033000 "Cast-in-Place Concrete" for installing bearing plates in concrete.
 - 2. Section 051200 "Structural Steel Framing" for steel framing and welded connections.
 - 3. Section 051200 "Structural Steel Framing" for furnishing bearing plates and anchors to be set in concrete and masonry.

1.2 DEFINITIONS

- A. SJI's "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."
- B. Special Joists: Steel joists or joist girders requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of joist, accessory, and product.
- B. Shop Drawings:
 - 1. Include layout, designation, number, type, location, and spacing of joists.
 - 2. Include joining and anchorage details; bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Welding certificates.
- C. Manufacturer certificates. Signed by manufacturers certifying that joists comply with requirements.

- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- E. Mill Certificates: For each type of bolt. Signed by manufacturers certifying that joists comply with requirements.
- F. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications."
 - 1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.
 - 2. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installation of joists that are similar to those indicated for this Project in material, design, and extent.
- B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. Special Inspector Qualifications: A qualified person employed or retained by an approved agency that has the recommended experience and certifications as summarized in Appendix C of the current International Code Council (ICC) Special Inspection Manual.
- D. SJI Specifications: Comply with standard specifications in SJI's "Specifications" that are applicable to types of joists indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle joists as recommended in SJI's "Specifications."
- B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated on Drawings.
 - 1. Use ASD; data are given at service-load level.

2. Design special joists to withstand design loads with live-load deflections no greater than the following:
 - a. Roof Joists: Vertical deflection of $1/360$ of the span.

2.2 STEEL JOISTS

- A. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends when indicated on Drawings, complying with SJI's "Specifications."
- B. Long-Span Steel Joist: Manufactured steel joists according to "Standard Specification for Longspan Steel Joists, LH-Series and Deep Longspan Steel Joists, DLH-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members; of joist type and end and top-chord arrangements as follows:
 1. Joist Type: LH-series long-span steel joists.
 2. End Arrangement: Underslung.
 3. Top-Chord Arrangement: Parallel.
 4. Camber long-span steel joists according to SJI's "Specifications".
- C. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds $1/4$ inch per 12 inches. Camber long-span steel joists according to SJI's "Specifications." For long-span joists directly adjacent to masonry walls, provide one half of camber listed in SJI's "Specifications."
- D. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.

2.3 PRIMERS

- A. Primer:
 1. SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.
 2. Provide shop primer that complies with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

2.4 STEEL JOIST ACCESSORIES

- A. Bridging:
 1. Schematically indicated. Detail and fabricate according to SJI's "Specifications." Furnish additional erection bridging if required for stability.
 2. Finish: Plain, uncoated.
- B. High-Strength Bolts, Nuts, and Washers: ASTM F3125, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436, Type 1, hardened carbon-steel washers.
 1. Finish: Plain.

- C. Welding Electrodes: Comply with AWS standards.
- D. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.5 CLEANING AND SHOP PAINTING

- A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2.
- B. Apply one coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Do not install joists until supporting construction is in place and secured.
- B. No field modifications to the joists will be permitted unless approved by Architect/Engineer and the joist manufacturer.
- C. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written instructions, and requirements in this Section.
 - 1. Before installation, splice joists delivered to Project site in more than one piece.
 - 2. Space, adjust, and align joists accurately in location before permanently fastening.
 - 3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
- D. Field weld joists to supporting steel. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- E. Install and connect bridging concurrently with joist erection before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 REPAIRS

A. Touchup Painting:

1. Immediately after installation, clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories.
 - a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
 - b. Apply a compatible primer of same type as primer used on adjacent surfaces.

3.4 FIELD QUALITY CONTROL

A. Special Inspections and field quality control testing: Owner will engage a qualified special inspector to perform field tests and inspections and prepare test reports.

1. Refer to drawings for testing and special inspection requirements.
2. Prepare and submit reports within 7 days of completing tests and inspections. Distribute reports to Architect, Engineer, Owner (or owner's representative), and Contractor. Clearly indicate non-compliance on reports.

B. Non-Compliant Work:

1. The contractor shall remove and replace all non-compliant work, or, at the contractor's expense, perform additional testing to verify compliance. Contractor shall submit results of additional testing to Architect, Engineer, and Owner (or owner's representative) for review and approval.

END OF SECTION 052100

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof deck.
2. Noncomposite form deck.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for normal-weight and lightweight structural concrete fill over steel deck.
2. Section 051200 "Structural Steel Framing".
3. Section 055000 "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Roof deck.
2. Noncomposite form deck.

B. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.3 INFORMATIONAL SUBMITTALS

A. Certificates:

1. Welding certificates.
2. Product Certificates: For each type of steel deck.

B. Test and Evaluation Reports:

1. Product Test Reports: For tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
 - a. Power-actuated mechanical fasteners.

- 2. Research Reports: For steel deck, from ICC-ES showing compliance with the building code.
- C. Field Quality-Control Submittals:
 - 1. Field quality-control reports.
- D. Qualification Statements: For welding personnel.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Special Inspector Qualifications: A qualified person employed or retained by an approved agency that has the recommended experience and certifications as summarized in Appendix C of the current International Code Council (ICC) Special Inspection Manual.
- C. Welding Qualifications: Qualify procedures and personnel in accordance with SDI QA/QC and the following welding codes:
 - 1. AWS D1.1/D1.1M.
 - 2. AWS D1.3/D1.3M.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store products in accordance with SDI MOC3. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck in accordance with AISI S100.

2.2 ROOF DECK

- A. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with SDI RD and with the following:
 - 1. Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 33, G60 zinc coating.
 - 2. Deck Profile: As indicated on drawings.

3. Profile Depth: As indicated on drawings.
4. Design Uncoated-Steel Thickness: As indicated on drawings.
5. Span Condition: Triple span or more.
6. Side Laps: Overlapped or interlocking seam at Contractor's option.

2.3 NONCOMPOSITE FORM DECK

- A. Noncomposite Form Deck: Fabricate ribbed-steel sheet noncomposite deck panels used as a form to comply with SDI NC, with the minimum section properties indicated, and with the following:
 1. Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 33, G60 zinc coating.
 2. Profile Depth, Thickness, Span and Configuration: Provide deck of depth, thickness, and configuration to support the dead load of the concrete plus 25 pounds per square foot construction loads while sustaining only a maximum of L/240 deflection when placed over number of spans used.
 3. Side Laps: Overlapped or interlocking seam at Contractor's option.

2.4 ACCESSORIES

- A. Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, **[0.0598 inch] [0.0747 inch]** thick, with factory-punched hole of 3/8-inch minimum diameter.
- G. Galvanizing Repair Paint: **[ASTM A780/A780M] [SSPC-Paint 20 or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight]**.
- H. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories in accordance with SDI C, SDI NC, and SDI RD, as applicable; manufacturer's written instructions; and requirements in this Section.
- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

3.3 INSTALLATION OF ROOF DECK

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
 - 1. Weld Diameter: 5/8-inch, nominal.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 18 inches, and as follows:
 - 1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
 - 1. End Joints: Lapped 2 inches minimum or butted at Contractor's option.

- D. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels in accordance with deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.

- 1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

3.4 REPAIR

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint in accordance with ASTM A780/A780M and manufacturer's written instructions.

- B. Repair Painting:

- 1. Wire brush and clean rust spots, welds, and abraded areas on top surface of prime-painted deck immediately after installation and apply repair paint.
 - 2. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections and field quality control testing: Owner will engage a qualified special inspector to perform field tests and inspections and prepare test reports.

- 1. Refer to drawings for testing and special inspection requirements.
 - 2. Prepare and submit reports within 7 days of completing tests and inspections. Distribute reports to Architect, Engineer, Owner (or owner's representative), and Contractor. Clearly indicate non-compliance on reports.

- B. Non-Compliant Work:

- 1. The contractor shall remove and replace all non-compliant work, or, at the contractor's expense, perform additional testing to verify compliance. Contractor shall submit results of additional testing to Architect, Engineer, and Owner (or owner's representative) for review and approval.

END OF SECTION 053100

SECTION 05 50 00 - METAL FABRICATION AND MISCELLANEOUS METAL

A. WORK INCLUDED

1. The work included under this section consists of furnishing all labor, material, tools, and equipment necessary to fabricate, furnish, and install, (unless shown or specified to be installed in other sections), all metal fabrications and miscellaneous metal items as shown on the Drawings or specified herein.
2. Items to be furnished and installed under this section include in general, but are not strictly limited to the following:
 - a. Stainless Steel Guard and Handrail System
 - b. Concrete-filled Galvanized Steel Bollards

B. SHOP DRAWINGS

1. Show complete details including plans, elevations, sections and details and attachments to other work.
2. Provide templates anchors and bolts specified for installation under other sections by others, and instructions for fabrications, assembly, and installation. Locate anchor bolts and devices required for installation in other work.
3. Drawings shall also include appropriate ASTM reference numbers with prime painting and galvanizing notes.
4. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. METAL FABRICATIONS

1. Provide miscellaneous steel framing and supports which are not part of structural steel framework, as required to complete work. Furnish setting drawings, templates and directions for installing anchorages, including concrete inserts, anchor bolts, embeds that are to be embedded in masonry or concrete. Deliver such items to project site in time for installation.
2. Fabricate miscellaneous units to sizes, shapes and profiles shown, or if not shown, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars of welded construction, using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

D. GENERAL REQUIREMENTS

1. Furnish inserts and anchoring devices to be built into other work for installation of miscellaneous metal items.
2. Steel Plates, Shapes, Bars: ASTM A 36.
3. Tubular Steel Items: Pipe, ASTM A 120.
4. Metal Primer Paint: Red Oxide or similar. FS TT-P-86, Type II, or SSPC 14. Apply to prepared steel surfaces at rate to provide a 2.0 mil dry film thickness.
5. Galvanizing: ASTM A 386 for assembled products: A153 for iron and steel hardware.
6. Fabrication--General: Use materials of size and thickness shown, or, if not shown, of required size and thickness to produce strength and durability.
7. Steel Pipe: ASTM A 53; type as selected; Grade A; black finish, unless galvanizing is required; welded and seamless; standard weight (Schedule 40), unless otherwise indicated.
 - a. Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Section 09 90 00.
8. Stainless Steel
 - a. Tubing: ASTM A 554, Grade MT 316.
 - b. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.
 - c. Plate and Sheet: ASTM A 666, Type 316.

E. PERFORMANCE REQUIREMENTS

1. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
 - a. Stainless Steel: 60 percent of minimum yield strength.
 - b. Steel: 72 percent of minimum yield strength.
2. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - a. Handrails and Top Rails of Guards:
 1. Uniform load of 50 lbf/ ft. applied simultaneously both vertically and horizontally.
 2. Concentrated load of 300 lbf applied at any point.
 3. Uniform and concentrated loads need not be assumed to act concurrently.
 - b. Components. Intermediate rails, balusters shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot.
 - c. Limit live load deflections of treads, platforms and framing members to $L/360$ and total load deflections to $L/240$.
 - d. Fabricator shall employ a Professional Engineer registered in the State of Ohio to design each system.
3. Thermal Movements: Provide exterior railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - a. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
4. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

F. FASTENERS

1. General: Provide the following:
 - a. Stainless-Steel Railings: Type 316 stainless-steel fasteners.
2. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated.
3. Fasteners for Interconnecting Railing Components:
 - a. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
4. Anchors: Provide anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

G. MISCELLANEOUS MATERIALS

1. Shop Primers: Provide primers that comply with Division 9 painting Sections.
2. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior applications. For exterior applications use Sikadur® 31, Hi-Mod Gel epoxy and Pecora Dynatrol II caulk.
3. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

H. FABRICATION

1. Workmanship: Use materials of size and thickness shown or, if not shown of required size and thickness of product strength and durability in finished product. Work to dimensions shown or accepted on Shop Drawings, using proven details of fabrication and support. Use type of materials shown or specified for

various components of work.

2. Except for expansion and contraction joints, handrails will be fabricated in the largest pieces practical and consistent with shipping and handling.
3. Form exposed work true to line and level, with accurate angles and surfaces, and straight sharp edges. Ease exposed edges to a radius of approximately 1/32", unless otherwise shown. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
4. Weld corners and seams continuously, complying with AWS recommendations at exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
5. Form exposed connections with hairline joints, flush, and smooth, using concealed fasteners wherever possible.
6. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
7. Cut, reinforce, drill, and tap miscellaneous metal work as indicated to receive finish hardware and similar items.
8. Galvanizing: Galvanize all exterior steel systems as described in Section 05 12 00 - Structural Steel.

I. FINISHES

1. General:
 - a. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - b. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
 - c. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.
 - d. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.
2. Stainless Steel Finishes:
 - a. Remove tool and die marks and stretch lines or blend into finish.
 - b. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
 - c. Directional Satin Finish: No. 4.
 - d. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

J. INSTALLATION

1. Install all fabricated components and systems to be plumb, level, true, and properly aligned with adjacent work.
2. Fit exposed connections together to form tight, hairline joints.
3. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

END OF SECTION 05 50 00

SECTION 06 10 00 - ROUGH CARPENTRY

A. SUMMARY

1. This Section includes the following:
 - a. Wood furring, grounds, nailers, and blocking.
 - b. Fasteners and metal framing anchors.

B. REFERENCES

1. American Forest and Paper Association (AFPA) - Manual for Wood Frame Construction
2. American National Standards Institute (ANSI) - A208.1 Mat-Formed Manufactured Panels
3. Engineered Wood Association - Form E30 Engineered Wood Design/Construction Guide
4. American Society of Mechanical Engineers (ASME)
 - a. B18.2.1 Square and Hex Bolts and Screws - Inch Series
 - b. B18.6.1 Wood Screws (Inch Series)
5. American Society for Testing and Materials (ASTM)
 - a. A153 Specification for Zinc -Coating (Hot-Dip of Iron and Steel Hardware)
 - b. A307 Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
 - c. A563 Specification for Carbon and Alloy Steel Nuts
 - d. A653 Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - e. D245 Practice for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber
 - f. D2555 Test Method for Establishing Clear Wood Strength Values
6. American Wood Preservers Association (AWPA)
 - a. C2 Lumber, Pressure Treatment
 - b. C9 Plywood, Pressure Treatment
 - c. C20 Structural Lumber, Fire-Retardant Pressure Treatment
 - d. C27 Plywood, Fire-Retardant Pressure Treatment
 - e. M4 Standard for the Care of Preservative-Treated Wood Products
7. Ohio Building Code - Chapter 23 Wood
8. U.S. Department of Commerce, National Institute of Standards and Technology
 - a. PS 1 US Product Standard for Construction and Industrial Plywood
 - b. PS 2 Performance Standard for Wood-Based Structural-Use Panels
 - c. PS 20 American Softwood Lumber Standard (ASLS)

C. SUBMITTALS

1. General: Submit the following in accordance with the conditions of Contract and Section 01330, "Submittal Procedures."
2. Product Data: Submit manufacturer's product data for each distinct product specified.
3. Material certificates for dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use, and design values approved by American Lumber Standards Committee's (ALSC) Board of Review.
4. Wood treatment data as follows, including chemical treatment manufacturer's warranty and instructions for handling, storing, installing, and finishing treated materials:
 - a. For each type of preservative-treated wood product, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
 - b. For waterborne-treated products, include statement that moisture content of treated materials was reduced to levels indicated before shipment to Project site.
 - c. For fire-retardant-treated wood products, include certification by treating plant that treated materials comply with specified standard and other requirements as well as data relative to bending strength, stiffness, and fastener-holding capacities of treated materials.

D. QUALITY ASSURANCE

1. Single-Source Responsibility for Fire-Retardant-Treated Wood: Obtain each type of fire-retardant-treated wood product from one source and by single producer.

E. DELIVERY, STORAGE, AND HANDLING

1. Deliver wood products bundled or crated to provide adequate protection during transit and job storage, with required grade marks clearly identifiable. Inspect wood products for damage upon delivery. Remove and replace damaged materials.
2. Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks, and under temporary coverings. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.
3. Protect sheet materials during handling to prevent breaking of corners and damage to surfaces.

F. LUMBER, GENERAL

1. Lumber Standards: Comply with PS 20-99, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review. Lumber design values are to comply with ASTM D245 and ASTM D2555.
2. Inspection Agencies: Inspection agencies, and their grading rules include the following:
 - a. Northeastern Lumber Manufacturers Association (NELMA) - Standard Grading Rules
 - b. National Lumber Grades Authority (NLGA)(Canadian) - Standard Grading Rules
 - c. Redwood Inspection Service (RIS) - Standard Specifications for Grades of California Redwood Lumber
 - d. Southern Pine Inspection Bureau (SPIB) - Standard Grading Rules for Southern Pine Lumber
 - e. West Coast Lumber Inspection Bureau (WCLIB) - No. 17 Standard Grading Rules for West Coast Lumber
 - f. Western Wood Products Association (WWPA) - Western Lumber Grading Rules
3. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
 - a. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece, or omit grade stamps and provide grade-compliance certificates issued by inspection agency.
4. Where nominal sizes are indicated, provide actual sizes required by PS 20-99 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - a. Provide dressed lumber, surfaced four sides (S4S), unless otherwise indicated.
 - b. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38 mm actual) thickness or less, unless otherwise indicated.

G. WOOD-PRESERVATIVE-TREATED MATERIALS

1. General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPAC C2 (lumber) and AWPAC C9 (plywood). Mark each treated item with Quality Mark Requirements of inspection agency approved by ALSC's Board of Review. For exposed items indicated to receive stained finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
2. Pressure treat above ground items with waterborne preservatives to minimum retention of 0.25 lb/cu. ft. (4.0 kg/cu. m.). After treatment, kiln-dry lumber and plywood to maximum moisture content of 19 and 15 percent, respectively. Treat indicated items and the following:
 - a. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - b. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 - c. Wood framing members less than 18 inches (460 mm) above grade.

3. Pressure treat wood members in contact with ground or freshwater with waterborne preservatives to minimum retention of 0.40 lb/cu. ft. (6.4 kg/cu. m.).
4. Complete fabrication of treated items before treatment, where possible. If cut after treatment, apply field treatment complying with AWP A M4 to cut surfaces. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

H. DIMENSION LUMBER

1. General: If not indicated on Contract Documents, provide dimension lumber of any species and grades indicated for applicable use category listed in table below. Lumber shall comply with ALSC National Grading Rule (NGR) provisions of inspection agency applicable to species.

PRODUCT (Nominal Dimension)	GRADE	USE
Structural Light Framing 2 to 4 inches thick 2 to 4 inches wide	Select Structural No. 1 No. 2 No. 3	Structural applications where highest design values are needed in light framing sizes.
Light Framing 2 to 4 inches thick 2 to 4 inches wide	Construction Standard Utility	Where high-strength values are not required, such as wall framing, plates, sills, cripples, and blocking.

2. Species and grades must meet or exceed the following values, unless indicated otherwise on Contract documents.
 - a. F_b (extreme fiber stress in bending): Minimum 850 psi (5.9 MPa).
 - b. E (modulus of elasticity): Minimum 1,300,000 psi (8950 MPa).

I. MISCELLANEOUS LUMBER

1. General: Provide lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.
2. Fabricate miscellaneous lumber from dimension lumber of sizes indicated, and into shapes shown on Contract documents.
3. Moisture Content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.
4. Grade and Species: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No. 3 Common or Standard grade per WWPA of any species.

J. STRUCTURAL-USE PANELS FOR BACKING

1. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant-treated plywood panels with grade C-D plugged Exposure 1, in thickness indicated on Contract documents or, if not otherwise indicated, not less than 15/32 inch (11.9 mm) thick.

K. FASTENERS

1. General: Provide fasteners of size and type indicated, that comply with requirements specified. Where rough carpentry work is exposed to weather, in ground contact, or in areas of high relative humidity, provide fasteners with hot-dip, zinc-coating per ASTM A153
2. Nails, Wire, Brads, and Staples: ASTM F1667
3. Wood Screws: ASME B18.6.1.
4. Lag Bolts: ASME B18.2.1.

5. Bolts: Steel bolts complying with ASTM A307, Grade A with ASTM A563 hex nuts and, where indicated, flat washers.

L. INSTALLATION

1. General:
 - a. Discard units of material with defects that impair quality of rough carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.
 - b. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.
 - c. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
 - d. Apply field treatment complying with AWP A M4 to cut surfaces of preservative-treated lumber and plywood.
 - e. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with IBC Table 2304.9.1 Fastening Schedule.
2. Wood Grounds, Nailers, Blocking and Sleepers
 - a. Install wood grounds, nailers, blocking, and sleepers where shown, and where required for screeding or attaching other work. Form to shapes shown and cut as required for true line and level of attached work. Coordinate locations with other work involved.
 - b. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
 - c. Install permanent grounds of dressed, preservative-treated, key-beveled lumber not less than 1-1/2 inches (38.1 mm) wide, and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.
3. Wood Furring
 - a. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
 - b. Firestop furred spaces of walls at each floor level, and at ceiling with wood blocking or noncombustible materials, accurately fitted to close furred spaces.

END OF SECTION 06 10 00

SECTION 06 41 16 – ARCHITECTURAL CASEWORK

A. WORK INCLUDED:

1. Provide and install Architectural casework as shown and specified. Architectural casework herein shall mean all casework exposed to view, including all exposed wood, plywood, and hard plastics.

B. RELATED WORK:

1. Section 06 10 00 - Rough Carpentry
2. Section 07 90 00 – Joint Sealants
3. Section 09 65 13 – Rubber Wall Base
5. Section 09 91 23 – Painting

C. REFERENCES

1. American Laminator's Association (ALA)
2. American National Standards Institute (ANSI)
 - a. A208.1 Wood Particleboard
 - b. A208.2 Medium Density Fiberboard for Interior Use
3. American Society of Mechanical Engineers (ASME)
 - a. B18.6.1 Wood Screws (Inch Series)
4. American Society of Testing and Materials (ASTM)
 - a. D 523 Test Method for Specular Gloss
5. Architectural Woodwork Institute (AWI)
 - a. AWI Quality Standards 6th Edition Version 1.1
6. Builders Hardware Manufacturers Association (BMHA)
 - a. A156.9 Cabinet Hardware
 - b. A156.18 Materials and Finishes
7. Federal Specification (FS)
 - a. FF-N-105 Nails, Brads, Staples, and Spikes: Wire, Cut and Wrought
8. Hardwood Plywood and Veneer Association (HPVA)
 - a. HP 1 Interim Voluntary Standard for Hardwood and Decorative Plywood
9. National Electrical Manufacturers Association (NEMA)
 - a. LD 3 High-Pressure Decorative Laminates
10. National Particleboard Association (NPA)
 - a. 9 Voluntary Standard for Formaldehyde Emission from Medium Density Fiberboard (MDF)

D. SUBMITTALS

1. Submit in accordance with General, Supplementary and Special Conditions.
2. Submit electronic pdf file of Shop Drawings for approval. Show materials, dimensions, cabinet-cut details, and sink locations. Shop Drawings shall be furnished for all casework, and shall be drawn in related and/or dimensional position with sections shown either full size or 3" scale.
3. Submit color samples upon award of contract for selection and coordination with other suppliers. Architect may request and retain samples and catalog cuts as required for accessory and special items.
4. Product certificates signed by woodwork manufacturer certifying that products comply with specified requirements.

E. QUALITY ASSURANCE

1. Fabricator Qualifications: Firm experienced in producing architectural woodwork similar to that indicated for this Project, and with record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying Work.
2. Single-Source Responsibility for Fabrication and Installation: Engage qualified woodworking firm to assume undivided responsibility for fabricating, finishing, and installing woodwork specified in this Section.
3. Quality Standard: Except as otherwise indicated, comply with AWI Quality Standard "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork, construction, finishes, and other requirements.
4. Source of Cabinet Accessories: Provide accessories obtained from one single source for each type of hardware and accessories so that finishes match.
5. The casework manufacturer is responsible for details and dimensions not controlled by job conditions, and shall show on his Shop Drawings all required field measurements beyond his control.
6. The Contractor, when installing items not shop assembled shall distribute to the best over-all advantage the defects allowed in the quality grade specified.
7. The Contractor shall be responsible to deliver casework when the building and/or storage area is sufficiently dry, to prevent damaged caused by excessive changes in moisture content.
8. All Counters, Tops and Desk surfaces shall be fabricated as self-edge type, with 2" radius on all exposed corners when viewed in plan.

F. DELIVERY, STORAGE, AND HANDLING

1. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.
2. Do not deliver woodwork until painting and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions."

G. PROJECT CONDITIONS

1. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet-work is completed, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.
2. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying Work.
 - a. Verify locations of concealed framing, blocking, reinforcements, and furring that support woodwork by accurate field measurements before being enclosed. Record measurements on final shop drawings.
 - b. Where field measurements cannot be made without delaying Work, guarantee dimensions for accurate fit and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site and coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

H. QUALITY, GRADE AND MATERIALS SELECTION

1. Quality, Grade: Material and workmanship of all cabinetry work shall conform to the "Custom Grade" requirements of the AWI Quality Standards.
2. Materials:

- a. Laminated Plastics/Finishes:
 - 1. High-pressure plastic laminate, V32 grade, for exterior cabinet surfaces shall exceed NEMA standards for vertical grade.
 - 2. Color Selection Available: Textured finish vertical surface grade from casework manufacturer's stock colors consisting of complete range of colors and patterns.
 - 3. Plastic Laminate Balancing Sheet: Heavy gauge plastic laminate backing sheet shall be textured surface, and meet NEMA standards, and be of a type and thickness to properly balance face-finish.
 - 4. Counter top High Pressure Plastic Laminate: High-pressure plastic laminate, textured finish .050 thickness. Color as selected from manufacturer's stock standard patterns and solid colors.
 - 5. Heavy gauge neutral colored backing sheet for balanced construction.
- b. Pressure Fused Laminate:
 - 1. Thermosetting acid resistant Pressure Fused laminate, permanently bonded to substrate.
 - 2. Pressure Fused laminate color to be selected by Architect.
 - 3. The following agency requirements, standards and tests shall apply:

U.S. Federal	F.S.L.P.-508
ASTM	D-1300-53T
U.S. Food & Drug	Section 175.300
NEMA	LD3-1985
 - 4. Neutral colored Pressure Fused for semi-exposed cabinet interiors behind doors and drawers, interiors of all open cabinets, and underside of wall cabinets.
- c. High Performance Particle Board Core:
 - 1. Particle Board to be of 47 lb. density, and balanced construction with moisture content not to exceed 8%. 3-Ply Particleboard shall exceed the requirements for its type and classification under Commercial Standard CS-236-66. Federal Specifications LLL-8-800A, and ASTM D 1037-78.
 - 2. ParticleBoard shall meet the following Performance Requirements. Submit compliance data from the manufactured prior to fabrication:

Screw Holding, Face	371 lbs.
Modulus of Rupture	2,400 psi
Modoulus of Elasticity	450,000 psi
Internal Bond	90 psi
Surface Hardness	900 lbs
- d. Hardboard: Hardboard shall meet or exceed Commercial Standards CS-251 and Federal Specifications LLL-B-00810. Tempered hardboard ¼ inch thick – smooth both sides.
- e. Hardware:
 - 1. Acceptable Manufacturers:
 - a. Accuride
 - b. Amerock
 - c. Grass
 - d. Ives
 - e. Knape & Vogt
 - 2. Hinges:
 - a. Heavy duty, 120-degree concealed cabinet hinge, 3-3/8". Provide Grass 3803 Hinge, or approved equal.
 - b. One pair per door to 48 inch height. One and one-half pair over 48 inch in height. Hinge to accommodate 13/16 inch thick laminated door, and allow 270 degree swing.
 - 3. Pulls: 4" centers, brushed Aluminum (26D).
 - 4. Drawer Slides:

- a. Standard Drawers: 20" Full Extension Drawer Glides, with positive in-stop, out-stop and out-keeper to maintain drawer in 80% open position. Captive nylon rollers, both front and rear. Minimum 100 lb. dynamic load rating. Provide adjuster cam to regulate body side sway.
 - 1. Standard Specified: Accuride - Model 7432.
- b. File Drawers: Full extension, 3 part progressive opening slide, minimum 150 lb., zinc plated or epoxy coated at manufacturer's option.
 - 1. Standard Specified: Accuride - Model 9301.
- c. Pencil Drawers: Minimum 45 lb.
 - 1. Standard Specified: Accuride - Model 2006.
- 5. Catches: 6 lb. magnetic catch for base and wall cabinets. Provide two 6 lb. pulls at each tall cabinet door.
- 6. Locks (all cabinet doors and drawers):
 - 1. Standard Specified: National Cabinet Lock NL-C8055-14A disc tumbler cam lock.

I. CABINET CONSTRUCTION

- 1. Sub-Base:
 - a. Cabinet Subbase: To be separate and continuous (no cabinet body sides-to floor), water resistant exterior grade plywood with concealed fastening to cabinet bottom. Ladder-type construction, of front, back and intermediates, to form a secure and level platform to which cabinets attach.
- 2. Cabinet Top and Bottom:
 - a. Base and tall cabinet bottoms to be Pressure Fused laminated particle board interior side, 3/4 inch thick with phenolic neutral colored backer sheet on concealed side.
 - b. Solid sub-top to be 3/4 inch, and furnished for all base and tall cabinets.
 - c. Wall cabinet and library stack bottoms and tops are 1 inch thick.
 - d. Exterior exposed wall cabinet bottoms to be Pressure Fused laminate both sides. Assembly devices to be concealed on bottom side of wall cabinets.
- 3. Cabinet Ends:
 - a. Pressure Fused laminated particle board interior side; 3/4 inch thick with phenolic neutral colored back sheet on concealed side.
 - b. Exposed exterior cabinet ends to be laminated with plastic laminate.
 - c. Exposed edges to be 1 mm edging.
- 4. Fixed and Adjustable Shelves:
 - a. Pressure Fused laminated particle board – all sides.
 - b. Thickness: 3/4 inch standard shelving to 36 inches wide. One inch shelving 36 inches wide and over.
 - c. Shelf edges shall have 1 mm edging.
- 5. Cabinet Backs:
 - a. Standard cabinet back to be 3/4 inch thick, Pressure Fused laminated particle board interior side for use on all cabinets with or without doors. Rear, unexposed, side of back to receive continuous bead of hot melt adhesive at joint between back and sides/top/bottom for sealing against moisture and vermin, and further contribute to case rigidity.
 - b. 3/4 inch thick hang rails shall be glued to rear of cabinet back and screwed to cabinet sides. Provide minimum of 2 at base, 2 at wall, and 3 at tall cabinets.
 - c. Exposed exterior backs to be 3/4 inch particle board faced with high pressure plastic laminate.
- 6. Door and Drawer Fronts:
 - a. Plastic laminated doors and drawer fronts to be 13/16 inch thick for all hinged and sliding doors. Core material to be 3/4 inch thick, 47 lb. density particle board bonded on exterior with high pressure plastic laminate and with colored heavy gauge balancing sheet on interior face. Drawer fronts and

- hinged doors are to overlay the cabinet body. Maintain a maximum $\frac{1}{8}$ " reveal between pairs of doors, between door and drawer front, or between multiple drawer fronts within the cabinet.
- b. Doors and drawer fronts shall have 3 mm edging.
7. Drawers:
- a. Drawer fronts shall be applied to separate drawer body component sub-front.
- b. Sides and back of drawers to be $\frac{1}{2}$ inch thick Pressure Fused laminated fiberboard; sub-front same, to be $\frac{5}{8}$ inch thick.
- c. Fiberboard to be of uniform density and meet the following minimum standards:
- | | |
|-----------------------|--------------|
| Screw Holding, Face | 355 lbs. |
| Screw Holding, Edge | 300 lbs. |
| Modulus of Rupture | 4,500 psi. |
| Modulus of Elasticity | 500,000 psi. |
| Internal Bond | 100 psi. |
- d. Drawer sides shall be dadoed to receive front and back, machine squared and held under pressure while hot melt glued and pinned together.
- e. Drawer bottom to be Pressure Fused laminate surface, $\frac{1}{4}$ inch thick, housed into front, sides and back. Underside of drawer to receive continuous hot melt adhesive at joint between bottom and back/sides/front for sealing and rigidity. Reinforce drawer bottoms as required with intermediate spreaders.
8. Countertops:
- a. Plastic Laminate:
1. High pressure plastic laminate bonded to particle board core. Thickness as shown on plans and specifications. Underside to be properly balanced with heavy gauge backing sheet. Edges to be high pressure plastic laminate to match horizontal surface color. Furnish countertops in design as shown on drawings. Provide continuous tops for counter type cabinets fixed in a line.
- b. Solid Surface Material
1. Grade: Custom
2. Solid-Surface Material Thickness: $\frac{3}{4}$ inch
3. Colors, Patterns, and Finishes: As selected from manufacturer's full range.
4. Fabricate tops in one piece, unless otherwise indicated. Comply with solid surface material manufacturer's written recommendations for adhesives, sealers, fabrication and finishing.
- a. Fabricate tops with shop-applied edges of materials and configuration indicated on the contract documents.
- b. Fabricate tops with backsplashes for field application.
5. Install integral sink bowls in countertops in shop.
6. Drill holes in countertops for plumbing fittings and soap dispensers in shop.
9. Workmanship:
- a. All exposed exterior cabinet surfaces to be V32 decorative high pressure plastic laminate, color as selected from manufacturer's stock colors consisting of complete range of colors and patterns. Laminate surface/backer to core under controlled conditions, by approved and regulated laminating methods to assure a premium lamination. Natural-setting adhesives that cure thru chemical reaction are required. Methods requiring heat are not allowed; "contact" methods of laminating are not allowed.
- b. Cabinet parts shall be accurately machined and bored for premium grade quality joinery construction utilizing automatic machinery to insure consistent sizing of modular components.
- c. End panels shall be doweled to receive bottom and top. Back panel shall be fully housed into, and recessed $\frac{1}{2}$ inch from the back of cabinet sides, top and bottom to insure rigidity and a fully closed cabinet.

- d. Drawer bottom shall be fully housed into, and recessed up $\frac{1}{2}$ inch from the bottom of sides, back and subfront. Sides of drawer shall be fully dadoed to receive drawer back, locked in fully to subfront, fastened with glue and mechanical fasteners.
- e. $\frac{3}{4}$ inch thick hang rails shall be glued to backside and screwed to end panels of all wall, base and tall cabinets for extra rigidity and to facilitate installation.
- f. Rear of cabinet back, and underside of drawer bottom joints to receive a continuous bead of hot melt adhesive to add to unit body strength and develop moisture and vermin seal.
- g. All cases shall be square, plumb and true.

J. COORDINATION

- 1. Coordinate work of this section with related work of other Sections as necessary to obtain proper installation of all items.
- 2. Verify site dimensions of cabinet locations in building prior to fabrication.
- 3. Prior to installation of Architectural woodwork, examine shipped fabricated work for completion and work as required, including back priming and removal of packing.
- 4. Coordinate installation with Owner supplied appliances and/or devices.

K. INSTALLATION

- 1. Quality Standard: Install woodwork to comply with AWI Section 1700.
- 2. Storage and Protection: Casework shall be protected in transit. Store under cover in a ventilated building not exposed to extreme temperature and humidity changes. Do not store or install casework in building until concrete, masonry, and plaster work is dry.
- 3. Condition woodwork to average prevailing humidity conditions prior to installing.
- 4. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of $\frac{1}{8}$ " in 8'-0" for plumb and level, including countertops, and with $\frac{1}{16}$ " maximum offsets in flush adjoining surfaces, $\frac{1}{8}$ " maximum offsets in revealed adjoining surfaces.
- 5. Scribe and cut work to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- 6. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners as required for complete installation.
- 7. Cabinets: Install without distortion so that doors and drawers fit openings properly, and are accurately aligned. Adjust hardware to center doors and drawers in openings, and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated. Install cabinets with no more than $\frac{1}{8}$ -inch in 96-inch sag, bow, or other variation from a straight line.
- 8. Tops: Anchor securely to base units and other support systems as indicated. Caulk space between backsplash and wall with specified sealant.
 - a. Install countertops with no more than $\frac{1}{8}$ inch in 96-inch sag, bow, or other variation from a straight line.
 - b. Secure backsplashes to tops with concealed metal brackets at 16-inches o. c.
 - c. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- 9. Install all items complete and adjust all moving parts to operate properly.
- 10. Install with minimum number of joints, using full-length pieces where possible. Stagger joints in adjacent and related members. Cope at returns, miter at corners, and comply with Quality Standards of Joinery.
- 11. Leave surface clean and free from defects at time of final acceptance.
- 12. Guarantee: All materials shall be guaranteed for a period of 1 year from manufacturer's defects and workmanship.

13. Clean Up: Remove all cartons, debris, sawdust, scraps, etc., and leave spaces clean and all casework ready for owner's use.

L. ADJUSTING AND CLEANING

1. Repair damaged and defective woodwork where possible to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
2. Clean, lubricate, and adjust hardware.
3. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

M. PROTECTION

1. Provide final protection and maintain conditions, in a manner acceptable to Architect that ensures that casework is without damage or deterioration at time of Substantial Completion.

END OF SECTION 06 41 16

SECTION 07 21 00 - BUILDING INSULATION

A. SUMMARY

1. The work included in this section consists of furnishing all labor, materials, tools, and equipment necessary to furnish and install the following types of thermal insulation:
 - a. Rigid Perimeter Insulation – Below Grade.
 - b. Batt-type Fiberglass Acoustic Insulation.
2. Related Sections:
 - a. Division 4 Section 04 20 00 - Unit Masonry: Cavity wall and masonry cell insulation.
 - b. Division 7 Section 07 92 00 - Joint Sealants.
 - c. Division 9 Section 09 21 16 - Gypsum Board Assemblies.
 - d. Division 9 Section 09 51 13 - Acoustical Ceiling Systems.
 - e. Division 23 Section 23 07 13 - Mechanical: Duct and equipment insulation, and pipe insulation.

B. REFERENCES

1. ASTM International:
 - a. ASTM C165 Standard Test Method for Measuring Compressive Properties of Thermal Insulations.
 - b. ASTM C356 Standard Test Method for Linear Shrinkage of Preformed High-Temperature Thermal Insulation Subjected to Soaking Heat.
 - c. ASTM C411 Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
 - d. ASTM C423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - e. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - f. ASTM C612 Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 - g. ASTM C1304 Standard Test Method for Assessing the Odor Emission of Thermal Insulation Materials.
 - h. ASTM C1320 Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
 - i. ASTM C1338 Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
 - j. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - k. ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - l. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
 - m. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.

C. SUBMITTALS

1. General: Submit listed submittals in accordance with provisions of Section 01300 Administrative Requirements.
2. Product Data: Manufacturer's data sheets on each product to be used, including:
 - a. Preparation instructions and recommendations.
 - b. Storage and handling requirements and recommendations.
 - c. Installation methods.
3. Samples: Submit manufacturer's standard selection and verification samples.
4. Quality Assurance/Control Submittals: Submit the following:
 - a. Test Reports: Upon request, submit test reports from recognized test laboratories.
 - b. Certificates: Submit manufacturer's certificate that products meet or exceed specified requirements.

D. QUALITY ASSURANCE

1. Obtain each type of building insulation through a single source.
2. Manufacturer Qualifications: Manufacturer with a minimum of ten years experience manufacturing products in this section shall provide all products listed.
3. Installer Qualifications: Products listed in this section shall be installed by a single organization with at least five years experience successfully installing insulation on projects of similar type and scope as specified in this section.

E. DELIVERY, STORAGE & HANDLING

1. General: Comply with Division 1 Product Requirement Section.
2. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
3. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

F. PROJECT CONDITIONS

1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

G. PRODUCTS

1. Insulating Materials - General:
 - a. General: Provide insulating materials that comply with requirements and referenced standards.
 1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths and lengths.
2. Rigid Perimeter Wall Insulation – Below Grade.
 - a. Rigid Insulation, 1-1/2" thick, 24" wide with a minimum R-Value of 7.50, closed-cell, extruded polystyrene foam.
 - b. Acceptable Products and Manufacturers:
 1. "Styrofoam SM" – Dow Chemical Co.
 2. "Foamular 150" – UC Industries
 3. "Thermax" – Celotex Corporation
3. Fiberglass Batt Acoustical Insulation
 - a. Unfaced glass fiber acoustical insulation complying with ASTM C 665, Type 1, Class A rating.
 1. Acceptable Manufacturer's:
 - a. Celotex Corporation
 - b. Certainteed Corporation
 - c. Owens - Corning Fiberglass
 - b. Size shall be 3-1/2" thick x 16" wide.
 - c. Fire Resistance Ratings: Passes ASTM E 119 Test.
 - d. Sound Transmission Class: STC 50.
 - e. Dimensional Stability: Linear Shrinkage less than 0.1%.
4. Miscellaneous Materials:
 - a. Adhesive for bonding insulation: The type recommended by the insulation manufacturer and complying with fire-resistance requirements and insurance requirements.
 - b. Mastic sealer: Type recommended by insulation manufacturer for bonding edge joints between units and filling voids in the work.

H. EXAMINATION

1. Site Verification of Conditions:

- a. Verify that site conditions are acceptable for installation of building insulation.
- b. Do not proceed with installation of building insulation until unacceptable conditions are corrected.
2. Do not proceed with the installation of insulation until subsequent work which conceals the insulation is ready to be performed, unless directed otherwise.

I. PREPARATION

1. Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

J. INSTALLATION

1. General: Comply with insulation manufacturer's written instructions applicable to products and application indicated.
 - a. Install insulation that is undamaged, dry and unsoiled and that has not been left exposed at any time to ice and snow.
 - b. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation.
 - c. Water Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
 - d. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.
2. Installation of General Building Insulation:
 - a. Seal joints between closed-cell (non-breathing) insulation units by applying adhesive, mastic or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic or sealant as recommended by insulation manufacturer.
 - b. Install glass-fiber blankets in cavities formed by framing members according to the following requirements:
 1. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 3. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.
 - c. Acoustical Insulation Installation: Install insulation where indicated in sound rated assemblies. Maintain acoustical rating of assembly.

J. PROTECTION

1. Protect installed work from damage due to subsequent construction activity on the site, until completion of the project. Repair damage to installed products prior to installation of finish materials.

END OF SECTION 07 21 00

SECTION 07 21 19 - FOAMED-IN-PLACE MASONRY WALL INSULATION

A. SUMMARY

1. Extent of insulation work is shown on drawings and indicated by provisions of this section.
2. Applications of insulation specified in this section include the following:
 - a. Foamed-In-Place masonry insulation for thermal, sound and fire resistance values.

B. SUBMITTALS

1. Manufacturer's specification sheets for foamed-in-place masonry wall insulation.
2. Certified Test Reports: With product data, submit copies of certified test reports showing compliance with specified performance values, including R-values, fire performance and sound abatement characteristics.
3. Material Safety Data Sheet: Submit Material Safety Data Sheet complying with OSHA Hazard Communication Standard, 29 CFR 1910 1200.

C. QUALITY ASSURANCE

1. Manufacturing Standards: Provide insulation produced by a single and approved manufacturer. The product must come from the manufacturer pre-mixed to ensure consistency.
2. Installer Qualifications for Foamed-In-Place Masonry Insulation: Engage an experienced dealer/applicator who has been trained and licensed by the product manufacturer.
3. Fire Performance Characteristics: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by a testing agency acceptable to authorities having jurisdiction.
4. Product must be classified by Underwriters Laboratory (UL), in compliance with the following Surface Burning Characteristics:
 - a. Fire Resistance Ratings: ASTM E-119
 - b. Surface Burning Characteristics: ASTM E-84
 - c. Combustion Characteristics: ASTM E-136

D. ACCEPTABLE MANUFACTURERS

1. Subject to compliance with requirements, provide products from one of the following:
 - a. Thermco Thermal Corporation of America
 - b. C.P. Chemical Co., Inc.
 - c. Approved Equal.

E. INSULATING MATERIALS

1. General: Provide insulating materials which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics.
2. Foamed-In-Place Masonry Insulation: Two component thermal insulation produced by combining a plastic resin and catalyst foaming agent surfactant which, when properly ratioed and mixed, together with compressed air produce a cold-setting foam insulation in the hollow cores of hollow unit masonry walls.
 - a. Surface Burning Characteristics: Maximum flame spread, smoke developed and fuel contributed of 5, 50-100, and 0 respectively.
 - b. Combustion Characteristics: Must be noncombustible, Class A building material. A Class A building material must have a flame spread rating of 25 or less.
 - c. Thermal Values: "R" Value of 4.7/ inch @ 35 degrees F mean; ASTM C-177.
 - d. Sound Abatement: Minimum Sound Transmission Class ("STC") rating of 54 for 12" CMU and 52 for 8" CMU.

F. INSPECTION AND PREPARATION

1. Application Assemblies: 6", 8", 10" or 12" concrete masonry units

G. INSTALLATION OF FOAMED-IN-PLACE INSULATION

1. General: Install foamed-in-place insulation from interior, or as specified, prior to installation of interior finish work and after all masonry and structural concrete work is in place; comply with manufacturer's instructions.
2. Examination: Examine walls and cavities to determine whether there are conditions that would adversely affect the performance of the insulation. The walls to be insulated must be free of moisture both inside and outside of the block. Insulation is not to be injected into wet walls.
3. Installation: Fill all open cells and voids in hollow concrete masonry walls where shown on drawings. The foam insulation shall be pressure injected through a series of 5/8" to 7/8" holes drilled into every vertical column of block cells (every 8" on center) beginning at an approximate height of four (4) feet from finished floor level. Repeat this procedure at an approximate height of ten (10) feet above the first horizontal row of holes (or as needed) until the void is completely filled. Patch holes with mortar and score to resemble existing surface.
4. Sampling: Verify insulation density by random sampling. One cubic foot of fresh foam shall weigh between 2 lbs.8oz. and 3 lbs.6oz.
5. Painting: Allow two weeks after foam installation before painting masonry walls.

END OF SECTION 07 21 19

SECTION 07 22 16 – ROOF DECK INSULATION

A. SUMMARY OF WORK

1. Furnish and install tapered (where required) polyisocyanurate insulation as indicated on the drawings and as specified herein. Include crickets where required.

B. RELATED SECTIONS

1. Drawings and general provisions of the Contract, including General Supplementary Conditions and Division 1 Specification Sections apply to this section.
2. Related work specified elsewhere:
 - a. Section 05 31 13 – Steel Deck
 - b. Section 06 10 00 – Rough Carpentry
 - c. Section 07 53 23 – EPDM Roof System

C. REFERENCES

- | | |
|---------------------|---|
| 1. ASTM A-653 | Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process |
| 2. ASTM C-165-95 | Test Method for Measuring Compressive Properties of Thermal Insulation |
| 3. ASTM C-209-92 | Test Method for Cellulosic Fiber Insulating Board |
| 4. ASTM C-272-91 | Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions |
| 5. ASTM C-518-91 | Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus |
| 6. ASTM C 1289 | Standard Specification for Faced Rigid Cellular Polyisocyanurate Insulation Board. |
| 7. ASTM D-5 | Test Method for Penetration of Bituminous Materials |
| 8. ASTM D-36 | Test Method for Softening Point of Bitumen (Ring and Ball Apparatus) |
| 9. ASTM D-312 | Specification for Asphalt Used in Roofing |
| 10. ASTM D-2178 | Standard Specification for Asphalt Glass Felts used in Roofing and Waterproofing |
| 11. ASTM D-5147 | Sampling and Testing Modified Bituminous Sheet Material |
| 12. ASTM E 108 | Standard Test Methods for Fire Tests of Roof Coverings |
| 13. ASTM E 119 | Standard Test Methods for Fire Tests of Building Construction and Materials. |
| 14. ASTM E 2114-01 | Standard Terminology for Sustainability Relative to the Performance of Buildings |
| 15. ASTM E 2129 –01 | Standard Practice for Data Collection for Sustainability Assessment of Building Products. |
| 16. FM 4450 | Approval Standard - Class I Insulated Steel Roof Decks |
| 17. FM 4470 | Approval Standard - Class I Roof Covers. |
| 18. NRCA | National Roofing Contractors Association, Chicago, IL |
| 19. SDI | Steel Deck Institute, St. Louis, Missouri |
| 20. UL 263 | Fire Tests of Building Construction and Materials |
| 21. UL 790 | Standard Test Methods for Fire Tests of Roof Coverings |
| 22. UL 1256 | Fire Test of Roof Deck Constructions. |
| 23. LTTR | Long Term Thermal Resistance predicted by CAN/ULC-S770-03. |

D. DEFINITIONS

1. LTTR (Long Term Thermal Resistance) is defined as using techniques from ASTM C1303 or CAN/ULC-S770, the predicted R-Value that has been shown to be equivalent to the average performance of a permeably faced foam insulation product over 15 years. LTTR applies to ALL foam

insulation products with blowing agents other than air, such as polyiso, extruded polystyrene and polyurethane. The new method is based on consensus standards in the US and Canada.

E. SUBMITTALS

1. Submit under provisions of Section 01 30 00 – Submittal Procedures.
2. Product Data: Provide manufacturer's specification data sheets for each product in accordance with Section 01 30 00.
3. Provide approval letters from insulation manufacturer for use of their insulation within this particular roofing system type.
4. Samples:
 - a. Submit 6 by 6 inch (152 by 152 mm) samples of each board type required.
 - b. Submit samples of each fastener type required.
5. Shop Drawings: Roof plan showing layout of boards and fastening patterns.
6. Installation instructions for insulation board and fasteners.

F. SHOP DRAWINGS

1. Submit manufacturer's shop drawings indicating complete installation details of tapered insulation system, including identification of each insulation block, sequence of installation, layout, drain locations, roof slopes, thicknesses, crickets and saddles.
2. Shop drawing shall include: Outline of roof, location of drains, complete board layout of tapered insulation components, thickness and the average "R" value for the completed insulation system.

G. CERTIFICATION

1. Submit roof manufacturer's certification that insulation fasteners furnished are acceptable.
2. Submit roof manufacturer's certification that insulation furnished is acceptable, as a component of roofing system and is eligible for roof manufacturer's system warranty.
3. Submit certification that insulation and fastening system furnished is Tested and Approved by Factory Mutual for 1-90 Wind Up-Lift Requirements.

H. QUALITY ASSURANCE

1. Fire Classification, ASTM E-108
2. Submit certification that the roof system furnished is approved by Factory Mutual, Underwriters Laboratories or Warnock Hersey for external Fire E-108 Class 1A and that the roof system is adhered properly to meet or exceed 1-90.

I. DELIVERY, STORAGE AND HANDLING

1. Deliver products with seals and labels intact, in manufacturer's original containers, dry and undamaged.
2. Store all insulation materials protected from the wind, sun and moisture damage prior to and during installation. Any insulation that has been exposed to moisture shall be removed from the project site.
3. Keep materials enclosed in a watertight, ventilated enclosure (i.e. tarpaulins).
4. Store materials off the ground. Any warped, broken or wet insulation boards shall be discarded.

J. INSULATION MATERIALS

1. Closed-cell polyisocyanurate foam core manufactured using blowing agent and integrally laminated to heavy non-asphaltic fiber-reinforced felt facers.
2. Provide thicknesses of insulation as indicated, provide combination of types and thicknesses to provide a complete system.

K. POLYISOCYANURATE ROOF INSULATION

1. Flat or Factory Tapered, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.
2. Insulation: R-25
 - a. Insulation shall be installed in multiple layers (4-1/2" total thickness). The first and second layer of insulation shall be mechanically fastened to the substrate in accordance with the manufacturer's published specifications.
3. See drawings for locations requiring tapered.
 - a. Taper Thickness: Minimum 1/2 in. at low points.
 - b. Tapered Slope: 1/4 in. per foot.
 - c. Average R-Value: Minimum 10.00
4. Insulation board shall meet the following requirements:
 - a. UL, WH or FM listed under Roofing Systems
5. Physical Properties:

a. Dimensional Stability	ASTM D-2126	2% max.
b. Compressive Strength	ASTM D-1621	25 psi min.
c. Vapor Permeability	ASTM E-96	1 perm max.
d. Foam Core Density	ASTM D-1622	2.0 pcf min.
e. Water Absorption	ASTM C-209	<1%
f. R-Factor HR per inch Thickness	ASTM C-518	5.6 (Design Value)

L. RELATED MATERIALS

1. Fiber Cant and Tapered Edge Strips: Performed rigid insulation units of sizes/shapes indicated, matching insulation board.
2. Roof Board Joint Tape: 6" wide glass fiber mat with adhesive compatible with insulation board facers.
3. Asphalt: ASTM D-312, Type IV Steep Asphalt.
4. Fasteners:
 - a. Corrosion resistant screw fastener as recommended by roof membrane manufacturer.
 - b. Factory Mutual Tested and Approved with 3 in. coated disc for 1-90 rating, length required to penetrate metal deck one inch.
 - c. Minimum pull out resistance of 800 lbs.

N. INSPECTION

1. Roofing contractor shall be responsible for preparing an adequate substrate to receive insulation.
2. Verify that work that penetrates roof deck has been completed.
3. Verify that wood nailers are properly and securely installed.
4. Examine surfaces for defects or irregularities that would prohibit timely and correct installation.
5. Do not proceed until defects are corrected.
6. Do not apply insulation until substrate is sufficiently dry.
7. Broom clean substrate immediately prior to application.
8. Use additional insulation to fill depressions and low spots that would otherwise cause ponding water.

O. INSTALLATION

1. Attachment with Mechanical Fasteners
 - a. Install base course of 1" thickness polyisocyanurate insulation; and, subsequent courses of the same insulation to incorporate a 1/4" per foot slope to drain. All polyisocyanurate insulation shall be fully attached to the deck with an approved mechanical fastening system, in accordance with manufacturer's recommendation for FM 1-90 approved system.
 - b. Filler pieces of insulation require at least two fasteners per piece if size of insulation is less than four square feet.

- c. Spacing pattern of fasteners shall be as per manufacturer's recommendations to meet the FM requirements. Placement of any fastener from edge of insulation board shall be a minimum of three inches, and a maximum of six inches.
- d. Minimum penetration into deck shall be as recommended by the fastener manufacturer.

P. CLEANING AND PROTECTION

- 1. Remove trash and construction debris from insulation surface prior to application of roofing membrane.
- 2. Do not leave installed insulation exposed to weather. Cover and waterproof with completed roof system immediately after installation.
 - a. Temporarily seal exposed insulation edges at the end of each day.
 - b. Remove and replace installed insulation that has become wet or damaged with new insulation.
- 3. Protect installed insulation and roof cover from traffic by use of protective covering materials during and after installation.

END OF SECTION 07 22 16

SECTION 07 42 13 – INSULATED METAL WALL PANELS

A. SUMMARY

- a. Foamed-insulation-core concealed fastener metal wall panels, with related metal trim and accessories.

B. RELATED REQUIREMENTS

- a. Division 05 Section "Structural Steel Framing" for steel framing supporting metal panels.
- b. Division 05 Section "Cold-Formed Metal Framing" for cold-formed metal framing supporting metal panels.
- c. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashing items in addition to items specified in this Section.

C. REFERENCES

1. American Architectural Manufacturer's Association (AAMA): www.aamanet.org:
 1. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
2. American Society of Civil Engineers (ASCE): www.asce.org/codes-standards:
 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
3. ASTM International (ASTM): www.astm.org:
 1. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 2. ASTM A 755 - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
 3. ASTM A 792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 4. ASTM A 240 – Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
 5. ASTM C 518 - Standard Test Method for Steady State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 6. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
 7. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.
 8. ASTM D 1622 - Apparent Density of Rigid Cellular Plastics.
 9. ASTM D 2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
 10. ASTM D 4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
 11. ASTM D 6226 - Standard Test Method for Open Cell Content of Rigid Cellular Plastics
 12. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
 13. ASTM E 84 - Test Methods for Surface Burning Characteristics of Building Materials.
 14. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 15. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
 16. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
4. National Fire Protection Association (NFPA)
 - a. NFPA 259 – Test Method for Potential Heat of Building Materials.
 - b. NFPA 285 – Evaluation of Fire Propagation Characteristics of Exterior Non-Load Bearing Wall Assemblies.

- c. NFPA 286 – Fire Test of Evaluating Conditions of Wall and Ceiling Finish to Roof Fire Growth.
- 5. FM Global (FM): www.fmglobal.com:
 - a. FM 4880 American National Standard for Evaluating Insulated Wall and Roof/Ceiling Assemblies
 - b. FM 4881 Approval Standard for Class 1 Exterior Wall Systems.

D. QUALITY ASSURANCE

- 1. Manufacturer/Source: Provide metal panel assemblies and accessories from a single manufacturer.
- 2. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum ten years' experience in the manufacturing of similar products and successful use in similar applications.
 - a. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - 1. Product data, including certified independent test data indicating compliance with requirements.
 - 2. Samples of each component.
 - 3. Project references: Minimum of five installations not less than five years old, with Owner and Architect contact information.
 - 4. Sample warranty.
 - 5. Certificate from an accredited third-party Quality Control Program.
- 3. Installer Qualifications: Experienced Installer certified by metal panel manufacturer, with minimum of five years' experience with successfully completed projects of a similar nature and scope.
 - a. Installer's Field Supervisor: Experienced mechanic certified by metal panel manufacturer supervising work on site whenever work is underway.

E. SUBMITTALS

- 1. Product Data: Manufacturer's data sheets for specified products.
- 2. Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, and special details. Make distinctions between factory and field assembled work.
 - a. Include data indicating compliance with performance requirements.
 - b. Indicate points of supporting structure that must coordinate with metal panel system installation.
 - c. Include structural data indicating compliance with performance requirements and requirements of local authorities having jurisdiction.
- 3. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.
- 4. Samples for Verification:
 - a. Provide 12-inch long section of each metal panel profile.
 - b. Provide color chip verifying color selection.
- 5. Product Test Results: Indicating compliance of products with requirements.
- 6. Qualification Information: For Installer
- 7. Warranty:
 - a. Submit manufacturer's written two (2) year limited warranty providing panels to be free from defects in materials and workmanship, beginning from the date of substantial completion excluding coil coatings (paint finishes) that are covered under a separate warranty.
 - b. The installation contractor shall issue a separate warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.
- 8. Closeout:
 - a. Maintenance data.
 - b. Manufacturer's Warranty: Executed copy of manufacturer's warranty.

F. DELIVERY, STORAGE, AND HANDLING

1. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping. Protect painted surfaces with a protective covering before shipping.
 - a. Deliver, unload, store, and erect metal panels and accessory items without deforming panels or exposing panels to surface damage from weather or construction operations.
 - b. Store in accordance with Manufacturer's written instructions.
 - c. Shield foam insulated metal panels from direct sunlight until all components are installed.

G. WARRANTY

1. Special Manufacturer's Warranty: Submit Manufacturer's two (2) year limited warranty providing panels to be free from defects in materials and workmanship, beginning from the date of substantial completion excluding coil coatings (paint finishes) that are covered under a separate warranty.
2. The installation contractor shall issue a separate warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.
3. Special Panel Finish Warranty: Submit Manufacturer's limited warranty on the exterior paint finish for adhesion to the metal substrate and limited warranty on the exterior paint finish for chalk and fade.
 1. Fluoropolymer Two-Coat System: Failure of adhesion, peeling, checking, or cracking.

H. PERFORMANCE REQUIREMENTS

1. General: Provide metal panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.
2. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, as determined by ASTM E 72 or ASTM E 1592 applied in accordance with ICC AC 04, Section 4, Panel Load Test Option or Section 5, Panel Analysis Option:
 - a. Wind Loads: Determine loads based on applicable building code, wind speed, importance factor, exposure category, and internal pressure coefficient indicated on drawings.
 1. Wind Negative Pressure: Certify capacity of metal panels by testing of proposed assembly.
 - b. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of 1/240 of the span with no evidence of failure.
3. Fire Performance Characteristics: Provide metal panel systems with the following fire-test characteristics determined by indicated test standard as applied by testing and inspection agency acceptable to authorities having jurisdiction.
 - a. Surface-Burning Characteristics: The insulating core shall have been tested per ASTM E 84. The core shall have:
 1. Flame spread index: 25 or less.
 2. Smoke developed index: 450 or less.
4. Air Infiltration, ASTM E 283:
 - a. Maximum 0.0002 cfm/sq. ft. (0.001 L/s per sq. m) at static air pressure difference of 1.57 lbf/sq. ft. (75 Pa).
5. Water Penetration Static Pressure:
 - a. ASTM E 331: No uncontrolled water penetration at a static pressure of 20 lbf/sq. ft. (958 Pa).
6. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.
7. Thermal Performance: When tested in accordance with ASTM C 518, Measurement of Steady State thermal Transmission, the panels shall provide a k factor of 0.114 btu/sf/hr/deg F at a 35° F (1.67° C) mean temperature.

I. INSULATED METAL WALL PANELS

1. Concealed Fastener, Insulated Metal Wall Panels with foam core: Structural metal panels consisting of flat exterior metal sheet with 7.2 rib pattern, and interior metal sheet with mesa profile, with factory foamed-in-place polyurethane core in thermally-separated profile, with tongue-and-groove panel edges, attached to supports using concealed fasteners.
 - a. Standard Specified: Metl-Span, CF 7.2 Insul-Rib
 - b. G-90 galvanized coated steel conforming to ASTM A 653 or AZ-50 aluminum-zinc alloy coated steel, conforming to ASTM A 792/A 792M, minimum grade 33, pre-painted by the coil-coating process per ASTM A 755/A 755M.
 1. Exterior Face Sheet: 24 gauge thickness, with smooth unembossed surface
 - a. Finish: Fluoropolymer two-coat system.
 - b. Color: As selected by Architect from manufacturer's standard colors.
 2. Interior Face Sheet: 26 gauge thickness, with smooth unembossed surface Mesa profile
 - a. Finish: Fluoropolymer two-coat system.
 - b. Color: As selected by Architect from manufacturer's standard colors.
 - c. Panel Width: 36 inches (914 mm)
 - d. Panel Thickness: 3 inch (76 mm).
 - e. Insulating Core: Polyurethane with zero ozone depletion potential blowing agent
 1. Closed Cell Content: 90% or more as determined by ASTM D 6226
 2. Compressive Strength: As required to meet structural performance requirements and with a minimum of 22 psi as determined by ASTM D 1621
 3. Shear Strength: As required to meet structural performance requirements and with a minimum of 36 psi as determined by ASTM C 273
 4. Tensile Strength: As required to meet structural performance requirements and with a minimum of 41 psi ASTM D 1623
 5. Minimum Density: 2.0 pcf (32 kg/m³) as determined by ASTM D 1622
 6. Thermal Resistance R-Value: 15.2 deg. F * hr * sq. ft./Btu (K * sq. m/W) per ASTM C 518 at 35 degrees Fahrenheit mean temperature.

J. METAL WALL PANEL ACCESSORIES

1. General: Provide complete metal panel assemblies incorporating trim, copings, fascia, and miscellaneous flashings. Provide required fasteners, closure strips, and sealants as indicated in manufacturer's written instructions.
2. Flashing and Trim: Match material, thickness, and finish of metal panels.
3. Panel Clips: ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating, one-piece, configured for concealment in panel joints, and identical to clips utilized in tests demonstrating compliance with performance requirements.
4. Panel Fasteners: Self-drilling or Self-tapping screws and other acceptable fasteners recommended by metal panel manufacturer. Where exposed fasteners cannot be avoided, supply corrosion-resistant fasteners with heads matching color of metal panels by means of factory-applied coating, with weathertight resilient washers.
5. Joint Sealers:
 - a. Sealants: Provide Tape Mastic Sealants, Non-skinning sealants, and Urethane Sealants in accordance with manufacturers standards
 - b. Vertical Joint Gasket: Manufacturers standard EPDM gasket.

K. FABRICATION

1. General: Provide factory fabricated and finished metal panels, trim, and accessories meeting performance requirements, indicated profiles, and structural requirements.
2. Fabricate metal panel joints configured to accept sealant providing weathertight seal.

3. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings.

L. FINISHES

1. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
2. Exterior Face Sheet Coil-Coated Finish System
 - a. Fluoropolymer Two-Coat System: 0.2 – 0.3 mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat, [meeting solar reflectance index requirements].
 1. Standard Specified: Metl-Span, Fluoropolymer.
3. Interior Face Sheet Coil-Coated Finish System
 - a. Fluoropolymer Two-Coat System: 0.2-mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat
 1. Standard Specified: Metl-Span, Fluoropolymer

M. EXAMINATION

1. Examine metal panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panels.
 - a. Inspect framing that will support insulated metal panels to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to metal panel manufacturer and installer. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal panels.
 - b. Panel Support Tolerances: Confirm that metal panel supports are within tolerances acceptable to metal panel manufacturer but not greater than the following:
 1. 1/4 inch (6 mm) in 20 foot (6100 mm) in any direction.
 2. 3/8 inch (9 mm) over any single wall plane.
 3. Girt Spacing 8 feet (2438 mm) or more: 1/4 inch (6 mm) out only.
 4. Girt Spacing Less Than 8 feet (2438 mm): 1/8 inch (3 mm) out only.
 5. CF Architectural girt spacing less than 4 feet (1219 mm): 1/16 inch (1.5 mm) inch out only.
2. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal panel installation.

N. METAL PANEL INSTALLATION

1. Concealed-Fastener Insulated Metal Panels with foam core: Install metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal panels in orientation, sizes, and locations indicated. Anchor panels and other components securely in place. Provide for thermal and structural movement.
2. Attach panels to metal framing using screws, fasteners, sealants, and adhesives recommended for application by metal panel manufacturer.
 - a. Fasten metal panels to supports with fasteners at each location indicated on approved shop drawings, at spacing and with fasteners recommended by manufacturer.
 - b. Cut panels in field where required using manufacturer's recommended methods.
 - c. Provide weatherproof jacks for pipe and conduit penetrating metal panels.
 - d. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer
3. Attach panel flashing trim pieces to supports using recommended fasteners and joint sealers
4. Joint Sealers: Install sealants where indicated and where required for weatherproof performance of metal panel assemblies
 - a. Seal panel base assembly, openings, panel head joints, and perimeter joints using sealants indicated in manufacturer's instructions

- b. Seal wall panel joints; apply continuously without gaps in accordance with manufacturer's written instructions, approved shop drawings, and project drawings
- c. Prepare joints and apply sealants per requirements of Division 07 Section.

O. ACCESSORY INSTALLATION

- 1. General: Install metal panel accessories with positive anchorage to building and weather tight mounting; provide for thermal expansion. Coordinate installation with flashings and other components.
 - a. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
 - b. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
 - c. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

P. FIELD QUALITY CONTROL

- 1. Testing Agency: Owner may engage an independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.

Q. CLEANING AND PROTECTION

- 1. Remove temporary protective films immediately in accordance with metal panel manufacturer's instructions. Clean finished surfaces as recommended by metal panel manufacturer.
- 2. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

END OF SECTION 07 42 13

SECTION 07 53 23 – EPDM ROOFING SYSTEM

A. SUMMARY

1. Description
 - a. The project consists of installing Fully Adhered EPDM Roofing System in conjunction with rigid roof insulation over new steel roof deck.
2. Extent of Work
 - a. Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of a 60-mil thick reinforced EPDM membrane Fully Adhered Roofing System including flashings and insulation as specified herein and as indicated on the drawings in accordance with the manufacturer's most current specifications and details.
 - b. The roofing contractor shall be fully knowledgeable of all requirements of the contract documents and shall make themselves aware of all job site conditions that will affect their work.
 - c. The roofing contractor shall confirm all given information and advise the Architect, prior to commencement of Work, of any conflicts that will affect their installation and weatherproof life of the roof.
 - d. Any contractor who intends to submit a bid using a roofing system other than the approved manufacturer must submit for pre-qualification in writing ten (10) days prior to the bid date. Any contractor who fails to submit all information as requested will be subject to rejection.

B. RELATED WORK

1. The following listed work is included under other sections:
 - a. Section 06 10 00 – Rough Carpentry
 - b. Section 07 22 16 – Roof Insulation
 - c. Section 07 92 00 – Joint Sealers

C. REFERENCES

1. American Society for Testing and Materials (ASTM)
2. Federal Specifications (FS)

D. SUBMITTALS

1. Shop Drawings: Submit drawing indicating roof size, location and type of penetrations, perimeter and penetration details, expansion joint details, roof insulation make-up and layout that have been accepted by an authorized manufacturer's representative.
2. Sample of the manufacturer's Membrane System Warranty.
3. Submit a letter of certification from the manufacturer which certifies the roofing contractor is authorized to install the manufacturer's roofing system and lists foremen who have received training from the manufacturer along with the dates training was received.
4. Upon completion of the installed work, submit copies of the manufacturer's final inspection to the specifier prior to the issuance of the manufacturer's warranty.

E. PRODUCT DELIVERY, STORAGE AND HANDLING

1. Deliver materials to the job site in the manufacturer's original, unopened containers or wrappings with the manufacturer's name, brand name and installation instructions intact and legible. Deliver in sufficient quantity to permit work to continue without interruption.
2. Comply with the manufacturer's written instructions for proper material storage.
 - a. Store materials between 60 deg. F and 80 deg. F in dry areas protected from water and direct sunlight. If exposed to lower temperature, restore to 60 deg. F minimum temperature before using.
 - b. Store materials containing solvents in dry, well ventilated spaces with proper fire and safety precautions.

Keep lids on tight. Use before expiration of their shelf life.

3. Insulation must be on pallets, off the ground and tightly covered with waterproof materials. Manufacturer's wrap does not provide sufficient waterproofing.
4. Any materials which are found to be damaged shall be removed and replaced at the applicator's expense.

F. WORK SEQUENCE

1. Schedule and execute work to prevent leaks and excessive traffic on completed roof sections. Care should be exercised to provide protection for the interior of the building and to ensure water does not flow beneath any completed sections of the membrane system.

G. PRE-INSTALLATION CONFERENCE

1. A pre-installation meeting shall be held at the job site, minimum of one (1) week prior to start of roof system installation. The roofing contractor shall observe actual conditions and verify all dimensions on the roof.
2. Any conditions which are not shown on the shop drawings should be indicated on a copy of the shop drawing and included with bid submittal if necessary to clarify any conditions not shown.

H. JOB SITE PROTECTION

1. The roofing contractor shall adequately protect building, paved areas, service drives, lawn, shrubs, trees, etc. from damage while performing the required work. Provide canvas, boards and sheet metal (properly secured) as necessary for protection and remove protection material at completion. The contractor shall repair or be responsible for costs to repair all property damaged during the roofing application.
2. During the roofing contractor's performance of the work, care shall be taken to prevent the spread of dust and debris, particularly where such material may sift into the building. The roofing contractor shall provide labor and materials to construct, maintain and remove necessary temporary enclosures to prevent dust or debris in the construction area(s) from entering the remainder of the building.
3. Do not overload any portion of the building, either by use of or placement of equipment, storage of debris, or storage of materials.
4. Protect against fire and flame spread. Maintain proper and adequate fire extinguishers.
5. Take precautions to prevent drains from clogging during the roofing application. Remove debris at the completion of each day's work and clean drains, if required. At completion, test drains to ensure the system is free running and drains are watertight. Remove strainers and plug drains in areas where work is in progress. Install flags or other telltales on plugs. Remove plugs each night and screen drain.
6. Store moisture susceptible materials above ground and protect with waterproof coverings.
7. Remove all evidence of piled bulk materials and return the job site to its original condition upon completion of the work.

I. SAFETY

1. The roofing contractor shall be responsible for all means and methods as they relate to safety and shall comply with all applicable local, state and federal requirements that are safety related. Safety shall be the responsibility of the roofing contractor. All related personnel shall be instructed daily to be mindful of the full time requirement to maintain a safe environment throughout the entire Project Site.

J. WORKMANSHIP

1. Applicators installing new roof, flashing and related work shall be factory trained and approved by the manufacturer they are representing.
2. All work shall be of highest quality and in strict accordance with the manufacturer's published specifications and to the building owner's satisfaction.
3. There shall be a supervisor on the job site at all times while work is in progress.

K. QUALITY ASSURANCE

1. The EPDM membrane roofing system must achieve a UL Class C and must have been successfully tested to meet or exceed the calculated uplift pressure required by the International Building Code (ASCE-7) or ANSI/SPRI WD-1.
2. The manufacturer must have a minimum of 20 years experience in the manufacturing of vulcanized thermal set sheeting.
3. Unless otherwise noted in this specification, the roofing contractor must strictly comply with the manufacturer's current specifications and details.
4. The roofing system must be installed by an applicator authorized and trained by the manufacturer in compliance with shop drawings as approved by the manufacturer. The roofing applicator shall be thoroughly experienced and upon request be able to provide evidence of having at least five (5) years successful experience installing single-ply EPDM roofing systems and having installed at least one (1) roofing application or several similar systems of equal or greater size within one year.
5. Provide adequate number of experienced workmen regularly engaged in this type of work who are skilled in the application techniques of the materials specified. Provide at least one thoroughly trained and experienced superintendent on the job at all times roofing work is in progress.
6. There shall be no deviations made from this specification or the approved shop drawings without the prior written approval of the Architect. Any deviation from the manufacturer's installation procedures must be supported by a written certification on the manufacturer's letterhead and presented for the specifier's consideration.
7. Upon completion of the installation, the applicator shall arrange for an inspection to be made by a technical representative of the membrane manufacturer in order to determine whether or not corrective work will be required before the warranty will be issued. Notify the Architect seventy-two (72) hours prior to the manufacturer's final inspection.

L. JOB CONDITIONS, CAUTIONS AND WARNINGS

1. Material Safety Data Sheets (MSDS) must be on location at all times during the transportation, storage and application of materials.
2. When positioning membrane sheets, exercise care to locate all field splices away from low spots and out of drain sumps. All field splices should be shingled to prevent bucking of water.
3. When loading materials onto the roof, the manufacturer's authorized Roofing Applicator must take all necessary care to prevent overloading and possible disturbance to the building structure.
4. Proceed with roofing work only when weather conditions are in compliance with the manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations.
5. Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage.
6. Provide protection, such as 3/4 inch thick plywood, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.
7. The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.
8. New roofing shall be complete and weathertight at the end of the work day.
9. Contaminants such as grease, fats and oils shall not be allowed to come in direct contact with the roofing membrane.

M. WARRANTY

1. Provide and execute, upon final acceptance by manufacturer, a twenty (20) year Manufacturer's Standard Total Systems Warranty.

N. PRODUCTS

1. General
 - a. Unless otherwise approved by the specifier and accepted by the membrane manufacturer, all products (including insulation, fasteners, fastening plates and edgings) must be manufactured and supplied by the roofing system manufacturer and covered by the warranty.
2. Acceptable manufacturers:
 - a. Carlisle
 - b. Firestone
 - c. Johns Manville
 - d. Versico
3. Membrane
 - a. Furnish 60-mil thick Reinforced EPDM (Ethylene, Propylene, Diene Terpolymer) in the largest sheet possible. The membrane shall conform to the minimum physical properties of ASTM D4637. When a 10 foot wide membrane is to be used, the membrane shall be manufactured in a single panel with no factory splices to reduce splice intersections.
4. Insulation/Underlayment
 - a. When applicable, insulation shall be installed in multiple layers. The first and second layer of insulation shall be mechanically fastened to the substrate in accordance with the manufacturer's published specifications.
 - b. Insulation shall be factory tapered, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber matt faces. See drawings for thickness and corresponding R-Value.
5. Adhesives, Cleaners and Sealants
 - a. Furnish and install all manufacturer's recommended products, specifically formulated for the intended purpose.
6. Fasteners and Plates
 - a. Furnish and install all manufacturer's recommended products, specifically intended purpose for proper mechanical attachment of insulation and membrane.
7. Metal Edging and Membrane Terminations
 - a. Parapet Locations: Manufacturer's standard system for termination as indicated; and, coping system consisting corrosion resistant fasteners and 0.040" aluminum snap-on coping cover. Metal coping color shall be as selected by Architect.
 - b. Roof Edge Locations: metal fascia/edge system with a 22 gauge continuous anchor cleat and .032 inch thick aluminum fascia. Metal edge/fascia color shall be as selected by Architect.
8. Expansion Joints
 - a. Manufacturer's standard details and materials for type and size of expansion joints.
9. Walkways
 - a. Protective surfacing for roof traffic shall be manufacturer's standard pressure-sensitive walkway pads (with factory-applied tape on the underside of the walkway) adhered to the membrane surface in conjunction with primer.

O. INSTALLATION

1. General
 - a. Comply with the manufacturer's published instructions for the installation of the membrane roofing system including proper substrate preparation, jobsite considerations and weather restrictions.
 - b. Position sheets to accommodate contours of the roof deck and shingle splices to avoid bucking water.
2. Insulation Placement
 - a. Install insulation or membrane underlayment over the substrate with boards butted tightly together with no joints or gaps greater than 1/4 inch. Stagger joints both horizontally and vertically if multiple layers

- are provided.
- b. Secure insulation to the substrate with the required mechanical fasteners in accordance with the manufacturer's specifications.
 3. Membrane Placement and Bonding
 - a. Unroll and position membrane without stretching. Allow the membrane to relax for approximately 1/2 hour before bonding. Fold the sheet back onto itself so half the underside of the membrane is exposed.
 - b. Apply the Bonding Adhesive in accordance with the manufacturer's published instructions, to both the underside of the membrane and the substrate. Allow the adhesive to dry until it is tacky but will not string or stick to a dry finger touch.
 1. Roll the coated membrane into the coated substrate while avoiding wrinkles. Brush down the bonded half of the membrane sheet with a soft bristle push broom to achieve maximum contact.
 2. Fold back the unbonded half of the membrane sheet and repeat the bonding procedure.
 - c. Install adjoining membrane sheets in the same manner, overlapping edges approximately 4 inches. Do not apply bonding adhesive to the splice area.
 4. Membrane Splicing with Splicing Cement
 - a. Adhesive splices must be a minimum of 3" wide. Field splices at roof drains must be located outside drain sump.
 - b. Fold the top sheet back and clean the dry splice area (minimum 3" wide) of both membrane sheets by scrubbing with clean natural fiber rags saturated with membrane cleaner or primer.
 - c. Apply Splicing Cement and In-Seam Sealant in accordance with the manufacturer's specifications and roll the top sheet onto the mating surface.
 - d. Roll the splice with a 2 inch wide steel roller and wait at least 2 hours before applying lap sealant to the splice edge following the manufacturer's requirements.
 - e. Field splices without in-seam sealant must be overlaid with uncured flashing.
 5. Flashing
 - a. Wall and curb flashing shall be cured EPDM membrane. Continue the deck membrane as wall flashing where practicable.
 - b. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.
 6. Expansion Joints
 - a. Follow manufacturer's typical procedures for all expansion joints.
 7. Walkways
 - a. Install walkways at all traffic concentration points (such as roof hatches, access doors, rooftop ladders, etc.) and all locations as identified on the specifier's drawing.
 - b. Adhere walkways pads to the EPDM membrane in accordance with the manufacturer's specifications.
 8. Daily Seal
 - a. When the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.
 - b. Complete an acceptable membrane seal in accordance with the manufacturer's requirements.
 9. Clean-up
 - a. Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.
 - b. Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.
 10. Manufacturer's Field Service
 - a. Upon completion of the roofing system, an authorized representative of the manufacturer will make an inspection of the installation prior to warranty issuance.

END OF SECTION 07 53 23

SECTION 07 60 00 – FLASHING & SHEET METAL

A. SUMMARY OF WORK

1. The work included in this section consists of furnishing all labor, material, tools and equipment necessary to furnish and install all sheet metal flashing and trim, including, but not limited to the following:
 - a. Roof and Wall Flashings.
 - b. Prefabricated Reglets and Counterflashings.
 - c. Metal Copings.
 - d. Metal Fascias.
 - e. Metal Soffits
 - f. Metal Roof Edges.
 - g. Trim and Break Metal.
 - h. Sealants and bonding agents between components of this Section and between the roof and other materials.

B. STANDARDS

1. American Society for Testing Materials (ASTM)
2. Ohio Building Code (OBC)
3. Architectural Aluminum Manufacturer's Assoc. (AAMA)
4. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)

C. PERFORMANCE REQUIREMENTS

1. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, ratting, leaking, and fastener disengagement.
2. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - a. Temperature Change (Range): 120 degrees F., ambient; 180 degrees F., material surfaces.
3. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

D. SUBMITTALS

1. Product Data: Manufacturer's technical product data, installation instructions and general recommendations for each specified sheet material and fabricated product.
2. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop and field assembled work. Include the following:
 - a. Identify material, thickness, weight, and finish for each item and location in project.
 - b. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 - c. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
 - d. Details of expansion joint covers, including showing direction of expansion and contraction.
3. Samples of Verification: For each type of exposed finish required, prepared on samples of size indicated below:
 - a. 8 inch square samples of specified sheet materials to be exposed as finished surfaces.
 - b. 12 inch long samples of factory fabricated products exposed as finish work. Provide complete with specified factory finish.
4. Shop drawings showing layout, profiles, methods of joining, and anchorage details.

E. QUALITY ASSURANCE

1. Except as otherwise indicated, the workmanship of sheet metal work, method for forming joints, anchoring, cleating and provisions for expansion shall conform to the standard details and recommendations of the "Architectural Sheet Metal Manual" published by SMACNA; and workmanship shall be of the best quality, in accordance with best trade practice and the recommendations and specifications of the Sheet Metal and Air Conditioning Contractors National Association, Inc.
2. Installer/Fabricator Qualifications: Not less than five (5) years documented successful experience with work comparable to Work of this Project, approved and acceptable to roofing manufacturer.

F. DELIVERY, STORAGE AND HANDLING

1. Deliver materials in manufacturer's unopened, labeled containers. Store materials to avoid damage, and store rolled goods on end. Comply with manufacturer's recommendations for job-site storage and protection.

G. MANUFACTURERS

1. Standard Specified shall be Alcoa Building Products.

H. MATERIALS

1. The type and locations of the various kinds, gauges, thickness, and finish of sheet metal to be used is specified hereinafter under the individual items. Where sheet metal is indicated on Drawings and kind or type of metal is not definitely specified, aluminum shall be provided.
2. Aluminum Extrusions: Alloy and temper recommended by manufacturer for use intended and as required for proper application of finish indicated, but not less than the strength and durability properties specified in ASTM B221 for 6063-T5.
3. Aluminum Sheet: Alloy and temper recommended by manufacturer for use intended and as required for proper application of finish indicated, but with not less than the strength and durability properties specified in ASTM B209 for 5005-H15.

I. MISCELLANEOUS MATERIALS AND ACCESSORIES

1. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashings and trim installation.
2. Fasteners: Same metal as flashing/sheet metal or other noncorrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened. Provide wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 - a. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
 1. Blind Fasteners: High-strength aluminum or stainless steel rivets.
3. Bituminous Coating: SSPC-Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15 mil dry film thickness per coat.
4. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant.
5. Elastomeric Sealant: Provide per recommendations of metal manufacturer.
6. Epoxy Seam Sealer: Two-Part non-corrosive metal seam cementing compound, recommended by metal manufacturer for exterior non moving joints.
7. Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.
8. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gauge required for performance.

J. PRODUCTS

1. Roof Flashings
 - a. Through-wall Flashing.
 - b. Counter Flashing.
 - c. Base and Counter Flashing.
 - d. Roof Penetration Flashing.
 - e. Miscellaneous flashing as shown on the drawings or referenced in standard details recommended in SMACNA "Architectural Sheet Metal Manual".
2. Pre-finished Metal Flashing
 - a. Flashing: .050 minimum thickness.
3. Pre-formed Metal Coping for Parapet Walls
 - a. Metal coping cap with galvanized steel anchor/support cleats for capping parapet wall. The system shall be maintenance free, and does not require exposed fasteners. Joints shall be a butt type with concealed splice plates. Furnish complete with joint accessories and miscellaneous accessories required for complete installation.
 - b. Metal: .050" aluminum with Kynar 500 coating. Color as selected by Architect.
 - c. Dimensions:
 1. Length: Longest length possible, minimum length of 12'-0"
 2. Width: as indicated on the drawings.
 3. Vertical face and back leg: minimum 6".
 - d. Attachment Accessories:
 1. Concealed splice plates: 8" wide. Finish to match finish of coping cap.
 2. Anchor/Support Cleats: 20 ga. Galvanized. Cleat anchors shall be stainless steel.
4. Prefabricated Reglets and Counterflashings:
 - a. 24 gauge galvanized steel.
 - b. Reglet shall have a 2 inch factory-formed end lap
 - c. Flashing shall have a 3 inch end lap.
 - d. Provide factory manufactured mitered and sealed corners.
 - e. Provide sealant at time of installation. Refer to Specification Section 07 90 00 – Joint Sealants.
5. Metal Roof Edge
 - a. Minimum .024" pre-finished, baked enamel, aluminum sheet, brake- formed to provide 3" roof deck flange, and 1-1/2" fascia flange with 3/8" drip at lower edge. Furnish in 8' or 10' lengths.
6. Aluminum Fascia and Trim Brake-Metal Sheet Material
 - a. Minimum .050 extruded aluminum with Kynar 500 coating. Color as selected by Architect.
 - b. Maximum two-part construction.
 - c. Concealed aluminum joint covers.
 - d. Anchor with stainless steel fasteners.
 - e. Corners shall be factory mitered and welded.

K. FINISHES

1. General: Apply coatings either before or after forming and fabricating panels, as required by coating process and as required for maximum coating performance capability. Protect coating either by application of strippable film or by packing plastic film or other suitable material between panels in a manner to properly protect the finish. Furnish air drying spray finish in matching color for touch-up.
2. High Performance Coating: AA-C12C42R1x. Apply in strict compliance with coating and resin manufacturer's instructions using a licensed applicator.
 - a. Fluoropolymer Coating: Manufacturer's standard two-coat, thermocured, full strength 70 percent "Kynar 500" coating consisting of a primer and a minimum of 0.75 mil dry film thickness with a total minimum dry film thickness of 0.9 mil and 30 percent reflective gloss when tested in accordance with ASTM D523.

L. FABRICATION

1. General: Shop fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. For metal other than aluminum, fin edges to be seamed, form seams and solder. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.
3. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
4. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.
5. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates by coating or other permanent separation as recommended by manufacturer/fabricator.

M. WARRANTY

1. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace manufactured roof specialties that show evidence of deterioration of factory applied finishes within specified warranty period.
 - a. Fluoropolymer Finish: Deterioration includes, but is not limited to the following:
 1. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 2. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 3. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 10 year from date of Substantial Completion.

N. EXAMINATION

1. General: The installer must examine substrates and conditions under which metal flashings will be installed, and notify Contractor in writing of unsatisfactory conditions. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

O. PREPARATION

1. Separate dissimilar metals from each other by painting each metal surface in area of contact with a heavy application of bituminous coating.

P. INSTALLATION:

1. General: Comply with published recommendations of sheet metal manufacturer details and recommendations of SMACNA "Architectural Sheet Metal Manual". Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints and seams that will be permanently watertight and weatherproof.
2. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.
3. Bituminous Coating: SSPC – Paint 12, solvent type bituminous mastic, nominally free of sulfur. Compounded for 15-mil dry film thickness per coat.

4. Prefabricated reglets and counterflashings shall be installed in accordance with manufacturer's printed instructions. Coordinate reglets with work by others.
5. Roofing Expansion Joints: Installation shall be in accordance with the manufacturer's written instructions and as indicated.
6. Prefabricated Fascia
 - a. Install as recommended by manufacturer and as indicated.
 - b. Fasten with non-corrosive, non-rusting fasteners.
 - c. Cover joints with strips of same material, screwed and caulked in place with appropriate sealant of matching color.
7. Flashing at Roof Penetrations (Miscellaneous)
 - a. Work under this Section shall include the flashing of roof penetrations not otherwise specified under other Sections.
 - b. Flashing of roof penetrations not detailed shall be performed according to the recommendations and specifications of the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), subject to approval by the Architect.

Q. CLEANING AND PROTECTION

1. Clean exposed metal surfaces in accordance with manufacturer's instructions. Touch-up damaged metal coatings.
2. Protection: Provide protective measures as required to ensure that work of this Section will be without damage or deterioration at time of Substantial Completion.

END OF SECTION 07 60 00

SECTION 07 84 13 - FIRESTOPPING

A. SUMMARY

1. Through penetration firestops and smoke-stops for all fire-rated bearing and non-bearing wall and floor assemblies, both blank (empty) and those accommodating penetrating items such as cables, conduits, pipes, ducts, etc.
2. Membrane penetration protection for fire-rated walls.
3. Architectural/Construction joint firestops within walls, floors, or the intersection of floors to exterior walls, or the intersection of top of walls to ceilings.
4. Top of wall firestopping in all fire-rated partitions.
5. Top of wall and construction joint smoke-stopping in all smoke partitions.

B. RELATED WORK

1. Proper execution of this work will maintain the hourly ratings of the walls and floors and ensure progress of work in other Sections. Coordinate work of this Section with the work of the following Sections:
 - a. Cast In Place Concrete
 - b. Unit Masonry
 - c. Joint Sealers
 - d. Gypsum Board
 - e. Fire Suppression and Supervisory Systems
 - h. Basic Mechanical Materials & Methods
 - i. Mechanical Insulation
 - j. Fire Protection
 - k. Plumbing
 - l. Basic Electrical Materials & Methods

C. REFERENCES

1. American Society For Testing and Materials Standards (ASTM):
 - a. ASTM E84: Standard Test Method For Surface Burning Characteristics of Building Materials
 - b. ASTM E814: Standard Test method For Fire Tests of Through-Penetration Firestops
2. Underwriters Laboratories Inc.:
 - a. UL 723 Surface Burning Characteristics of Building Materials
 - b. UL 1479 Fire Tests of Through-Penetration Firestops
3. UL Fire Resistance Directory:
 - a. Through Penetration Firestop Devices (XHJI)
 - b. Fire Resistive Ratings (BXUV)
 - c. Through Penetration Firestop Systems (XHEZ)
 - d. Fill, Void, or Cavity Material (XHHW)

D. SUBMITTALS

1. Submit manufacturer's product literature for each type of firestop material to be installed. Literature shall indicate product characteristics, typical uses, performance and limitation criteria, and test data. Submittal should be in compliance with Section 01300.
2. Material Safety Data Sheets (MSDS): Submit MSDS for each firestop product.
3. UL Tested Systems: Submit drawings showing typical installation details for the methods of installation. Indicate which firestop materials will be used and thickness for different hourly ratings.
4. Submit manufacturer's installation procedures for each type of product.
5. Approved Applicator: Submit document from manufacturer wherein manufacturer recognizes the installer as qualified or submit a list of past projects to demonstrate capability to perform intended work.

E. QUALITY ASSURANCE

1. Firestopping systems (materials and design):

- a. Shall conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire tests in a configuration that is representative of field conditions.
 - b. The F rating must be a minimum of one (1) hour but not less than the fire resistance rating of the assembly being penetrated. T rating when required by code authority shall be based on measurement of the temperature rise on penetrating item(s). The fire test shall be conducted with a minimum positive pressure differential of 0.01 inches of water column.
 - c. For joints, must be tested to UL 2079 with movement capabilities equal to those of the anticipated conditions.
2. Firestopping materials & systems must be capable of closing or filling through-openings created by 1) the burning or melting of combustible pipes, cable jacketing, or pipe insulation materials, or 2) deflection of sheet metal due to thermal expansion (electrical & mechanical duct work).
 3. Firestopping material shall be asbestos and lead free and shall not incorporate nor require the use of hazardous solvents.
 4. Firestopping sealants must be flexible, allowing for normal pipe movement.
 5. Firestopping materials shall not shrink upon drying as evidenced by cracking or pulling back from contact surfaces.
 6. Firestopping materials shall be moisture resistant, and may not dissolve in water after curing.
 7. All firestopping materials shall be manufactured by one manufacturer (to the maximum extent possible).
 8. Installation of firestopping systems shall be performed by a contractor (or contractors) trained or approved by the firestop manufacturer.
 9. Material used shall be in accordance with the manufacturer's written installation instructions.

F. PRODUCT DELIVERY, STORAGE, AND HANDLING

1. Deliver material in the manufacturer's original, unopened containers or packages with the manufacturer's name, product identification, lot number, UL label, and mixing and installation instructions as applicable.
2. Store materials in the original, unopened containers or packages, and under conditions recommended by the manufacturer.
3. All firestop materials shall be installed prior to expiration of shelf life.

G. PROJECT CONDITIONS

1. Conform to manufacturer's printed instructions for installation and when applicable, curing in accordance with temperature and humidity. Conform to ventilation and safety requirements.
2. Verify the condition of the substrates before starting work.
3. Weather Conditions: Do not proceed with installation of firestop materials when temperatures fall outside the manufacturer's suggested limits.
4. Care should be taken to ensure that firestopping materials are installed so as not to contaminate adjacent surfaces.

H. SEQUENCING

1. Schedule firestopping after installation of penetrants but prior to concealing the openings.
2. Firestopping shall precede gypsum board finishing.

I. PROTECTION

1. Where firestopping is installed at locations which will remain exposed in the completed work, provide protection as necessary to prevent damage to adjacent surfaces and finishes, and protect as necessary against damage from other construction activities.

J. GENERAL

1. Firestopping materials and systems shall meet the requirements specified herein.
2. Architect must approve in writing any alternates to the materials and systems specified herein.

3. All firestop products and systems shall be designed and installed so that the basic sealing system will allow the full restoration of the thermal and fire resistance properties of the barrier being penetrated with minimal repair if penetrants are subsequently removed.
4. For applications where combustible penetrants are involved, i.e. insulated and plastic pipe, a suitable intumescent material must be used.

K. ACCEPTABLE MANUFACTURERS

1. 3m Company
2. Hilti
3. Specified Technologies Inc.
4. United States Gypsum Co.

L. MATERIALS

1. Standard specified is that of Specified Technologies Inc.
 - a. Intumescent Firestop Sealants and Caulks: SpecSeal SSS100
 - b. Latex Firestop Sealant: SpecSeal LC150 Sealant
 - c. Acrylic Water-Based Sealant: SpecSeal ES100 Elastomeric Sealant
 - d. Silicone Firestop Sealants and Caulks: SpecSeal Pensil 300
 - e. Firestop Putty: SpecSeal SSP100 Firestop Putty Bars and Pads
 - f. Firestop Collars: SpecSeal SSC Firestop Collars
 - g. Wrap Strips: SpecSeal SSW Wrap Strip
 - h. 2-Part Silicone Firestop Foam: SpecSeal Pensil 200
 - i. Firestop Mortar: SpecSeal SSM Mortar
 - j. Firestop Pillows: STI SpecSeal SSB Pillows
 - k. Elastomeric Spray: SpecSeal AS Elastomeric Spray
 - l. Accessories:
 1. Forming/Damming Materials: Mineral fiberboard or other type as per manufacturer recommendation.

M. CONDITIONS REQUIRING FIRESTOPPING

1. General: Provide firestopping for conditions specified whether or not firestopping is indicated, and if indicated, whether such material is designed as insulation, safing, or otherwise.
2. Through-Penetrations: Firestopping shall be installed in all open penetrations and in the annular space in all penetrations in any bearing or non-bearing fire-rated barrier.
3. Membrane-Penetrations: Where required by code, all membrane-penetrations in rated walls shall be protected with firestopping products that meet the requirements of third party time/temperature testing.
4. Construction Joints/Gaps: Firestopping shall be provided:
 - a. between the edges of floor slabs and exterior walls
 - b. between the tops of walls and the underside of floors
 - c. in the control joint in masonry walls and floors
 - d. in expansion joints
5. Smoke-Stopping: As required by the other Sections, Smoke-Stops shall be provided for Through-Penetrations, Membrane-Penetrations, and Construction Gaps with a material approved and tested for such application.

N. EXAMINATION

1. Examine the areas and conditions where firestops are to be installed and notify the architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected by the contractor in a manner acceptable to the architect and in accordance with Section 01039.
2. Verify that environmental conditions are safe and suitable for installation of firestop products.

3. Verify that all pipe, conduit, cable, and other items which penetrate fire-rated construction have been permanently installed prior to installation of firestops.

O. INSTALLATION

1. Installation of firestops shall be performed by an applicator/installer qualified and trained by the manufacturer. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures.
2. Apply firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, and manufacturer's recommendations.
3. Unless specified and approved, all insulation used in conjunction with through-penetrants shall remain intact and undamaged and may not be removed.
4. Seal holes and penetrations to ensure an effective smoke seal.
5. In areas of high traffic, protect firestopping materials from damage. If the opening is large, install firestopping materials capable of supporting the weight of a human.
6. Insulation types specified in other sections shall not be installed in lieu of firestopping material specified herein.
7. All combustible penetrants (e.g. non-metallic pipes or insulated metallic pipes) shall be firestopped using products and systems tested in a configuration representative of the field condition.

P. FIELD QUALITY CONTROL

1. Prepare and install firestopping systems in accordance with manufacturer's printed instructions and recommendations.
2. Follow safety procedures recommended in the Material Safety Data Sheets.
3. Finish surfaces of firestopping which are to remain exposed in the completed work to a uniform and level condition.
4. All areas of work must be accessible until inspection by the applicable Code Authorities.
5. Correct unacceptable firestops and provide additional inspection to verify compliance with this specification.

Q. CLEANING

1. Remove spilled and excess materials adjacent to firestopping without damaging adjacent surfaces.
2. Leave finished work in neat, clean condition with no evidence of spill overs or damage to adjacent surfaces.

END OF SECTION 07 84 13

SECTION 07 92 13 - JOINT SEALERS

A. SCOPE OF WORK

1. Include all materials, labor and equipment necessary for the complete caulking and sealant work as specified, indicated on the drawings, or as otherwise necessary. Include, but not limited to all joints both interior and exterior, as follows:
 - a. Joints in masonry walls.
 - b. Perimeter door frames, door sills, windows and other openings.
 - c. Building control joints.
 - d. All locations where casework and counters adjoins walls.
 - e. Necessary locations of joints requiring weathertight sealant.
2. Drawings and general conditions and other Division 1 Specification Sections apply to this Section.

B. STANDARDS

1. American Society of Testing and Materials (ASTM).

C. PRODUCT HANDLING

1. Deliver, store and handle material in a manner to prevent the entrance of foreign materials and damage of materials by water or breakage. Damaged materials shall not be installed. The name of manufacturer and trade name of each caulking shall be on each container.

D. SUBMITTALS

1. Submit samples per the requirements outlined in Division 1.

E. QUALITY ASSURANCE

1. Applicator shall have a minimum of two (2) years experience and must be approved by the manufacturer.
2. Obtain elastomeric materials only from single manufacturer.

F. PROJECT CONDITIONS

1. Preparation of joint surfaces, backing, and the conditions under which the sealant and caulking is to be installed shall conform to manufacturer's recommendations.
2. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:
 - a. When ambient and substrate temperature conditions are outside the limits permitted by sealant manufacturer.
 - b. When joint substrates are wet.
 - c. Where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
 - d. Contaminants capable of interfering with adhesion have not yet been removed from joint substrate.

F. WARRANTY

1. Provide manufacturer's two (2) year guarantee on materials.
2. Workmanship must be guaranteed against leakage for minimum of two (2) years from date of Owner's acceptance of the building.

G. MANUFACTURERS

1. Subject to the compliance with the requirements, provide products by one of the following:
 - a. DAP, Inc.
 - b. Dow Corning Corp.
 - c. Hilti Construction Chemicals

- d. General Electric Co., GE Silicones
- e. Pecora Corp.
- f. Sonneborn Building Products
- g. Tremco, Inc.

H. MATERIALS

1. General
 - a. Provide type, grade, class, hardness and similar characteristics of material as indicated or, where not indicated, to comply with manufacturer's recommendations relative to exposures, traffic, weather conditions and other factors of the joint system for best possible overall performance. Except as otherwise indicated, joint sealers are required to permanently maintain airtight and waterproof seals, without failures in joint movement accommodation, cohesion, adhesion (where applicable), migration, staining, and other performances as specified.
 - b. Color shall be selected by Architect from manufacturer's full range of samples.
2. Caulking Compounds (Acrylic Latex Sealant)
 - a. Latex rubber modified, acrylic emulsion polymer sealant compound; manufacturer's standard one-part, non-sag, mildew resistant, acrylic emulsion sealant complying with ASTM C 834, formulated to be paintable, and recommended for exposed applications on interior locations involving joint movement of not more than +/- 5%.
 1. Acceptable Products:
 - a. Acrylic Latex Caulk with Silicone – DAP, Inc.
 - b. AC-20 – Pecora Corp.
 - c. Sonolac – Sonneborn Building Products.
 - d. Acrylic Latex Caulk 834 – Sonneborn Building Products.
3. One-Part Elastomeric Sealant (Silicone)
 - a. One component elastomeric sealant, complying with ASTM C 920, Class 25, Type NS (non-sag), unless Type S (self leveling) recommended by manufacturer for the application shown. Provide additional movement capability where indicated.
 1. Acceptable Products:
 - a. Dow Corning 790 – Dow Corning Corp.
 - b. Silpruf – GE
 - c. Pecora 864 Architectural Silicone Sealant – Pecora Corp.
 - d. Omniseal - Sonneborn Building Products.
 - e. Spectrum 1 - Sonneborn Building Products.
 - b. One component mildew resistant silicone sealant: (Around countertops, and backsplashes, and other locations subject to moisture and wet conditions.)
 1. Acceptable Products:
 - a. Dow Corning 786 – Dow Corning Corp.
 - b. Sanitary 1700 – GE
 - c. Tremsil 600 – Tremco, Inc.
 - d. 898 Silicone Sanitary Sealant – Pecora Corp.
4. Elastomeric Sealant (Polyurethane)
 - a. One component polyurethane sealant complying with ASTM C 920, Type S, Grade NS, Class 25 (non-sag).
 1. Acceptable Products:
 - a. Dynatrol I - Pecora Corp.
 - b. Sonolastic NP 1 - Sonneborn Building Products.
 - c. Dymonic or Vulkem 921 - Tremco, Inc.
 - b. Two component polyurethane sealant complying with ASTM C 920, Type M, Grade NS, Class 25 (non-sag).
 1. Acceptable Products:

- a. Dynatrol II - Pecora Corp.
 - b. Sonolastic NP 2 - Sonneborn Building Products.
 - c. Dymeric 511 or Vulkem 922 - Tremco, Inc.
5. One-Part Self-Leveling Polyurethane Sealant (for traffic areas)
 - a. One component polyurethane self-leveling sealant, complying with ASTM C 920, Type S, Grade P, Class 25.
 1. Acceptable Products:
 - a. NR-201 Urexpan - Pecora Corp.
 - b. Sonolastic SL 1 - Sonneborn Building Products.
 - c. Vulkem 45 - Tremco, Inc.
 - b. Two component polyurethane self-leveling sealant, complying with ASTM C 920, Type M, Grade P, Class 25.
 1. Acceptable Products:
 - a. NR-200 Urexpan - Pecora Corp.
 - b. Sonolastic SL 2 - Sonneborn Building Products.
 - c. Vulkem 245 or THC900/THC901 - Tremco, Inc.
 6. Miscellaneous Materials:
 - a. Provide joint cleaner and joint primer sealer as recommended by sealant or caulking compound manufacturer.
 - b. Sealant backer rod shall be compressible rod stock polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam, or other similar material as recommended by the manufacturer.
 1. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
 - a. Type C: Closed cell material with a surface skin.
 2. Where a 2 inch building expansion joint is indicated, provide an expanding foam secondary sealant, behind sealant, in lieu of backer rod.
 - c. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates.
 - d. Cleaners for Non-Porous Surfaces: Provide non-staining, chemical cleaners of type which are acceptable to manufacturers of sealant and sealant backing materials, and do not harm or affect substrates or adjacent materials.

I. EXAMINATION, PREPARATION AND INSTALLATION

1. Examine joints indicated and/or required to receive sealants, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. If unsuitable conditions are present, notify Architect of items requiring correction. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.
2. All surfaces must be clean, dry, and free from loose aggregate, paint, corrosion, oil, grease, wax, tar, or other impurities. Joints must not be contaminated with bituminous materials.
3. Prime joints, if required, apply back-up material and sealants in strict accordance with manufacturer's directions.
4. Joints with wrinkles, sags, poor adhesion, or improperly cured, shall be cut out and replaced without additional cost to the owner.

J. SELECTION OF MATERIAL

1. Caulking compounds shall be used for interior non-moving joints and at locations indicated, including, but not limited to:
 - a. Perimeter joints of exterior openings, unless otherwise noted.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.

- c. Interior control joints, unless otherwise indicated.
- 2. One component elastomeric silicone sealants shall be used at exterior and interior joints where thermal or dynamic movement is anticipated, including, but not limited to:
 - a. Metal to metal joints.
 - b. Sheet metal flashing, coping, pre-formed metal caps, fascia and trim.
 - c. Glass to metal joints.
 - d. Exterior insulation and finish system. Provide at joints within system, and at joints where system abuts other materials.
- 3. One component mildew resistant silicone sealant at locations indicated, including, but not limited to:
 - a. Joints between plumbing fixtures and adjoining walls, floors and counters.
 - b. Joints between countertops and backsplashes and walls.
- 4. One or two part elastomeric polyurethane sealants shall be used at exterior and interior joints where weatherproofing or waterproofing is required, and at exterior and interior joints between dissimilar materials including, but not limited to:
 - a. Exterior and interior sides of building expansion joints.
 - b. Exterior side of frame of doors, windows, and louvers to adjacent dissimilar materials.
 - c. Lintels and shelf angles to masonry construction.
 - d. Exterior building control joints and masonry expansion joints.
 - e. Joints in concrete sitework (sidewalks, ramps, retaining walls, etc.), and the joint between concrete slabs and dissimilar materials.
 - f. Sealant in pipe sleeves where materials perforate floor slab (non-rated).
 - g. Perimeter of floor slabs and concrete curbs which abut vertical surfaces.
 - h. Tile control and expansion interior joints in vertical and horizontal non-traffic surfaces.
 - i. Exterior joints between dissimilar materials where the joining of two surfaces require a watertight seal.
- 5. One or two part self-leveling polyurethane sealant shall be used for exterior and interior horizontal joints subject to pedestrian and moderate vehicular traffic.

K. CLEANING

- 1. Clean off excess sealants or smears adjacent to joints as the work progresses, with materials recommended by joint sealer manufacturer.

L. PROTECTION

- 1. Protect joint sealants during and after curing period from contact with contaminating substrates and from damage resulting from construction operations, or other causes, for acceptance at time of substantial completion. If damage occurs, cut out and remove damaged or deteriorated joint sealants, immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07 92 13

SECTION 08 12 13 - STEEL DOORS AND FRAMES

A. SUMMARY

1. Section Includes hollow metal steel doors and frames.

B. RELATED SECTIONS

1. Section 08 21 00 - Wood Doors
2. Section 08 70 00 - Door Hardware
3. Section 08 80 00 – Glazing
4. Section 09 90 00 – Painting

C. REFERENCES

1. ASTM - American Society for Testing and Materials
 - a. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - b. ASTM A 924 - Specification for General Requirements for Steel Sheet, Metallic Coated by the Hot Dip Process.
 - c. ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, High Strength Low-Alloy, High Strength Low Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
 - d. ASTM E 90 - Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
 - e. ASTM E 413 - Classification for Rating Sound Insulation.
2. ANSI - American National Standards Institute
 - a. ANSI/DHI A115 - Specifications for Hardware Preparations in Standard Steel Doors and Frames.
 - b. ANSI/DHI A115.IG - Installation Guide for Doors and Hardware.
 - c. ANSI A156.7 - Hinge Template Dimensions.
 - d. ANSI A 250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames.
 - e. ANSI A250.4 – Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing.
 - f. ANSI A 250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames.
 - g. ANSI A 250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
 - h. ANSI/SDI 250.11 - Recommended Erection Instructions for Steel Frames
3. SDI - Steel Door Institute
 - a. SDI 105 - Recommended Erection Instructions for Steel frames.
 - b. SDI 111 - Recommended Details and Guidelines for Standard Steel Doors and Frames and Accessories.
 - c. SDI 112 - Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors and Frames.
 - d. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames.
 - e. SDI 118 - Basic Fire Door Requirements.
 - f. SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
 - g. SDI 124 - Maintenance of Standard Steel Doors and Frames.
4. NAAMM/HMMA - Hollow Metal Manufacturers Association
 - a. HMMA 840 - Guide Specification for Installation and Storage of Hollow Metal Doors and Frames
 - b. HMMA 820 TN01- Grouting Hollow Metal Frames
 - c. HMMA 820 TN03 – Guidelines for Glazing of Hollow Metal Transom, Sidelight and Windows
5. Building Code references
 - a. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
 - b. NFPA 252 – Standard Method of Fire Tests of Door Assemblies

- c. ANSI/UL 10C - Standard for Safety for Positive Pressure Fire Tests of Door Assemblies
- d. UL 1784 - Air Leakage Tests of Door Assemblies
- e. UL - Building Materials Directory; Underwriters Laboratories Inc
- f. WH - Certification Listings; Warnock Hersey International Inc.

D. SUBMITTALS

1. Submit for review PDF files of the hollow metal shop drawings covering complete identification of items required for the project. Include manufacturer's names and identification of product. Included PDF files of catalog cuts and/or technical data sheets and other pertinent data as required to indicate compliance with these specifications.
2. Shop Drawings: submit complete and detailed with respect to quantities, dimensions, specified performance, and design criteria, materials and similar data to enable the Architect to review the information as required.
3. Indicate frames configuration, anchor types and spacing, location of cutouts for hardware, reinforcement, to ensure doors and frames are properly prepared and coordinated to receive hardware.
4. Indicate door elevations, internal reinforcement, closure method, and cutouts for glass lights and louvers.
5. Submit manufacturer's installation instructions, including a current copy of ANSI A250.11 as part of the shop drawing submittal.
6. Shop drawings, product data, and samples: stamp with Contractor's stamp verifying they have been coordinated and reviewed for completeness and compliance with the contract documents.
7. Shop drawings submitted without the above requirements will be considered incomplete, will NOT be reviewed, and will be returned directly to the Contractor.
8. Follow the same procedures for re-submittal as the initial submittal with the appropriate dates revised.
9. Provide evidence of manufacturer's membership in the Steel Door Institute.

E. QUALITY ASSURANCE

1. Select a qualified hollow metal distributor who is a direct account of the manufacturer of the products furnished. In addition, that distributor must have in their regular employment an Architectural Hardware Consultant (AHC), a Certified Door Consultant (CDC) or an Architectural Openings Consultant (AOC), who will be available to consult with the Architect and Contractor regarding matters affecting the door and frame opening.
2. Conform to requirements of the above reference standards. Submit test reports upon request by the Owner or Architect.
3. Underwriters' Laboratories and Intertek Testing Services / Warnock Hersey, labeled fire doors and frames:
 - a. Label fire doors and frames listed in accordance with Underwriters Laboratories standard UL10C, and Positive Pressure Fire Tests of Door Assemblies.
 - b. Construct and install doors and frames to comply with applicable issue of ANSI/NFPA 80.
 - c. Manufacture Underwriters' Laboratories labeled doors and frames under the UL factory inspection program and in strict compliance to UL procedures, and provide the degree of fire protection, heat transmission and panic loading capability indicated by the opening class.
 - d. Manufacture Intertek Testing Services / Warnock Hersey labeled doors and frames under the ITS/WH factory inspection program and in strict compliance to ITS/WH procedures, and provide the degree of fire protection capability indicated by the opening class.
 - e. Affixed physical label or approved marking to fire doors and/or fire door frames, at an authorized facility as evidence of compliance with procedures of the labeling agency. Labels to be metal, paper or plastic. Stamped or die cast labels are not permitted. Labels are not to be removed, defaced or made illegible while the door is in service as covered in NFPA Pamphlet 80.
 - f. Conform to applicable codes for fire ratings. It is the intent of this specification that hardware and its application comply or exceed the standards for labeled openings. In case of conflict between types required for fire protection, furnish type required by NFPA and UL.

4. Manufacturer Qualifications: Member of the Steel Door Institute.
5. Installer: Minimum five years documented experience installing products specified in this Section.

F. DELIVERY, STORAGE AND HANDLING

1. Storage of Doors
 - a. Store doors vertically in a dry area, under proper cover. Place the units on at least 4" high wood sills on floors in a manner that will prevent rust and damage. Avoid storage in non-vented plastic or canvas shelters, which create a humidity chamber and promote rusting. If the door becomes wet, or moisture appears, remove protective wrapping immediately. Provide a 4" space between the doors to permit air circulation. Proper storage is required to meet the requirements of ANSI/SDI A250.11 and HMMA 840.
2. Storage of Frames
 - a. Store frames in an upright position with heads uppermost under cover on 4" wood sills on floors in a manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters, which create a humidity chamber and promote rusting. Store assembled frames in a vertical position, five units maximum in a stack. Provide a 2" space between frames to permit air circulation.
 - b. Provide proper storage for doors and frames, to maintain the quality and integrity of the factory applied paint, and maintain the requirements of ANSI/SDI A250.10 and HMMA 840.
 - c. Sand, touch up and clean prime painted surfaces prior to finish painting in accordance with the manufacturer's instructions.

G. COORDINATION

1. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal cutouts and reinforcement for door hardware, electric devices and recessed items.
2. Coordinate work with frame opening construction, door and hardware installation.
3. Sequence installation to accommodate required door hardware.
4. Verify field dimensions for factory assembled frames prior to fabrication.

H. STANDARDS AND MANUFACTURERS

1. Standards: Comply with the requirements of Steel Door Institute, "Recommended Specifications for Standard Steel Doors and Frames," (SDI-100), and as herein specified.
2. Manufacturers: A recognized producer of hollow metal work complying with the requirements, including any one of the following:
 - American Welding and Manufacturing Co.
 - Ceco Corp.
 - Fenestra
 - Mesker Brothers Industries, Inc.
 - Republic Steel Corp.
 - Steelcraft Manufacturing Co.
 - Virginia Metal Products

I. MATERIALS

1. DOORS:
 - a. Construct exterior/interior doors to these designs and gages:
 1. Exterior Doors: Zinc-Iron Alloy-Coated galvanized steel, ASTM A 653, Class A60, 18 gage Zinc-Iron Alloy-Coated galvanized steel, with closed tops.
 - a. Include galvanized components and internal reinforcements with galvanized doors.
 - b. Close tops of exterior swing-out doors to eliminate moisture penetration. Galvanized steel top caps are permitted.
 2. Interior Doors: Cold-rolled steel, A 1008, 18 gage cold rolled or galvanized steel.

- a. Include galvanized components and internal reinforcements with galvanized doors.
3. Factory prime painted doors indicated on door schedule as HM.
4. Hardware Reinforcements:
 - a. Hinge reinforcements for full mortise hinges: minimum 7 gage.
 - b. Lock reinforcements: minimum 16 gage.
 - c. Closer reinforcements: minimum 14 gage, 20" long.
 - d. Galvanized doors: include galvanized hardware reinforcements.
 - e. Projection welded hinge and lock reinforcements to the edge of the door.
 - f. Provided adequate reinforcements for other hardware as required.
5. Glass moldings and stops (both labeled and non-labeled doors):
 - a. Fabricate glass trim from 24 gage steel conforming to:
 1. Interior openings ASTM designation A 366 cold rolled steel
 2. Exterior openings ASTM designation A 924 Zinc-Iron Alloy-Coated galvanized steel with a zinc coating of 0.06 ounces per square foot (A60) for exterior openings.
 - b. Install trim into the door as a four sided welded assembly with mitered, reinforced and welded corners.
 - c. Trim: identical on both sides of the door.
 - d. Exposed fasteners are not permitted. Labeled and non-labeled doors: use the same trim.
 - e. Acceptable mounting methods:
 1. Fit into a formed area of the door face, not extending beyond the door face, and interlocking into the recessed area.
 2. Cap the cutout not extend more than 1/16" from the door face.
- b. Full Flush Type Doors Construction
 1. ANSI-A250.4 criteria and tested to 5,000,000 operating cycles.
 2. Approved door core constructions:
 - a. Honeycomb: Reinforced, stiffened, sound deadened and insulated with impregnated Kraft honeycomb core completely filling the inside of the doors and laminated to inside faces of both panels using contact adhesive applied to both panels and honeycomb core.
 - b. Polystyrene: Reinforced, stiffened, sound deadened and insulated with a rigid polystyrene core bonded to the inside faces of both panels with contact adhesive. Fill voids around the perimeter of the door with honeycomb.
 - c. Steel Stiffened: Vertically stiffened with steel stiffeners and sound deadened with fiberglass batt insulation. Fabricate hat shaped stiffeners from 20 gage. Locate vertical interior webs 6" apart, welded to the inside of the face sheets 5" on center. Weld the hat shape stiffeners together at the top and bottom of the door. Fill areas between stiffeners with fiberglass.
 3. Vertical edge seams: Provide doors with continuous vertical mechanical inter-locking joints at lock and hinge edges with visible edge seams, or a one piece full height 14 gage channel. Apply a continuous bead of structural epoxy in the internal vertical connection.
 - a. Filled Vertical Edges (F): Continuous vertical mechanical interlocking joint with internal epoxy seal; edge seams epoxy filled and ground smooth.
 4. Bevel hinge and lock door edges 1/8 inch (3 mm) in 2 inches (50 mm). Square edges on hinge and/or lock stiles are not acceptable.
 5. Reinforce top and bottom of doors with galvanized 14 gage, welded to both panels.
2. DOOR FRAMES:
 - a. Construct exterior and metal door frames to these profiles, designs and gages;
 1. Exterior Frames: Zinc-Iron Alloy-Coated galvanized steel, ASTM A 653, Class A60, 16 gage Zinc-Iron Alloy-Coated galvanized steel.
 2. Interior Frames in Masonry: Zinc-Iron Alloy-Coated galvanized steel, ASTM A 653, Class A60, 16 gage galvanized steel.
 3. Interior Frames in stud wall construction: 16 gage cold rolled frames.

4. Include galvanized components and internal reinforcements with galvanized frames.
- b. Flush Frames: knocked down for field assembly or set-up and welded with temporary shipping bars. Factory die-mitered corner connections reinforced with four integral tabs to secure and interlock at jambs to head. Unless otherwise indicated, frame will have 2" faces and 5/8" stops. Frame depths per the architectural door schedule.
 1. Provide frames with a minimum of six wall anchors and two adjustable base anchors of manufacturer's standard design.
 2. Provide welded 3 sided frames as follows:
 - a. Face welded: Weld miter joints between head and jamb faces completely along their length either internally or externally. The remaining elements of the frame profile (soffit, stop and rabbets) are not welded. Grind and finish face joints smooth.
- c. Drywall Frames: same as flush frames, 16 gage except:
 1. Form frames with double return backbends to prevent cutting into drywall surface. Design knock down frames to be securely installed in the rough opening after wallboard is applied.
 - a. Drywall frames: knocked down for field assembly. Factory die-mitered corner connections reinforced at miters, including soffit tabs to secure and interlock at jambs to head.
 2. Locate adjustable anchors in each jamb 4" from the top of the door opening to hold frame in rigid alignment.
 - a. Provide security anchor at strike jambs on all frames 7'6" high and over.
 3. Base anchor: Weld-in base anchor attaching plate in each jamb for field installation of loose base anchors to allow proper anchoring at base of frame.
- d. Prepare frames to receive inserted type door silencers (3) per strike jamb on single doors, and (2) per head for pair of doors. Stick-on silencers are not permitted.
- e. Frame Hardware Reinforcements:
 1. Mortise hinge reinforcement: minimum 7 gage.
 - a. Provide high frequency hinge reinforcement for top hinge on all exterior, cross corridor, and stairwell frames, in accordance with SDI 111-H, Example "A" Application, where full mortise hinges are specified.
 2. Strike reinforcements: minimum 16 gage and prepared for an ANSI-A115.1-2 strike.
 3. Closer reinforcement: minimum 14 gage steel.
 4. Projection weld hinge and strike reinforcements to the door frame.
 5. Provide metal plaster guards for all mortised cutouts.
 6. Provide adequate reinforcements for other hardware as required.
 7. Include galvanized hardware reinforcements in all galvanized frames.

J. FABRICATION:

1. Face Welded Frames:
 - a. Continuous face weld the joint between the head and jamb faces along their length either internally or externally. Grind, prime paint, and finish smooth face joints with no visible face seams.
 - b. Externally weld, grind, prime paint, and finish smooth face joints at meeting mullions or between mullions and other frame members per a current copy of ANSI/SDI A250.8.
 - c. Provide two temporary steel spreaders (welded to the jambs at each rabbet of door openings) on welded frames during shipment. Remove temporary steel spreaders prior to installation of the frame.

K. FINISH:

1. Doors, frames and frame components are required to be cleaned, phosphatized, and finished with one coat of baked-on rust inhibiting prime paint in accordance with the ANSI/SDI A250.10 "Test Procedures and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames."
2. Back prime all hollow metal door frames that are to be installed in masonry walls with suitable product as recommended by manufacturer.

L. INSTALLATION:

1. Install doors and frames in accordance with Steel Door Institute's recommended erection instructions for steel frames ANSI A250.11.
2. Install label doors and frames in accordance with NFPA-80.
3. Remove temporary steel spreaders prior to installation of frames.
4. Set frames accurately in position; plumb, align and brace until permanent anchors are set. After wall construction is complete, remove temporary wood spreaders.
 - a. Field splice only at approved locations indicated on the shop drawings. Weld, grind, and finish as required to conceal evidence of splicing on exposed faces.
5. Provide full height 3/8" to 1-1/2" thick strip of polystyrene foam blocking at non-labeled frames requiring grouting where continuous hinges are specified. Apply the strip to the back of the frame, where the hinge is to be installed, to facilitate field drilling or tapping.
6. Where grouting is required in masonry, provide and install temporary bottom and intermediate wood spreaders to maintain proper width and avoid bowing or deforming of frame members. Refer to ANSI A250.11-2001, Standard.
 - a. Hollow Metal Frames to receive grouting: comply with a current copy of ANSI/SDI Standard A250.8, paragraph 4.2.2, whereby grout will be mixed to provide a 4" maximum slump consistency and hand troweled into place. Do not use grout mixed to a thinner, pumpable consistency. Refer to HMMA 820 TN01 Grouting Hollow Metal Frames.
7. Provide a vertical wood brace during grouting of frame at openings over 4'0" wide, to prevent sagging of frame header.
8. Glaze and seal exterior transom, sidelight and window frames in accordance with HMMA-820 TN03.
9. Apply hardware in accordance with hardware manufacturers' instructions and Section 08 70 00 FINISH HARDWARE of these Specifications. Install hardware with only factory-provided fasteners. Adjust door installation to provide uniform clearance at head and jambs, to achieve maximum operational effectiveness and appearance.

M. ADJUSTING

1. Final Adjustments: Adjust operating doors and hardware items just prior to final inspection and acceptance by the Owner and Architect. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames that are damaged, bowed or otherwise unacceptable.
2. Prime Coat Touch-Up: Immediately after erection, sand smooth rusted or damaged areas of prime coat, and apply touch-up of compatible air-drying primer.

N. PROTECTION

1. Provide protective measures required throughout the construction period to ensure that door and frame units will be without damage or deterioration, other than normal weathering, at time of acceptance.

END OF SECTION 08 12 13

SECTION 08 36 13 - SECTIONAL OVERHEAD DOORS

A. SUMMARY OF WORK

1. Motor operated insulated sectional overhead doors, with accessories and components.
2. Manual operated glazed aluminum sectional overhead doors, with accessories and components.

B. RELATED WORK

1. Section 04 20 00 - Unit Masonry Assemblies: Prepared opening in masonry. Execution requirements for placement of anchors in masonry wall construction.
2. Section 05 50 00 - Metal Fabrications: Steel frame and supports.
3. Section 06 10 00 - Wood Blocking and Curbing: Rough wood framing and blocking for door opening.
4. Section 07 90 00 - Joint Sealers: Perimeter sealant and backup materials.
5. Section 09 90 00 - Paints and Coatings: Field painting.
6. Division 16 - Raceway and Boxes: Empty conduit from control station to door operator; Wiring Connections: Electrical service to door operator.

C. REFERENCE STANDARDS

1. ANSI/DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors.
2. ASTM A123 - Zinc hot-dipped galvanized coatings on iron and steel products.
3. ASTM A216 - Specifications for sectional overhead type doors.
4. ASTM A229 - Steel wire, oil-tempered for mechanical springs.
5. ASTM A-653-94 - Steel sheet, zinc-coated [galvanized] by the hot-dipped process, commercial quality.
6. ASTM D1929 - Ignition temperature test to determine flash and ignition temperature of foamed plastics.
7. ASTM E84-91A - Tunnel test for flame spread and smoke developed index.
8. ASTM E330 - Structural performance of exterior windows, curtain walls, and doors by uniform static air pressure difference.
9. ASTM E413-87 - Sound transmission class.
10. ASTM E1332-90 - Outdoor-indoor transmission class.
11. ASTM E283-91 - Air infiltration

D. SUBMITTALS

1. Submit under provisions of Division 1 and General Conditions.
2. Product Data: Manufacturer's product data, technical literature and installation instructions.
3. Shop Drawings: Clearly indicate the following:
 - a. Design and installation details to withstand standard windload.
 - b. All details required for complete operation and installation.
 - c. Hardware locations.
 - d. Type of metal and finish for door sections.
 - e. Finish for miscellaneous components and accessories.
4. Operation and Maintenance Data.

E. QUALITY ASSURANCE

1. Sectional overhead doors and all accessories AND components required for complete and secure installations shall be manufactured as a system from one manufacturer.
2. Sectional overhead doors shall be tested and labeled certifying compliance with ASTM D1929 and ASTM E84-91A standards.
3. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
4. Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.

5. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

F. DELIVERY, STORAGE AND HANDLING

1. Deliver products in manufacturer's original containers, dry, undamaged, seals and labels intact.
2. Store and protect products in accordance with manufacturer's recommendations.

G. WARRANTY

1. Provide manufacturer's standard ten-year warranty for the following:
 - a. Against separation/degradation of the polyurethane foam from the steel skin of the panel.
 - b. Door and operators System warranty against cracking, splitting or deterioration due to rust-through.

H. MANUFACTURERS

1. Acceptable Manufacturers:
 - a. Cloplay
 - b. Haas Doors
 - c. Overhead Door
 - d. Raynor
 - e. Wayne-Dalton Corporation.

I. SECTIONAL OVERHEAD DOORS

1. Motor Operated Insulated Sectional Overhead Doors
 - a. Standard specified: Wayne-Dalton Model TS 200, or approved equal.
 1. Operation: motor
 2. Material: Galvanized steel with baked-on polyester primer, ready for field finish paint.
 3. Insulation: Polyurethane
 - b. Insulated Sectional Overhead Doors: Insulated steel tongue-and-groove jointed panels with roll-formed internal struts with polypropylene rib caps to provide thermal break; end caps to provide tight seal at jambs; and hardware plates at all fastener points.
 1. Complying with ANSI/DASMA 102 requirements for commercial doors.
 2. Wind Load Performance: Withstanding 15.2 psf (728 Pa) external pressure and 12 psf (575 Pa) internal pressure when tested in accordance with ASTM E 330.
 3. Insulation: Foamed-in-place high density polyurethane core with flamespread of 10 and smoke density of 210 when measured in accordance with ASTM E 84.
 4. Finish: Two-coat baked-on polyester. Color: White.
 5. Panel Thickness: 2 inches.
 6. Face Sheet Thickness: 20 gauge.
 7. Panel Design: Flush.
 8. Thermal Resistance: Calculated "R" value of 17.50.
 9. Zinc Coating: Z275 galvanized, before finishing.
 - c. Components:
 1. Tracks: Design shall be vertical lift. Vertical mounting angles shall be hot-dipped galvanized. Track size shall be 3". Vertical track shall be graduated to provide wedge type weathertight closing with continuous angle mounting for masonry jambs, and shall be fully adjustable to seal door at jambs.
 - a. Material: 16 gage, 0.06 inch (1.52 mm), galvanized steel sheet, ASTM A 653/A 653M, Z120 hot-dipped zinc-aluminum coating.
 2. Hardware:
 - a. Hinges: Hot-dipped galvanized steel.
 - b. Track Rollers: Steel, with case-hardened inner steel races and 10 ball bearings.

- c. Weatherstripping: Doors shall be equipped with factory-installed, top seal to seal against header, co-polymer joint seals between sections and vinyl "bulb" shaped astragal provided on the bottom section.
 - d. Locks shall engage the right-hand vertical track and utilize standard size rim cylinder.
 - e. Counterbalances: Spring torsion type capable of supporting entire door weight, made of ASTM A 229/A 229M oil-tempered steel wire.
 - 1. Performance: Minimum of 25,000 cycles.
 - 2. Spring Fittings and Drums: Die-cast high strength aluminum.
 - 3. Cables: Preformed galvanized steel aircraft cables with minimum safety factor of 5 to 1.
- 2. Manual Operated Glazed Aluminum Sectional Overhead Doors
 - a. Standard Specified: Wayne Dalton 452 Series Aluminum Doors.
 - 1. Operation: Manual
 - b. Door Assembly: Stile and rail assembly of aluminum alloy 6063-T6, 1-3/8 inch thick stiles and rails, joined with self tapping screws.
 - 1. Rails: Top and bottom rails with 3-1/2 inches wide, lower intermediate rail 1-3/8 inches, upper rail 1-5/8 inches, minimum wall thickness 0.062 inch.
 - 2. Stiles: Top, bottom, and end stiles are 3-1/2 inches wide, center stile 3 inches wide, minimum wall thickness 0.062 inch.
 - 3. Glazing: 1/8 inch (3 mm) Clear Tempered glass.
 - 4. Finish and Color: Anodized Finish: Clear anodized.
 - c. Components:
 - 1. Springs: Standard cycle spring: 10,000 cycles
 - 2. Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.
 - 3. Lock: Interior mounted slide lock.
 - 4. Weatherstripping: Flexible bulb-type strip at bottom section.
 - 5. Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
 - a. Size: 2 inch (51 mm).
 - b. Type: Vertical lift.
 - 6. Manual Operation: Chain hoist.

J. OPERATORS

- 1. Products:
 - a. LiftMaster Industrial Duty Trolley Operator – Model T.
 - b. Raynor Industrial Duty Trolley Operator – Model RBT.
 - c. Approved Equal.
- 2. Three (3) button stations, up/down/stop operations. See Electrical Drawings for locations.
- 3. The Overhead Door/Operator Contractor shall be responsible to install and connect the push button stations to the operators.
- 4. Electrical requirements: See Electrical Drawings
- 5. Provide spring loaded disconnect for manual operations.

K. PHOTO ELECTRIC SENSOR

- 1. Furnish and install microwave sensors at all overhead doors.
- 2. Sensors shall be Model GD11S, universal beam, by Microwave Sensors, or approved equal.
- 3. Universal beam units shall be surface mounted.
- 4. Units shall have a factory set time delay of 0.5 seconds.
- 5. Specifications:
 - a. Range: 0-30 feet.
 - b. Power Requirements: 12 to 24 VAC or DC, 100mA.

- c. Relay: N.O. or N.C. contacts.
 - d. Relay Contact Rating: 1A, 24 VAC or DC.
 - e. Relay Surge Protection: Over 300 volts.
 - f. Temperature Range: 0 to 140 degrees F.
 - g. Finish: Brushed anodized aluminum.
 - h. Time Delay: Adjustment of ½ to 15 seconds.
 - i. Bracket: Extends from 43 to 8 inches.
 - j. Size: 1-1/2" wide x 1-1/2" deep x 5-3/4" long.
- 6. Photo Electric Sensor Units and all associated power and control wiring shall be furnished and installed by Overhead Door/Operator Contractor.
 - 7. All low voltage wiring shall be totally enclosed within the sensor box. The electrical power shall have conduit attached to the sensor box.

L. EXAMINATION

- 1. Before beginning work, verify that openings have been properly prepared, and that existing conditions are ready to receive sectional overhead door work.

M. INSTALLATION

- 1. Install in accordance with manufacturer's instructions and standards.
- 2. Install door complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports in accordance with final shop drawings, manufacturer's instructions, and as specified herein.
- 3. Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.
- 4. Anchor assembly to wall construction and building framing without distortion or stress.
- 5. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- 6. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.
- 7. Install doors plumb, level, and operating smoothly without binding.
- 8. Upon completion of final installation lubricate, test and adjust doors to operate easily, free from warp, twist or distortion and fitting for entire perimeter.

N. CLEANING, ADJUSTING AND PROTECTION

- 1. Clean doors, frames and glass using non-abrasive materials and methods recommended by manufacturer.
- 2. Remove labels and visible markings.
- 3. Touch-up, repair or replace damaged products before Substantial Completion.
- 4. Do not permit construction traffic through overhead door openings after adjustment and cleaning.
- 5. Protect installed products until completion of project.

END OF SECTION 08 36 13

SECTION 08 41 13 - ALUMINUM ENTRANCE AND STOREFRONT

A. WORK INCLUDED

1. Furnish and install aluminum entrance systems and storefront systems as shown on drawings and specified in this section.

B. RELATED WORK

1. Masonry – Section 04 20 00
2. Joint Sealers – Section 07 92 00
3. Finish Hardware – Section 08 70 00
4. Glass and Glazing – Section 08 80 00

C. SUBMITTALS

1. Contractor shall submit shop drawings, finish samples, test reports, and warranties per Division 1 General Requirements.
 - a. Samples of materials as may be requested without cost to owner, i.e., metal, glass, fasteners, anchors, frame sections, etc.
 - b. Design for windload of 30 PSF with maximum deflection in both vertical and horizontal mullions not to exceed 1/175 of span.

D. STANDARDS

1. American Society for Testing and Materials (ASTM)
2. Underwriter's Laboratories (UL)
3. American National Standards Institute (ANSI)
4. Aluminum Association (AA)

E. WARRANTY

1. Materials and workmanship furnished and installed shall be free from defects for a period of one (1) year from date of final acceptance. It is the responsibility of this contractor to provide a watertight installation.

F. PRODUCTS

1. Aluminum Storefront System: Standard specified shall be Tubelite 14000T thermally broken system, or equal.
 - a. Acceptable Manufacturers:
 - a. Kawneer Co., Inc.
 - b. Vistawall Architectural Products
 - c. Tubelite
 - d. YKK
 - b. Frames
 1. Extrusions shall be 6063-T5 alloy and tempered.
 2. Provide polypropylene backed wool pile weather stripping.
 3. Frame type shall be Tubelite 14000T thermally broken system, or equal.
 4. Frames shall be constructed of extruded aluminum sections.
 5. Corners shall be square cut and fastened using stainless steel screens and extruded corner brackets.
 6. Hardware Preparation
 - a. Hinge and strike plates shall be mortised, drilled and tapped to comply with hardware specifications.
 - b. Provide for overhead surface mounted closure.
 - c. Doors
 1. Manufacturer's standard "wide stile" units.
 2. Finish shall be manufacturer's standard anodized aluminum system.

3. Provide acrylic pile weather stripping around door perimeter.
4. Extrusions shall be 6063-T5 alloy and tempered.
5. Anchors shall be aluminum or stainless steel.
6. See Drawings for size and location.
7. Door Hardware: See Specification Section 08 70 00.
 - a. Items provided by Aluminum Storefront Entry Supplier:
 1. Standard Aluminum Door Manufacturer's threshold, sweeps and weatherstripping.
 - b. Pre-wire doors and frames for security system integrated locks and contact sensors.
 - d. Break Metal: Where indicated on the Drawings, all break metal shall be .063 anodized aluminum. All break metal shall be broken to required shape at factory before final anodization.
 - e. Fabrication: Accurately fit to surrounding work. Connections securing the aluminum framing to the building structure shall be so designed that the framing can be properly plumbed and aligned to compensate for variations in the building sub-structure.
 - f. Finish: Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I) complying with AAMA 607.1.

G. DELIVERY, STORAGE, AND HANDLING

1. Do not allow doors and frames to be delivered to project site until work has sufficiently progressed and preparations made that will enable new window installation to proceed upon delivery.
2. Comply with manufacturer's recommendations for handling, storage, and protection during installation.

H. WARRANTIES

1. Total System
 - a. The contractor shall assume full responsibility and warrant for one year the satisfactory performance of the total door and window installation which includes that of the doors, frames, windows, glass, glazing, anchorage and setting system, sealing, flashing, etc., as it relates to air, water and structural adequacy as called for in the specifications and approved shop drawings.
 - b. Any deficiencies due to such elements not meeting the specifications shall be corrected by the contractor at his expense during the warranty period.

I. EXECUTION

1. Inspection
 - a. Verify that openings are dimensionally within allowable tolerances, plumb, level, clean, provide a solid anchoring surface and are in accordance with approved shop drawings.
2. Installation
 - a. Use only skilled tradesmen. Complete work in accordance with approved shop drawings and specifications.
 - b. Plumb and align units in a single plane for each wall plane and erect materials square and true. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.
 - c. Furnish and apply sealants to provide a weathertight installation at all joints and inter-sections and at opening perimeters. Wipe off excess material and leave all exposed surfaces and joints clean and smooth.
3. Adjusting and Cleaning
 - a. After completion of installation, doors and windows shall be inspected, adjusted, put into working order and left clean, free of labels, dirt, etc.

END OF SECTION 08 41 13

SECTION 08 70 00 - FINISH HARDWARE

A. WORK INCLUDED

1. This work shall include the furnishing and delivery to the Contractor of all the finish hardware, including all screws, bolts and other devices required to complete the work.
2. Templates of all hardware shall be promptly furnished to the metal door frame manufacturer.

B. DELIVERY OF HARDWARE

1. All finish hardware will be installed under the Carpentry Division. The Contractor will issue instructions for the time and place of delivery.

C. SUBMITTALS

1. Submit PDF file of hardware schedule to Architect with catalog-cuts of each item of hardware listed for approval.
2. Submit above, prior to ordering material, in accordance with General conditions.

D. INSTALLATION

1. Install all hardware per manufacturer's directions, a mounting heights recommended by the Door and Hardware Institute, and in compliance with the ADAAG.

E. FINISH HARDWARE SCHEDULE

1. All hardware shall be of the makes and models listed in the attached Hardware Schedule, or approved equals.
2. Furnish and deliver all finish hardware, complete with all necessary fasteners. Provide templates for all hardware to metal door manufacturer.

<u>PRODUCT</u>	<u>SPECIFIED MANUFACTURER</u>	<u>APPROVED EQUAL</u>
Hinges	Hager	Stanley, McKinney
Locksets, Cylinders	Sargent	Schlage
Closers	LCN	Sargent, Corbin/Ruswin
Push/Pulls	Hager	Baldwin, Rockwood, DCI
Stops	Hager	Burns, Ives, Rockwood
Kickplates	Hager	Burns, Ives, Rockwood
Flush bolts	Hager	Burns, Ives, Rockwood
Thresholds	National Guard	Pemko, Zero
Weatherstrip	National Guard	Pemko, Zero
Electric Strikes	Hanchett Entry Systems	
Power Supplies	Securitron	

1. The successful hardware supplier must have an architectural hardware consultant on staff.
2. The successful hardware supplier is responsible to field verify all existing doors to ensure compatibility of new hardware.

HARDWARE SET 1 - Door: 101A

3	Ea.	Hinges	BB1168 4.5 x 4.5 x US26D x NRP	HA
1	Ea.	Exit Device	8800 Series ETL x 32D	SA
1	Ea.	Closer	351CPS x EN	SA
1	Ea.	Wall Stop	232W x US32D	HA
1	Ea.	Threshold	424 x 36" x AL	NA
1	Ea.	Electric Strike	5200	HES
1	Ea.	Power Supply	BPS-12-1	SEC

Balance of Hardware to be provided in Aluminum Entrance System Package

Note: Doors shall be equipped with door contacts. Coordinate with Security Contractor.

HARDWARE SET 2 - Door: 101B

3	Ea.	Hinges	BB1168 4.5 x 4.5 x US26D	HA
1	Ea.	Lever Lockset	8205 LNL x 26D	SA
1	Ea.	Closer	351CPS x EN	SA

HARDWARE SET 3 - Door: 102, 105A, 109, 125B

12	Ea.	Hinges	BB1279 4.5 x 4.5 x US26D	HA
3	Ea.	Lever Lockset	8205 LNL x 26D	SA
3	Ea.	Wall Stop	232W x US32D	HA

HARDWARE SET 4 - Door: 103, 105B

6	Ea.	Hinges	BB1279 4.5 x 4.5 x US26D	HA
2	Ea.	Lever Lockset	8204 LNL x 26D	SA

HARDWARE SET 5 - Door: 104A, 111A, 112A, 112B, 127

15	Ea.	Hinges	BB1279 4.5 x 4.5 x US26D	HA
5	Ea.	Lever Lockset	8205 LNL x 26D	SA
5	Ea.	Closer	351CPS x EN	SA
5	Ea.	Wall Stop	232W x US32D	HA
5	Ea.	Kick Plate	190S 8" x 34" x US32D	HA

HARDWARE SET 6 - Door: 104B

3	Ea.	Hinges	BB1279 4.5 x 4.5 x US26D	HA
1	Ea.	Lever Lockset	8205 LNL x 26D	SA
1	Ea.	Wall Stop	232W x US32D	HA

HARDWARE SET 7 - Door: 106, 122

6	Ea.	Hinges	BB1279 4.5 x 4.5 x US26D	HA
2	Ea.	Locksets	8265 x VN1 x V20 x L x 32D	SA
2	Ea.	Wall Stop	232W x US32D	HA

HARDWARE SET 8 - Door: 107, 113

6	Ea.	Hinges	BB1279 4.5 x 4.5 x US26D	HA
2	Ea.	Lever Lockset	8205 LNL x 26D	SA
2	Ea.	Floor Stop	241F x US32D	HA

HARDWARE SET 9 - Door: 110

3	Ea.	Hinges	BB1279 4.5 x 4.5 x US26D	HA
1	Ea.	Lever Lockset	8204 LNL x 26D	SA
1	Ea.	Wall Stop	232W x US32D	HA

HARDWARE SET 10 - Door: 111B, 112D

6	Ea.	Hinges	BB1168 4.5 x 4.5 x US26D x NRP	HA
2	Ea.	Lever Lockset	8205 LNL x 26D	SA
2	Ea.	Closer	351CPS x EN	SA
2	Ea.	Threshold	424 x 36" x AL	NA
2	Ea.	Electric Strike	5200	HES
2	Ea.	Power Supply	BPS-12-1	SEC

Balance of Hardware to be provided in Aluminum Entrance System Package

Note: Doors shall be equipped with door contacts. Coordinate with Security Contractor.

HARDWARE SET 11 – Door: 111C, 112C, 114A, C103C

16	Ea.	Hinges:	BB1279 4.5 x 4.5 x US26D	HA
4	Ea.	Lever Lockset	8205 LNL x 26D	SA
4	Ea.	Lever Lockset	8294 LNL x 26D	SA
(with template #4298, to accept latchbolt from active door)				
4	Ea.	Closer	4041 x AL	LC
4	Ea.	Flush Bolts	282D x US26D	HA
4	Ea.	Dustproof Strike	280X x US26D	HA
4	Ea.	Kick Plate	190S 8" x 34" x US32D	HA

HARDWARE SET 12 – Door: 114B

3	Ea.	Hinges	BB1279 4.5 x 4.5 x US26D x NRP	HA
1	Ea.	Lever Lockset	8205 LNL x 26D	SA
1	Ea.	Closer	351CPS x EN	SA
1	Ea.	Threshold	424 x 36" x AL	NA

Balance of Hardware to be provided in Aluminum Entrance System Package

Note: Doors shall be equipped with door contacts. Coordinate with Security Contractor.

HARDWARE SET 13 - Door: 118A, 120, 121, C103A

12	Ea.	Hinges	BB1168 4.5 x 4.5 x US26D	HA
4	Ea.	Closer	351CPS x EN	SA
4	Ea.	Wall Stop	232W x US32D	HA
4	Ea.	Push	49L	HA
4	Ea.	Pull	9L	HA
4	Ea.	Kick Plate	190S 8" x 34" x US32D	HA

HARDWARE SET 14 - Door: 118B

3	Ea.	Hinges	BB1168 4.5 x 4.5 x US26D	HA
1	Ea.	Closer	351CPS x EN	SA
1	Ea.	Push	49L	HA
1	Ea.	Pull	9L	HA
1	Ea.	Kick Plate	190S 8" x 34" x US32D	HA

HARDWARE SET 15 - Door: 119, 123A, 123B

9	Ea.	Hinges	BB1279 4.5 x 4.5 x US26D	HA
3	Ea.	Lever Lockset	8204 LNL x 26D	SA

HARDWARE SET 16 – Door: 124B, 124C, 124E

9	Ea.	Hinges:	BB1168 4.5 x 4.5 x US26D NRP	HA
3	Ea.	Lever Lockset	8205 LNL x 26D	SA
3	Ea.	Closer	4041 x AL	LC
3	Ea.	Kick Plate	190S 8" x 34" x US32D	HA
3	Ea.	Threshold	424 x 36" x AL	NA
3	Ea.	Door Sweep	102 VA x 36"	NA
3	Ea.	Weatherstrip	700 NA 1 x 36" + 2 x 84"	NA

HARDWARE SET 17 – Door: 124H

3	Ea.	Hinges:	BB1168 4.5 x 4.5 x US26D NRP	HA
1	Ea.	Lever Lockset	8205 LNL x 26D	SA
1	Ea.	Closer	4041 x AL	LC
1	Ea.	Kick Plate	190S 8" x 34" x US32D	HA
1	Ea.	Threshold	424 x 36" x AL	NA
1	Ea.	Door Sweep	102 VA x 36"	NA
1	Ea.	Weatherstrip	700 NA 1 x 36" + 2 x 84"	NA
1	Ea.	Electric Strike	5200	HES
1	Ea.	Power Supply	BPS-12-1	SEC

HARDWARE SET 18 - Door: C101

3	Ea.	Hinges	BB1168 4.5 x 4.5 x US26D	HA
1	Ea.	Lever Lockset	8205 LNL x 26D	SA
1	Ea.	Closer	4041 x AL	LC
1	Ea.	Wall Stop	232W x US32D	HA

HARDWARE SET 19 – Door: C103B, 128D, 128E

9	Ea.	Hinges:	BB1279 4.5 x 4.5 x US26D NRP	HA
3	Ea.	Lever Lockset	8205 LNL x 26D	SA
3	Ea.	Closer	4041 x AL	LC
3	Ea.	Kick Plate	190S 8" x 34" x US32D	HA
3	Ea.	Threshold	424 x 36" x AL	NA
3	Ea.	Door Sweep	102 VA x 36"	NA
3	Ea.	Weatherstrip	700 NA 1 x 36" + 2 x 84"	NA

HARDWARE SET 20 – Door: 128A, 128H

6	Ea.	Hinges:	BB1168 4.5 x 4.5 x US26D NRP	HA
2	Ea.	Lever Lockset	8205 LNL x 26D	SA
2	Ea.	Closer	4041 x AL	LC
2	Ea.	Kick Plate	190S 8" x 34" x US32D	HA
2	Ea.	Threshold	424 x 36" x AL	NA
2	Ea.	Door Sweep	102 VA x 36"	NA
2	Ea.	Weatherstrip	700 NA 1 x 36" + 2 x 84"	NA
2	Ea.	Electric Strike	5200	HES
2	Ea.	Power Supply	BPS-12-1	SEC

HARDWARE SET 21 – Door: C103D

8	Ea.	Hinges:	BB1279 4.5 x 4.5 x US26D	HA
1	Ea.	Lever Lockset	8205 LNL x 26D	SA
1	Ea.	Lever Lockset	8294 LNL x 26D	SA
(with template #4298, to accept latchbolt from active door)				
2	Ea.	Closer	4041 x AL	LC
1	Ea.	Flush Bolts	282D x US26D	HA
1	Ea.	Dustproof Strike	280X x US26D	HA
2	Ea.	Kick Plate	190S 8" x 34" x US32D	HA

HARDWARE SET 22 – Door: 128I, 128K, 128L

9	Ea.	Hinges:	BB1279 4.5 x 4.5 x US26D	HA
3	Ea.	Lever Lockset	8205 LNL x 26D	SA
3	Ea.	Closer	4041 x AL	LC
3	Ea.	Kick Plate	190S 8" x 34" x US32D	HA

END OF SECTION 08700

SECTION 08 80 00 - GLASS AND GLAZING

A. SCOPE OF WORK

1. Furnish and install float glass, of the types and at the locations indicated on the drawings, including but not limited to the following:
 - a. Insulated Glass for Storefront Framed Windows - See Section 08 41 13.
 - b. Interior glass for Interior Borrow Lights and Vision Panels.

B. STANDARDS

1. American National Standard Institute (ANSI).
2. American Society for Testing Materials (ASTM).
3. Flat Glass Marketing Association (FGMT).
4. Ohio Building Code (OBC).
5. Underwriters Laboratories (UL).
6. Manufacturer's published glazing recommendations.

C. REFERENCES

1. ANSI Z 97.1 - Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test.
2. ASTM C 1036 - Standard Specification for Flat Glass.
3. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.
4. ASTM C 1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
5. ASTM E 773 - Standard Test Method for Accelerated Weathering of Sealed Insulating Glass Units.
6. ASTM E 774 - Standard Specification for the Classification of the Durability of Sealed Insulating Glass Units.
7. ASTM E 2188 - Standard Test Method for Insulating Glass Unit Performance.
8. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
9. CPSC 16CFR-1201 - Safety Standard for Architectural Glazing Materials.
10. Glass Association of North America (GANA) Glazing Manual.

D. DEFINITIONS

1. Sealed Insulating Glass Unit Surfaces:
 - a. Surface No. 1: Exterior surface of outer lite.
 - b. Surface No. 2: Interior surface of outer lite.
 - c. Surface No. 3: Exterior surface of inner lite.
 - d. Surface No. 4: Interior surface of inner lite.
 - e. Airspace: Space between lites of an insulating glass unit that contains dehydrated air or other inert specified gas.

E. SUBMITTALS

1. Product Data: Manufacturer's specifications, including performance characteristics, and installation instructions for each type of glass and glazing material specified, and spacers and compressible filler rod.
2. Shop Drawings: Submit manufacturer's or fabricator's shop drawings, including plans, elevations, sections, and details, indicating glass dimensions, tolerances, types, thicknesses, and coatings.
3. Samples:
 - a. Glass: 12 x 12 inch pieces for each type of glass specified.
 - b. Color Samples for Glazing Materials: Manufacturer's standard colors.
4. Fabricator's Certification: Submit fabricator's certification by manufacturer.
5. Quality Control Submittals:

- a. Test Reports: Certified test data to sufficiently substantiate glass or glass assembly compliance with requirements specified.
- 6. Warranty: Submit manufacturer's standard warranty for sealed insulating glass units.

F. QUALITY ASSURANCE

- 1. Manufacturer's Qualifications: Minimum of 5 years experience manufacturing specified glass type(s).
- 2. Fabricator's Qualifications: Minimum of 5 years experience manufacturing insulating glass units meeting ASTM E 2190, Class CBA.
 - a. Certified by manufacturer.

G. DELIVERY, STORAGE, AND HANDLING

- 1. Delivery:
 - a. Deliver glass to site in accordance with manufacturer's instructions.
 - b. Deliver glass in manufacturer's or fabricator's original containers and packaging, with labels clearly identifying product name and manufacturer.
- 2. Storage:
 - a. Store glass in accordance with manufacturer's instructions.
 - b. Store glass in clean, dry area indoors.
 - c. Protect from exposure to direct sunlight and freezing temperatures.
 - d. Apply temporary coverings loosely to allow adequate ventilation.
 - e. Protect from contact with corrosive chemicals.
 - f. Avoid placement of glass edge on concrete, metal, and other hard objects.
 - g. Rest glass on clean, cushioned pads at 1/4-points.
- 3. Handling:
 - a. Handle glass in accordance with manufacturer's instructions.
 - b. Protect glass from damage during handling and installation.
 - c. Do not slide 1 lite of glass against another.
 - d. Do not use sharp objects near unprotected glass.

H. PRODUCTS AND MANUFACTURERS

- 1. Double-Glazed Sputter-Coated Insulating Glass Units: Standard Specified: Guardian Industries SN 68
 - a. Conformance: ASTM E 2190, Class CBA.
 - b. Outboard Lite: Clear float glass.
 - 1. Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
 - 2. Glass Thickness: 6 mm (1/4 inch).
 - 3. Heat-Treatment:
 - a. Heat-strengthened, ASTM C 1048, Kind HS.
 - b. Tempered; ASTM C 1048, Kind FT; CPSC 16CFR-1201; ANSI Z 97.1.
 - c. Air Space: 12 mm (1/2 inch) wide, hermetically sealed, dehydrated air space.
 - d. Inboard Lite: Sputter-coated Low-E clear float glass.
 - 1. Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
 - 2. Vacuum Deposition Sputtered Coating: ASTM C 1376.
 - 3. Coating on Surface No. 3.
 - 4. Glass Thickness: 6 mm (1/4 inch).
 - 5. Heat Treatment:
 - a. Heat-strengthened, ASTM C 1048, Kind HS.
 - b. Tempered; ASTM C 1048, Kind FT; CPSC 16CFR-1201; ANSI Z 97.1.
 - e. Glass Unit Performance Characteristics:
 - 1. Visible Light Transmittance: 68 percent
 - 2. Visible Light Reflectance Outdoors: 11 percent

3. Direct Solar Energy Transmittance: 33 percent
4. Direct Solar Energy Reflectance Outdoors: 32 percent
5. Winter U-Value Nighttime: 0.29
6. Summer U-Value Daytime: 0.28
7. Shading Coefficient: 0.43
8. Solar Heat Gain Coefficient: 0.38
9. Summer Relative Heat Gain: 90
- f. Edge Seals: ASTM E 773, with aluminum spacers and silicone sealant for glass-to-spacer seals.
- g. Sealant: Approved by glass manufacturer.
3. Interior glass at vision panels: 1/4" clear tempered plate safety glass.
4. Acceptable Manufacturers:
 - a. AFG
 - b. Ford Glass
 - c. Guardian Industries Corp.
 - d. Libby-Owens-Ford Co.
 - e. PPG
5. Glazing Materials:
 - a. Silicone sealant: FS FF-S001543, Class A; non-acid type, except acid type if channel surfaces are porous.

I. EXAMINATION

1. The glazing contractor shall examine the framing or glazing channel surfaces, backing, removable stop design, and the conditions under which the glazing is to be performed, and notify the Architect in writing, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the glazing until all unsatisfactory conditions have been corrected in a manner acceptable to the glazing contractor.

J. PREPARATION

1. Verify glazing openings are correct size and within tolerance.
2. Verify glazing channels, recesses, and weeps are clean and free of obstructions.

K. INSTALLATION OF GLASS

1. General: Except as otherwise indicated, comply with glass manufacturer's instructions, glazing materials manufacturer's instructions, and "Glazing Manual" by FGMA and other technical publications of recognized authorities in the industry. Install each piece to achieve watertight and airtight performance, and to minimize breakage.
 - a. Clean channel surfaces and prime as recommended by sealant manufacturer.
 - b. Cut glass to size required for measured opening; provide adequate edge clearance and glass bit all around. Cut prior to tempering or strengthening, if any, and prior to fabrication into insulating glass units, if any.
 - c. Do not install sheets which have significant edge damage or other defects.
 - d. Install setting blocks at quarter points. Set in a bed of sealant if heel-bead is used.
 - e. Install spacers inside and out, all around, wherever liquid or plastic/mastic compounds are used.
 - f. Do not leave voids in the glazing channel.
 - g. Replace glass which is broken or damaged prior to the time of acceptance.
 - h. Required Performance: Each piece of exterior glass must be airtight and watertight, and without glass breakage through normal weather/temperature cycles and through normal door/window operations.

L. FIELD QUALITY CONTROL

1. Coated glass, when viewed from minimum of 10 feet, exhibiting slightly different hue or color not apparent in hand samples, will not be cause of rejection of glass units, as determined by Architect.
2. Verify glass is free of chips, cracks, and other inclusions that could inhibit structural or aesthetic integrity.

L. CLEANING

1. Clean glazing in accordance with manufacturer's instructions. Use only procedures and cleaning agents approved by glazing manufacturer.
2. Remove excess glazing compounds.
3. Remove labels and protective masking paper.
4. Wash both faces of glazing.
5. Remove debris from the premises.

M. PROTECTION

1. Protect installed glass from damage during construction.
2. Protect installed glass from contact with contaminating substances resulting from construction operations.
3. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents, and vandalism.

END OF SECTION 08 80 00

SECTION 09 21 16 – GYPSUM BOARD ASSEMBLIES

A. DESCRIPTION OF WORK

1. The extent of the gypsum drywall is shown on the Drawings and in schedules and is hereby defined to include gypsum board work with a tape-and-compound joint treatment system known as "drywall finishing" work.
2. The types of work required include the following:
 - a. Gypsum drywall including screw-type metal support system.
 - b. Drywall finishing (joint tape-and-compound treatment).
 - c. See drawings for limits of drywall installation and limits of other installations of finishes.

B. QUALITY ASSURANCE

1. Where work is indicated for fire-resistance ratings, including those required to comply with governing regulations, provide materials and installations identical with applicable assemblies which have been tested and listed to be recognized authorities.
2. Comply with applicable requirements of GA-216 "Application and Finishing of Gypsum Board" by the Gypsum Association, except where more detailed or more stringent requirements are indicated, including the recommendations of the manufacturer.
3. 1/8" offsets between planes of board faces and 1/4" in 8'-0" for plumb, level, warp, and bow.
4. Obtain gypsum boards, trim accessories, adhesives, and joint treatment products from a single manufacturer or from manufacturers recommended by the prime manufacturer of gypsum boards.

C. SUBMITTALS

1. For information only, submit two copies of manufacturer's product Specifications and installation instructions for each gypsum drywall component, including other data as may be required to show compliance with these Specifications. Distribute an additional copy of each installation instruction to the installer.

D. PRODUCT HANDLING

1. Deliver gypsum drywall materials in sealed containers and bundles, fully identified with manufacturer's name, brand, type, and grade. Store in a dry, well ventilated space, protected from the weather, under cover and off the ground.

E. JOB CONDITIONS

1. Installer must examine the substrates and the spaces to receive gypsum drywall and the conditions under which gypsum drywall is to be installed and shall notify the Contractor, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
2. Maintain ambient temperatures at not less than 55 degrees F for the period of 24 hours before drywall finishing, during installation, and until compounds are dry.

F. PRODUCTS

1. Metal Support Materials:
 - a. To the extent not otherwise indicated, comply with Gypsum Association Specification GA – 203 "Installation of Screw-Type Steel Framing." Members to receive gypsum board (as specified and recommended), for metal system supporting gypsum drywall work.
 - b. Drywall Suspension System: Armstrong Contract Interiors – Drywall System.
 1. Hangers shall be 3/8" threaded steel rods. Include all fasteners and accessories.
 - c. Studs: 1-1/2 x 3-5/8 steel as furnished under Carpentry, except as otherwise indicated.

- d. Runners: Match studs, type recommended by stud manufacturer for floor and ceiling support of studs and for vertical abutment of drywall work at other work.
- e. Stud System Accessories: Provide stud manufacturer's standard clips, shoes, ties, reinforcements, fasteners, and other accessories as needed for a complete stud system. Horizontal reinforcement shall be provided as per manufacturer's published recommendations for height of various assemblies.
- f. Fasteners: Type and size recommended by furring manufacturer for the substrate and application indicated.
- g. Screw-type metal stud framing is to be designed to support all dead and live loads.
- 2. Gypsum Board Products: To the extent not otherwise indicated, comply with GA-216 as specified and recommended:
 - a. Fiber Reinforced Gypsum Board – Provide at all locations except where noted otherwise.
 - 1. Manufacturer: Standard Specified: Abuse Resistant VHI Firecode X, as manufactured by USG.
 - a. Acceptable Manufacturers:
 - 1. BPB America, Inc.
 - 2. Georgia Pacific Gypsum
 - 3. National Gypsum Co.
 - 4. U.S. Gypsum
 - 2. Provide products that meet or exceed the requirements of ASTM C1278 and physical properties of ASTM C36.
 - 3. Panel Thickness: 5/8" with tapered edges.
 - b. Gypsum Wall Board: Type "X" (fire- resistive) gypsum drywall with tapered long edges.
 - 1. Sheet Size: Maximum length available which will minimize end joints.
 - 2. Thickness: 5/8" except where otherwise indicated.
 - 3. Manufacturers:
 - a. BPB America, Inc.
 - b. Georgia Pacific Gypsum
 - c. National Gypsum Co.
 - d. U.S. Gypsum
- 3. Trim Accessories:
 - a. Manufacturer's standard galvanized steel beaded units with flanges for concealment in joint compound, including corner beads, edge trim, and control joints; except provide semi-finishing type (flange not concealed) where indicated.
- 4. Joint Treatment Materials:
 - a. ASTM C475, type recommended by the manufacturer for the application indicated, except as otherwise indicated.
 - b. Joint Tape: Perforated type.
 - c. Joint Compound: Ready-mixed vinyl type for interior use.
- 5. Miscellaneous Material:
 - a. Provide auxiliary materials for gypsum drywall work of the type and grade recommended by the manufacturer of the gypsum board.
 - b. Gypsum Board Fasteners: Comply with GA-216.
 - c. Concealed Acoustical Sealant: Mastic type, non-shrinking, non-drying, non-migrating, and non-staining.
 - d. Exposed Acoustical Sealant: Latex, acrylic, or acrylic-latex type, permanently elastic and paintable.
 - e. Sound Insulation: See Division 7 – Insulation.

G. EXECUTION

- 1. Installation of metal support systems:
 - a. To the extent not otherwise indicated, comply with GA-216 and manufacturer's instructions.

- b. Install supplementary framing, runners, furring, blocking, and bracing at opening and terminations in the work and at locations required to support fixtures, equipment, services, heavy trim, furnishings, and similar work which cannot be adequately supported directly on gypsum board alone.
- 2. General Gypsum Board Installation Requirements:
 - a. Meet at the project site with the installers of related work and review the coordination and sequencing of work to ensure that everything to be concealed by gypsum drywall has been accomplished and that chases, access panels, openings, supplementary framing and blocking, and similar provisions have been completed.
 - b. Install sound insulation if indicated, prior to gypsum board.
 - c. Install wall/partition boards vertically to avoid end-butt joints wherever possible. At high walls, install boards horizontally with end joints staggered over studs.
 - d. Space fasteners in gypsum boards in accordance with GA-216 and manufacturer's recommendations, except as otherwise indicated.
- 3. Installation of Drywall Trim Accessories:
 - a. Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges by nailing or stapling in accordance with manufacturer's instructions and recommendations.
 - b. Install metal corner beads to external corners of drywall work.
 - c. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed.
- 4. Installation of Drywall Finishing: Comply with ASTM C 840 and GA-216 for Level 5 finish for all gypsum board exposed to view.
 - a. Apply treatment at gypsum board joints (both directions, flanges, of trim accessories, penetration, fastener heads, surface defects, and elsewhere as required to prepare work for decoration). Prefill open joints and rounded or beveled edges, using type of compound recommended by manufacturer.
 - b. Apply joint tape at between gypsum boards, except where a trim accessory is indicated.
 - c. Apply joint compound in three coats (not including prefill of openings in base) and sand between last two coats and after last coat.
 - d. Refer to other section for decorative finishes to be applied to drywall work.

H. PROTECTION OF WORK

- 1. Installer shall advise contractor of required procedures for protection of the gypsum drywall work from damage and deterioration during the remainder of the construction period.

END OF SECTION 09 21 16

SECTION 09 22 16 – NON-STRUCTURAL METAL FRAMING

A. RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. SUMMARY

1. This Section includes the following:
 - a. Wall Studs.
 - b. Bracing, fasteners, and related accessories for light-gauge, load-bearing metal elements.
2. Related Sections include the following:
 - a. Division 5 Section "Structural Steel" for masonry shelf angles and connections.
 - b. Division 5 Section "Steel Deck" for metal decking.
 - c. Division 6 Section "Carpentry" for wall sheathing or roof sheathing using wood-based products.
 - d. Division 7 for insulation, roof deck assemblies, shingles, and metal roofing.

C. DEFINITIONS

1. Minimum Uncoated Steel Thickness: Minimum uncoated thickness of cold-formed framing delivered to the Project site shall be not less than 95 percent of the thickness used in the cold-formed framing design. Lesser thicknesses shall be permitted at bends due to cold forming.
2. Producer: Entity that produces steel sheet coil fabricated into cold-formed members.

D. PERFORMANCE REQUIREMENTS

1. Structural Performance: Where cold-formed metal framing sizes are not indicated on drawings, provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
 - a. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
 1. Upward and downward movement of 1/2 inch.

E. SUBMITTALS

1. Product Data: For each type of cold-formed metal framing product and accessory indicated.
2. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining Work.
 - a. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
3. Mill certificates signed by steel sheet producer [or test reports from a qualified independent testing agency] indicating steel sheet complies with requirements.
4. Welding Certificates: Copies of certificates for welding procedures and personnel.
5. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
6. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:
 - a. Power-actuated anchors.

- b. Mechanical fasteners.
 - c. Vertical deflection clips.
 - d. Miscellaneous structural clips and accessories.
7. Research/Evaluation Reports: Evidence of cold-formed metal framing's compliance with The Ohio Building Code.

F. QUALITY ASSURANCE

1. Installer Qualifications: An experienced installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
2. Engineering Responsibility: Engage a qualified professional engineer to prepare design calculations, Shop Drawings, connection details, and other structural data.
3. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.
4. Mill certificates signed by steel sheet producer [or test reports from a qualified independent testing agency] indicating steel sheet complies with requirements, including uncoated steel thickness, yield strength, tensile strength, total elongation, chemical requirements, [ductility,] and galvanized-coating thickness.
5. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
6. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
7. AISI Specifications: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members" for calculating structural characteristics of cold-formed metal framing.
 - a. CCFSS Technical Bulletin: "AISI Specification Provisions for Screw Connections."
8. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

G. DELIVERY, STORAGE, AND HANDLING

1. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
2. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

H. MANUFACTURERS

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allied American Studco, Inc.
 - b. Angeles Metal Systems.
 - c. California Expanded Metal Products Co.
 - d. California Metal Systems, Inc.
 - e. Clark Steel Framing Industries.
 - f. Consolidated Fabricators Corp.
 - g. Consolidated Systems, Inc.
 - h. Dale Industries, Inc.
 - i. Design Shapes in Steel.
 - j. Dietrich Industries, Inc.

- k. Knorr Steel Framing Systems.
- l. MarinoWare; Div. of Ware Industries, Inc.
- m. Steel Construction Systems.
- n. Unimast, Inc.
- o. United Metal Products, Inc.

I. MATERIALS

- 1. Comply with ASTM C955-00.
- 2. Steel Sheet: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
 - a. Grade: 40 (yield point 40,000 psi) for units 16-gauge and heavier. Grade: 33 (yield point 33,000 psi) for units 18-gauge and lighter.
 - b. Coating: Galvanized ASTM A525 [G60].

J. WALL STUDS

- 1. Steel Studs: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, complying with ASTM C 955, and as follows:
 - a. Minimum Uncoated-Steel Thickness: As indicated on drawings.
 - b. Flange Width: As indicated on drawings.
 - c. Section Properties: As indicated on drawings.

K. FRAMING ACCESSORIES

- 1. Fabricate steel-framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33,000 psi (230 MPa).
- 2. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 - a. Supplementary framing.
 - b. Bracing, bridging, and solid blocking.
 - c. Web stiffeners.
 - d. End clips.
 - e. Gusset plates.
 - f. Stud kickers, knee braces, and girts.
 - g. Joist hangers and end closures.
 - h. Hole reinforcing plates.
 - i. Backer plates.

L. ANCHORS, CLIPS, AND FASTENERS

- 1. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123.
- 2. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel headless, hooked bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.
- 3. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- 4. Mechanical Fasteners: Corrosion-resistant-coated, self-drilling, self-threading steel drill screws.
 - a. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- 5. Welding Electrodes: Comply with AWS standards.

M. MISCELLANEOUS MATERIALS

- 1. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035.

2. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration or premixed, non-metallic, non-corrosive, non-staining grout containing selected silica sands, Portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.

N. FABRICATION

1. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.
 - a. Fabricate framing assemblies using jigs or templates.
 - b. Cut framing members by sawing or shearing; do not torch cut.
 - c. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
 1. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 2. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
 - d. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.
2. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
3. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
 - a. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - b. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

O. EXAMINATION

1. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

P. PREPARATION

1. Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting concrete or masonry construction.

Q. INSTALLATION, GENERAL

1. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
2. Install cold-formed metal framing according to ASTM C 1007, unless more stringent requirements are indicated.
3. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - a. Bolt or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).
4. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.

- a. Cut framing members by sawing or shearing; do not torch cut.
- b. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
 1. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 2. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
 3. Reinforce connections and attachments with fasteners in direct tension (pull out) with minimum 0.0538 inch – 16-gauge cover plates.
5. Install framing members in one-piece lengths, unless splice connections are indicated for track or tension members.
6. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
7. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
8. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
9. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
 - a. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

R. FIELD QUALITY CONTROL

1. Remove and replace Work that does not comply with specified requirements.

S. REPAIRS AND PROTECTION

1. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
2. Protect paper-surfaced gypsum sheathing that will be exposed to weather for more than 30 days by covering exposed exterior surface of sheathing with a securely fastened air-infiltration barrier. Apply covering immediately after sheathing is installed.
3. Protect cutouts, corners, and joints in sheathing by filling with a flexible sealant or by applying tape recommended by sheathing manufacturer at time sheathing is applied.
4. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 22 16

SECTION 09 32 13 - TILE WORK

A. DESCRIPTION OF WORK

1. The extent of tile work is shown on the Drawings and in schedules. The work generally includes all floor paving and wall tile work, including preparation and accessories.

B. RELATED SECTIONS

1. Section 04 20 00 – Unit Masonry
2. Section 07 92 00 – Joint Sealants

C. REFERENCES

1. ANSI A108.1A, 1999 - Specifications for Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar.
2. ANSI A108.1B, 1999 - Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
3. ANSI A108.1C, 1999 - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar -or- Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
4. ANSI A108.4, 1999 - Specifications for Ceramic Tile Installed with Organic Adhesives or Water-Cleanable Tile Setting Epoxy Adhesive.
5. ANSI A108.5, 1999 - Specifications for Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
6. ANSI A108.6, 1999 - Specifications for Ceramic Tile Installed with Chemical-Resistant, Water-Cleanable Tile-Setting and -Grouting Epoxy.
7. ANSI A108.9, 1999 - Specifications for Ceramic Tile Installed with Modified Epoxy Emulsion Mortar/Grout.
8. ANSI A108.10, 1999 - Specifications for Installation of Grout in Tilework.
9. ANSI A118.1, 1999 - Standard Specification for Dry-Set Portland Cement Mortar.
10. ANSI A118.3, 1999 - Chemical-Resistant, Water-Cleanable, Tile-Setting and -Grouting Epoxy and Water-Cleanable Tile-Setting Epoxy Adhesive.
11. ANSI A118.4, 1999 - Latex-Portland Cement Mortar.
12. ANSI A118.6, 1999 - Standard Ceramic Tile Grouts.
13. ANSI A118.7, 1999 - Polymer Modified Cement Grouts.
14. ANSI A118.8, 1999 - Modified Epoxy Emulsion Mortar/Grout.
15. ANSI A118.9, 1999 - Test Methods and Specifications for Cementitious Backer Units
16. ANSI A118.10, 1999 - Load bearing, Bonded, Waterproof Membranes for Thinset Ceramic Tile and Dimensional Stone.
17. ANSI A136.1, 1999 - Organic Adhesives for Installation of Ceramic Tile.
18. ANSI A137.1, 1988 - Specifications for Ceramic Tile.
19. ASTM C50 - Standard Specification for Portland Cement.
20. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
21. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
22. ASTM C847 - Standard Specification for Metal Lath.
23. ASTM C1028 - Test method for Determining the Static Coefficient of Friction on Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull meter Method.
24. ASTM D4397 - Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
25. TCA (HB) - Handbook for Ceramic Tile Installation; Tile Council of America, Inc.

D. SUBMITTALS

1. Submit under provisions of Section 01 33 00.

2. Manufacturer's data sheets on each product to be used, including:
 - a. Preparation instructions and recommendations.
 - b. Storage and handling requirements and recommendations.
 - c. Installation methods.
3. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
4. Selection Samples: Samples of actual tiles for selection.
5. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
6. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

E. QUALITY ASSURANCE

1. Furnish tile conforming with Standard Grade requirements of ANSI A 137.1.
2. When using setting and grouting material manufactured under TCA license, include identification together with formula on each container.
3. Provide materials obtained from only one source for each type and color of tile, mortar, adhesive and grout.
4. Handle, store, mix, and apply all materials in compliance with manufacturer's instructions.
5. Installer Qualifications: Company specializing in performing the work of this section with minimum 10 years experience.

F. PERFORMANCE REQUIREMENTS

1. Static Coefficient of Friction: Tile on walkway surfaces shall be provided with the following values as determined by testing in conformance with ASTM C 1028.
 - a. Level Surfaces: Minimum of 0.6 (Wet).
 - b. Step Treads: Minimum of 0.6 (Wet).
 - c. Ramp Surfaces: Minimum of 0.8 (Wet).

F. DELIVERY AND STORAGE

1. Deliver packaged materials and store in original containers with seals unbroken and labels intact until time of use, in accordance with manufacturer's instructions.
2. Protect adhesives and liquid additives from freezing or overheating in accordance with manufacturer's instructions.
3. Store tile and setting materials on elevated platforms, under cover and in a dry location and protect from contamination, dampness, freezing or overheating.

G. ENVIRONMENTAL REQUIREMENTS

1. Do not install adhesives in an unventilated environment.
2. Maintain ambient and substrate temperature of 50 degrees F (10 degrees C) during installation of mortar materials.

H. MATERIALS

1. General: Provide tile that complies with ANSI A137.1 for types, compositions and other characteristics indicated. Provide tile in the locations and of the types colors and pattern indicated on the Drawings, and specified herein. Tile shall also be provided in accordance with the following:
 - a. Factory Blending: For tile exhibiting color variations within the ranges selected under Submittal of samples, blend tile in the factory and package so tile taken from one package shows the same range of colors as those taken from other packages.
 - b. Mounting: For factory mounted tile, provide back or edge mounted tile assemblies as standard with the manufacturer, unless otherwise specified.
 - c. Factory Applied Temporary Protective Coatings: Where indicated under tile type, protect exposed

surfaces of tile against adherence of mortar and grout by precoating with a continuous film of petroleum paraffin wax applied hot. Do not coat unexposed tile surfaces.

2. Floor Tiles:
 - a. Floor Tile 1: Daltile – “Keystones” 1” x 1” Mosaic Tile. Colors: As selected by Architect.
3. Ceramic Wall Tile:
 - a. Daltile Classic “Color Wheel” Ceramic Wall Tile
 - b. Polished Finish
 - c. Price Group 2.
 - d. Tile Base:, 6” x 6” Coved Base; color to be selected by Architect.
 - e. Wall Tile: 6” x 6” Ceramic Tile; color to be selected by Architect.
 - f. Wall Tile Trim: 2” x 6” Bullnose Ceramic Tile; color to be selected by Architect.
4. Setting Materials:
 - a. Mortar: Standard multi-purpose polymer modified thinset mortar, complying with ANSI A 118.4.
 - b. Grout: Sanded, Group I, Latex fortified. Color as selected by Architect.
5. Grout sealer: Provide and apply grout manufacturer’s recommended standard water-based penetrating sealer for all grout surfaces. Sealant shall be resistant to all water based stains.

I. EXAMINATION

1. Installer must examine the areas and conditions under which tile work is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
2. Verify that wall surfaces are free of substances which would impair bonding of setting materials, smooth and flat within tolerances specified in ANSI A137.1, and are ready to receive tile.
3. Verify that sub-floor surfaces are dust-free, and free of substances which would impair bonding of setting materials to sub-floor surfaces, and are smooth and flat within tolerances specified in ANSI A137.1.
4. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

J. PREPARATION

1. Protect surrounding work from damage.
2. Remove any curing compounds or other contaminants.
3. Vacuum clean surfaces and damp clean.
4. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
5. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.
6. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

K. INSTALLATION

1. General
 - a. Install tile and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCA Handbook recommendations. Maintain minimum temperature limits and installation practices as recommended by proprietary mortar and grout materials manufacturer.
 - b. Lay tile to pattern indicated. Arrange pattern so that a full tile or joint is centered on each wall and that no tile less than 1/2 width is used. Do not interrupt tile pattern through openings.
 - c. Extend tile work into recesses and under equipment and fixtures to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges, and corners without disruption of pattern or joint alignments. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

- d. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
- e. Form internal angles square and external angles bullnosed.
- f. Install thresholds where indicated, or where intended for material transitions.
- g. Sound tile after setting. Replace hollow sounding units.
- h. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
- i. Allow tile to set for a minimum of 48 hours prior to grouting.
- j. Grout tile joints. Use standard grout unless otherwise indicated.
- k. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.
- 2. Installation – Floors, Thin-set Method
 - a. Over interior concrete substrates, install in accordance with TCA Handbook Method F113, latex-portland cement bond coat, with standard grout, unless otherwise indicated.
- 3. Installation – Wall Tile
 - d. Over interior concrete and masonry install in accordance with TCA Handbook Method W202, thin-set with latex-portland cement bond coat.

L. CLEANING AND PROTECTION OF FINISHED WORK

- 1. Clean all tile and grout surfaces in accordance with manufacturer's written instructions. Use only products recommended by manufacturer for types of surfaces to be cleaned.
- 2. Do not permit traffic over finished floor surface for 72 hours after installation.
- 3. Cover floors with kraft paper and protect from dirt and residue from other trades.
- 4. Where floor will be exposed for prolonged periods cover with plywood or other similar type walkways.
- 5. Leave finished installation clean and free of cracked shipped, broken, unbonded, or otherwise defective tile work.

END OF SECTION 09 32 13

SECTION 09 51 13 – ACOUSTICAL CEILING SYSTEM

A. SUMMARY

1. Section Includes:
 - a. Acoustical ceiling panels.
 - b. Exposed grid suspension system.
 - c. Wire hangers, fasteners, main runners, cross tees, wall angle moldings, and hold-down clips.
2. Related Sections:
 - a. Section 09 21 16 - Gypsum Board Assemblies
 - b. Divisions 22 and 24 - Mechanical Work
 - c. Division 26 Sections - Electrical Work
3. Substitutions
 - a. Requests shall be in accordance with Division 1.

B. REFERENCES

1. American Society for Testing and Materials (ASTM):
 - a. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 - b. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - c. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
 - d. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - e. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - f. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
 - g. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - h. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.
 - i. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems.
 - j. ASTM E 1264 Classification for Acoustical Ceiling Products.
 - k. ASTM E 1477 Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
 - l. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
 - m. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material.
2. ASHRAE Standard 62.1-2004, "Ventilation for Acceptable Indoor Air Quality"

C. SUBMITTALS

1. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
2. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.
3. Shop Drawings: Layout and details of acoustical ceilings. Show locations of items which are to be coordinated with, or supported by the ceilings.
4. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

5. If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

D. QUALITY ASSURANCE

1. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.
2. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - a. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.
 1. Flame Spread: 25 or less
 2. Smoke Developed: 50 or less
 - b. Fire Resistance Ratings: As indicated by reference to design designations in UL Fire Resistance Directory, for types of assemblies in which acoustical ceilings function as a fire protective membrane and tested per ASTM E 119.
 1. Protect lighting fixtures and air ducts to comply with requirements indicated for rated assembly.

E. DELIVERY, STORAGE, AND HANDLING

1. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
2. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
3. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

F. PROJECT CONDITIONS

1. Space Enclosure:
 - a. All ceiling products and suspension systems must be installed and maintained in accordance with manufacturer's written installation instructions for that product in effect at the time of installation and best industry practice. Prior to installation, the ceiling product must be kept clean and dry, in an environment that is between 32oF (0o C) and 120oF (49o C) and not subject to abnormal conditions. Abnormal conditions include exposure to chemical fumes, vibrations, moisture from conditions such as building leaks or condensation, excessive humidity, or excessive dirt or dust buildup.
 - b. Standard Ceilings: Do not install interior ceilings until space is enclosed and weatherproof; wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are continuously maintained at values near those intended for final occupancy. Building areas to receive ceilings shall be free of construction dust and debris.

G. WARRANTY

1. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
 - a. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.
 - b. Grid System: Rusting and manufacturer's defects
 - c. Acoustical Panels designated as inherently resistive to the growth of micro-organisms: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.

2. Warranty Period:
 - a. Acoustical panels: Ten (10) years from date of substantial completion.
 - b. Grid: Ten years from date of substantial completion.
 - c. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is thirty (30) years from date of substantial completion.
3. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

H. MAINTENANCE

1. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
 - a. Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.
 - b. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 5.0 percent of amount installed.

I. MANUFACTURERS / PRODUCTS

1. Acoustical Ceiling Tile Panels - 2 x 4
 - a. Surface Texture: Medium
 - b. Composition: Mineral Fiber
 - c. Color: White
 - d. Size: 24 in X 48 in
 - e. Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton, 0.55.
 - f. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton, 35
 - g. Flame Spread: ASTM E 1264; Class A (UL)
 - h. Light Reflectance (LR): ASTM E 1477; White Panel: Light Reflectance: 0.84.
 - i. Dimensional Stability: Temperature is between 32°F (0° C) and 120°F (49° C). It is not necessary for the area to be enclosed or for HVAC systems to be functioning. All wet work (plastering, concrete, etc) must be complete and dry.
 - j. Antimicrobial Protection: Resistance against the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.
 - k. Acceptable Products:
 1. Armstrong Contract Interiors – Angled Tegular Lay-in “Fine Fissured” #1733
2. Suspension Systems:
 - a. Components: All main beams and cross tees shall be commercial quality hot-dipped galvanized (galvanized steel, aluminum, or stainless steel) as per ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping pre-finished galvanized steel (aluminum or stainless steel) in baked polyester paint. Main beams and cross tees shall have rotary stitching (exception: extruded aluminum or stainless steel).
 1. Structural Classification: ASTM C 635 Intermediate Duty.
 2. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
 3. Acceptable Products:
 - a. Prelude XL 15/16" Exposed Tee as manufactured by Armstrong World Industries, Inc.
 - b. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
 - c. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least time three design load, but not less than 12 gauge.
 - d. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations, including light fixtures, that

fit type of edge detail and suspension system indicated. Provide moldings with exposed flange of the same width as exposed runner.

J. EXAMINATION

1. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

K. PREPARATION

1. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.
2. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
 - a. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

L. INSTALLATION

1. Install suspension system and panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.
2. Suspend main beam from overhead construction with hanger wires spaced 4'-0" on center along the length of the main runner. Install hanger wires plumb and straight.
3. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.
4. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

M. ADJUSTING AND CLEANING

1. Replace damaged and broken panels.
2. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 65 13 - RUBBER WALL BASE

A. SUMMARY

1. Section Includes: Resilient Rubber Wall Base.

B. RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

C. SUBMITTALS

1. Product Data: For each type of product indicated.
2. Samples for Initial Selection: For each type of product indicated.
3. Samples for Verification: For each type of product indicated, in manufacturer's standard-size samples of each resilient product color, texture, and pattern required.

D. DELIVERY, STORAGE, AND HANDLING

1. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by Johnsonite, but not less than 55 deg F or more than 85 deg F.

E. PROJECT CONDITIONS

1. Install resilient products after other finishing operations, including painting, have been completed.
2. Maintain ambient temperatures within range recommended by Johnsonite, but not less than 65 deg F or more than 85 deg F in spaces to receive resilient products during the following time periods:
 - a. 48 hours before installation.
 - b. During installation.
 - c. 48 hours after installation.
3. Maintain the ambient relative humidity between 40% and 60% during installation.
4. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 85 deg F.

F. RESILIENT WALL BASE

1. Traditional Rubber Wall Base, 1/8" thick, as manufactured by Johnsonite.
 - a. Style DC – (with toe).
 - b. Height – See Drawings.
 - c. Length – Coils for seamless installation.
 - d. Color as selected by Architect.
2. Manufactured from a proprietary thermoplastic rubber formulation.
3. Meets performance requirements for ASTM F 1861 Standard Specification for Resilient Wall Base, Type TP, Group 1.
4. ASTM E 648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm² or greater, Class I.
5. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials, Class A, Smoke <450.
6. Flexibility: Does not crack, break, or show any signs of fatigue when bent around a 1 1/4" diameter cylinder when tested according to ASTM F 137 Standard Test Method for Flexibility of Resilient Flooring Materials protocols.
7. Color Stability: Meets or exceeds ASTM F 1861 requirements for color stability when tested to ASTM F 1515 Standard Test Method for Measuring Light Stability of Resilient Flooring protocols.

G. INSTALLATION MATERIALS

1. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based formulation manufactured and warranted by a reputable manufacturer.
2. Adhesives: as recommended by manufacturer to meet site and substrate conditions.

H. EXAMINATION

1. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
2. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

I. PREPARATION

1. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient wall base.
2. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
3. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
4. Vacuum clean substrates to be covered by resilient products immediately before installation.

I. INSTALLATION

1. Comply with manufacturer's written instructions for installing resilient base.
2. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
3. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
4. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
5. Do not stretch resilient base during installation.
6. Job-formed corners:
 - a. Outside corners: Form by bending without producing discoloration (whitening) at bends.
 - b. Inside corners: Butt one piece to corner then scribe next piece to fit.

J. CLEANING AND PROTECTION

1. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
2. Perform the following operations immediately after completing resilient product installation:
 - a. Remove adhesive and other blemishes from exposed surfaces.
 - b. Damp-mop surfaces to remove marks and soil.
3. Protect resilient products from marks, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

M. MAINTENANCE

1. Do not perform manufacturer's recommended maintenance procedures until adhesive has fully cured, no sooner than 72 hours after installation.
2. Use only cleaning products recommended by the manufacturer.
3. Protect installed product from damage and construction operations and inspect immediately before final acceptance of project.

END OF SECTION 09 65 13

SECTION 09 65 19 - RESILIENT RUBBER TILE FLOORING

A. SUMMARY OF WORK

1. Furnish and install resilient rubber tile flooring.

B. RELATED SECTIONS:

1. Other Specification Sections which directly relate to the work of the section include, but are not limited to, the following:
 - a. Concrete: Refer to Division 3 Concrete sections for cast-in-place concrete, concrete underlayments, slab surface tolerances, vapor barrier for applications on or below grade.

C. REFERENCES (Industry Standards)

1. American Society for Testing and Materials (ASTM)
 - a. ASTM D-2047 - Static coefficient of friction.
 - b. ASTM D-2240 - Material hardness.
 - c. ASTM D-2859 - Test method for flammability of finished textile floor covering materials.
 - d. ASTM D-3389 - Resistance to tabor abrasion using H-18 wheels, 500 gram load, at 1,000 cycles.
 - e. ASTM E-492 - Test method for noise reduction (impact insulation class).
 - f. ASTM E-662 - Test method for specific density of smoke generated by solid materials.
 - g. ASTM F-710 - Practice for preparing concrete floors and other monolithic floors to receive resilient flooring.
 - h. ASTM F-925 - Test method for resistance to chemicals.
 - i. ASTM F-970 - Test method for static load limit.
 - j. ASTM F-1344 - Standard specification for rubber floor tile.
 - k. ASTM F-1514 - Test method for measuring heat stability.
 - l. ASTM F-1515 - Test method for measuring light stability.
 - m. ASTM F-1860 - Standard specification for rubber sheet flooring with backing.
 - n. ASTM F-1861 - Standard specification for resilient wall base.
 - o. ASTM F-1914 - Test method for measuring residual indentation.
2. National Fire Protection Association (NFPA)
 - a. NFPA 253 - Test method for critical radiant flux of floor covering systems using a radiant energy source.
 - b. NFPA 255 - Test method of surface burning characteristics of building materials (Steiner Tunnel Test).
 - c. NFPA 258 - Test method for specific density of smoke generated by solid materials.
3. Other references
 - a. Americans with Disabilities Act - ADA.
 - b. American National Standards Institute – ANSI
 - c. ANSI - A117.1-1986 - Tactile Surface.

D. SUBMITTALS

1. Product Data: Submit manufacturer's product data, installation instructions, and maintenance recommendations for each material proposed for use.
2. Samples: Submit verification samples of each product specified in color selected for use.
3. Certificates: Attesting fire rated materials tested by independent testing agency and comply with specifications.
4. Material Safety Data Sheets (MSDS): Submit MSDS for each manufacturer's recommended adhesive proposed for use.

E. QUALITY ASSURANCE

1. Manufacturer: Provide resilient flooring manufactured by a firm with a minimum of 10 years experience in the production of resilient flooring of types equivalent to those specified. Manufacturers proposed for

use, which are not named in the Section, shall submit evidence of ability to meet performance requirements specified not less than 10 days prior to bid date.

- a. Color Matching: Provide resilient flooring products, including wall base and accessories, from one manufacturer to ensure color matching.
- b. Manufacturer capable of providing field service representation.
2. Installer's Qualifications: Installer experienced (minimum of 5 years) to perform work of this Section, who has specialized in the installation of work similar to that required for this project and who is acceptable to the product manufacturer.
3. Materials: For each type of material required for the work of this Section, provide primary materials, which are the products of one manufacturer. Provide secondary materials, which are acceptable to the manufacturer of the primary materials. Comply with applicable regulations regarding VOC (volatile organic compound) content of the adhesives.

F. DELIVERY, STORAGE AND HANDLING

1. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's recommendations. Protect from damage due to weather, excessive temperatures, and construction operations.
2. Deliver materials sufficiently in advance of installation to condition materials to room temperature prior to installation.

G. PROJECT CONDITIONS

1. Install resilient products after other finishing operations, including painting, have been completed.
2. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 85 deg F in spaces to receive resilient products during 48 hours prior to, during, and 48 hours after installation.
3. Maintain the ambient relative humidity between 40% and 60% during installation.
4. Until Substantial Completion, maintain ambient temperatures within range recommended by the manufacturer.

H. WARRANTY

1. Provide manufacturer's standard one-year warranty against defects in manufacturing and workmanship of resilient flooring products. Warranty shall commence at time of building substantial completion.

I. PRODUCTS

1. Resilient Rubber Tile Flooring: Standard Specified: MICROTONE Hammered Texture Speckled Rubber Tile, as manufactured by Johnsonite.
 - a. Complies with requirements for ASTM F 1344 Standard Specification for Rubber Floor Tile, Class 1-B.
 - b. Manufactured from a homogeneous composition of 100% synthetic rubber.
 - c. Overall thickness: 1/8"
 - d. Tile size: 24" x 24".
 - e. ASTM D 2240 Standard Test Method for Rubber Property—Durometer Hardness: Not less than 85 Shore A.
 - f. ASTM D 3389 Standard Test Method for Coated Fabrics Abrasion Resistance: < 1.00 gram weight loss.
 - g. ASTM D 2047, Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring: Exceeds Federal Standards and A.D.A. requirements for slip-resistant.
 - h. ASTM F 970, Standard Test Method for Static Load Limit – passes at 250 PSI.
 - i. ASTM E 648, Standard Test method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source – Class 1.
 - j. Phthalate, chlorine and halogen free.

- k. NSF-332 Gold Certified.
- l. Manufacturer's facilities are ISO 9001 and ISO 14001 Certified.

J. INSTALLATION MATERIALS

- 1. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic-cement-based formulation.
- 2. Adhesives: As recommended by manufacturer to meet site conditions.

K. EXAMINATION

- 1. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
- 2. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- 3. Proceed with installation only after unsatisfactory conditions have been corrected.

L. PREPARATION

- 1. Prepare substrates according to manufacturer's written instructions to ensure adhesion of Resilient Tile Flooring.
- 2. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
- 3. Remove substrate paint, coatings and other substances that are incompatible with adhesives or contain soap, wax, oil, solvents, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- 4. Mechanically remove contamination on the substrate that may cause damage to the resilient flooring material. Permanent and non-permanent markers, pens, crayons, paint, etc., must not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and stain the flooring material.
- 5. Prepare Substrates according to ASTM F 710 including the following:
 - a. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 1. Perform anhydrous calcium chloride test, ASTM F 1869. Results must not exceed 5 lbs. Moisture Vapor Emission Rate per 1,000 sq. ft. in 24 hours. –OR–
 - 2. Perform relative humidity test using in situ probes, ASTM F 2170. Must not exceed 80%.
 - b. A pH test for alkalinity must be conducted. Results should range between 7 and 9. If the test results are not within the acceptable range of 7 to 9, the installation must not proceed until the problem has been corrected.
 - c. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
 - d. The floor must be rigid, free of movement.
- 6. Fill cracks, holes, depressions and irregularities in the substrate with good quality Portland cement based underlayment leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- 7. Do not install resilient products until they are same temperature as the space where they are to be installed. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- 8. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

M. INSTALLATION

- 1. Install resilient flooring in accordance with manufacturer's printed installation instructions. Comply with the following:
 - a. Dry lay resilient flooring to provide equal size at perimeter. Adjust layout as necessary to eliminate resilient flooring which is cut to less than half full width.

- b. Dry lay resilient flooring with arrows in same direction and running parallel.
- c. Inspect dry laid installation and verify color match and any defects present. If color match is not correct or defects are present, do not proceed with the installation.
- d. Install resilient flooring without cracks or voids at seams. Lay seams together without stress.
- e. Extend resilient flooring into closets, alcoves, and similar openings.
- f. Install reducer mouldings at exposed edges.
- g. Do not install resilient flooring over building expansion joints.
- h. Do not install damaged or defective resilient flooring.
- i. Remove adhesive residue immediately, before it dries.

N. MAINTENANCE

- 1. Do not perform manufacturer's recommended maintenance procedures until adhesive has fully cured, no sooner than 72 hours after installation.
- 2. Use only cleaning products recommended by the manufacturer.
- 3. Protect installed product from damage and construction operations and inspect immediately before final acceptance of project.

O. CLEANING AND PROTECTION

- 1. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- 2. Perform the following operations immediately after completing resilient product installation:
 - a. Remove adhesive and other blemishes from exposed surfaces.
 - b. Sweep and vacuum surfaces thoroughly.
 - c. Damp-mop surfaces to remove marks and soil.
- 3. Protect resilient products from marks, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- 4. No traffic for 24 hours after installation.
- 5. No heavy traffic, rolling loads, or furniture placement for 72 hours after installation.
- 6. Wait 72 hours after installation before performing initial cleaning.

END OF SECTION 09 65 19

SECTION 09 91 23 – PAINTING

A. WORK INCLUDED

1. The work under this section includes the furnishing of all labor, material, equipment, appliances, and tools to perform the work indicated on the Drawings or specified herein including, but not limited to the following:
 - a. Painting
 - b. Preparation of surfaces for painting.

B. WORK EXCLUDED

1. The following listed work is included under other sections:
 - a. Shop coat on miscellaneous iron and steel.
 - b. Factory finish on exterior metal.
 - c. Prime coat on new hollow metal work shall be furnished under the Hollow Metal Section.

C. REFERENCES

1. Society for Protective Coatings (SSPC)
 - a. SSPC-SP 1 - Solvent Cleaning
 - b. SSPC-SP 2 - Hand Tool Cleaning
 - c. SSPC-SP 3 - Power Tool Cleaning
 - d. SSPC-SP 7 – Brush-off Blast Cleaning
2. Environmental Protective Agency (EPA)
 - a. EPA-Method 24
3. American Society of Testing and Materials (ASTM)
 - a. ASTM D3960-04 Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
 - b. ASTM D6886 - Test Method for Speciation of the Volatile Organic Compounds (VOCs) in Low VOC Content Waterborne Air-Dry Coatings by Gas Chromatography.

D. SUBMITTALS

1. Submit under provisions of General Conditions and Division 1.
2. Product Data: Manufacturer's data sheets on each paint and coating product to be used, including:
 - a. Product characteristics.
 - b. Preparation instructions and recommendations.
 - c. Primer requirements and recommendations.
 - d. Storage and handling requirements and recommendations.
 - e. Application methods.
 - f. Cautions, VOC's.
3. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and sheens.

E. QUALITY ASSURANCE

1. VOC Content: Determine VOC (Volatile Organic Compound) content of solvent borne and waterborne paints and related coatings in accordance with EPA Method 24 or ASTM D3960.

F. DELIVERY, STORAGE AND HANDLING

1. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information:
 - a. Product name, and type (description)
 - b. Application & use instructions

- c. Surface preparation
 - d. VOC content
 - e. Environmental issues
 - f. Batch date
 - g. Color number/name
2. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
 3. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

G. MATERIALS

1. All finished materials, thinners, etc., shall be the best quality, first line materials as manufactured by:
 - a. Benjamin Moore
 - b. The Glidden Company
 - c. Harrison Paint Co.
 - d. ICI Dulux
 - e. Pittsburgh Paints - PPG
 - f. Pratt and Lambert, Inc.
 - g. The Sherwin-Williams Company
2. All paint materials shall be delivered to the job in the manufacturer's original unopened labeled containers, and they shall be used strictly in accordance with the manufacturer's directions.
3. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such a procedure is specifically described in manufacturer's product instructions. VOC numbers used in this document need to be confirmed by using the products MSDS sheets.

H. APPLICATIONS/SCOPE

1. Scope: Use products specified in this section to finish ALL interior and exterior surfaces exposed to view, unless otherwise indicated; DO NOT PAINT THE FOLLOWING:
 - a. Items specified or provided with factory finish; materials and products having factory-applied primer are not considered factory finished.
 - b. Items indicated to receive other finishes.
 - c. Items indicated to remain unfinished.
 - d. Marble, granite, slate, and other natural stones.
 - e. Brick, concrete, cast stone.
 - f. Glass.
 - g. Stainless steel, anodized aluminum, bronze.
 - h. Equipment nameplates, fire rating labels, and operating parts of equipment.
 - i. Concealed pipes, ducts, and conduits.
2. Exterior Surfaces to be Painted:
 - a. Hollow metal doors and frames.
3. Interior Surfaces to be Painted:
 - a. Hollow metal doors and frames.
 - b. Gypsum board walls and ceilings, concrete masonry walls, soffits, bulkheads, and column enclosures.
 - c. Bare metal, primed metal, and galvanized metal – all metal exposed to view, regardless of location, including, but not limited to, columns, beams, joists, deck, purlins and girts.
 - d. Pipes, ducts, conduits, hangers and supports, equipment, and equipment enclosures exposed to view in all rooms and spaces.
 - e. Access panels and equipment cabinets.

4. Colors: To be selected by Architect from manufacturer's full range of available colors. See item J below.

I. EXTERIOR AND INTERIOR PAINT SPECIFICATIONS

1. If these Specifications conflict with the recommendations of the manufacturer, this discrepancy shall be brought to the attention of the Architect, to decide which method shall be followed.
2. Raw linseed oil, turpentine, benzine, gloss oil, or coal oil shall not be used in any of the materials for interior work. Any thinner used shall be subject to the provisions stated above.
3. All Surfaces To Be Painted, Unless Otherwise Specified:
 - a. Concrete Masonry Surfaces (Semi-Gloss): (Lower Odor/Low VOC Vinyl Acrylic Latex System)
 1. Primer: Waterborne Vinyl Acrylic Block Filler - (16 mils wet, 8 mils dry)
 2. Two (2) Finish Coats: Waterborne Vinyl Acrylic Semi-Gloss (4 mils wet, 1.6 mils dry per coat)
 - b. Concrete Masonry Surfaces (Semi-Gloss): (Lower Odor/Low VOC Epoxy System)
 1. Primer: Waterborne Epoxy Block Filler - (16 mils wet, 8 mils dry)
 2. Two (2) Finish Coats: Waterborne Semi-Gloss Catalyzed Epoxy - (2.5 - 3 mils dry per coat)
 - c. Metal – Ferrous (Semi-Gloss): (Lower Odor/Low VOC Waterborne Acrylic Latex System)
 1. Primer: Waterborne Acrylic Metal Primer - (5-10 mils wet, 2-4 mils dry)
 2. Two (2) Finish Coats: Waterborne Acrylic Latex, Semi-Gloss - (4 mils wet, 1.4 mils dry per coat)
 3. Surfaces: Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous & Ornamental Iron, Structural Iron, Ferrous Metal.
 - d. Exposed Architectural Steel – Ferrous (Satin): (Lower Odor/Low VOC Acrylic Waterborne System)
 1. Preparation as specified by manufacturer.
 2. Primer: Waterborne Acrylic Metal Primer - (5-10 mils wet, 2-4 mils dry)
 3. Finish Coats: Satin: 2 coats Acrylic Waterborne Dry-Fall System - (11 mils wet, 4.5 mils dry)
 4. Surfaces: Interior Overhead Steel - Including deck, panels, joists, structural members, ducts, piping, louvers.
 - e. Exposed Architectural Steel – Galvanized (Satin): (Lower Odor/Low VOC Acrylic Waterborne System)
 1. Prepare and clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP7 is necessary to remove these treatments.
 2. Primer: Waterborne Acrylic Metal Primer - (5-10 mils wet, 2-4 mils dry)
 3. Finish Coats: Satin: 2 coats Acrylic Waterborne Dry-Fall System - (11 mils wet, 4.5 mils dry)
 4. Surfaces: Interior Overhead Galvanized Steel - Including deck, panels, ducts.
 - f. Gypsum Board (Egg-Shell): (Lower Odor/Low VOC Acrylic Latex System)
 1. Primer: Vinyl Acrylic Latex - (4 mils wet, 1.3 mils dry per coat)
 2. Two (2) Finish Coats: Modified Alkyd Egg-Shell - (4 mils wet, 1.6 mils dry per coat)
 3. Surfaces: Ceilings and bulkheads.
 - g. Gypsum Board (Semi-Gloss): (Lower Odor/Low VOC Acrylic Latex System)
 1. Primer: Vinyl Acrylic Latex - (4 mils wet, 1.5 mils dry per coat)
 2. Two (2) Finish Coats: Vinyl Acrylic Semi-Gloss - (4 mils wet, 1.6 mils dry per coat)
 3. Surfaces: Gypsum Wallboard Walls
 - h. Gypsum Board (Semi-Gloss): (Lower Odor/Low VOC Epoxy System)
 1. Primer: Waterborne Epoxy Primer - (4 mils wet, 1.5 mils dry per coat)
 2. Two (2) Finish Coats: Waterborne Catalyzed Epoxy Semi-Gloss - (2.5 - 3 mils dry per coat)

J. COLOR SAMPLES

1. Colors will be selected by the Architect from the manufacturer's standard colors. Final colors must match exactly with the approved sample.
2. Colors shall be chosen by Architect for each of the following surfaces:
 - a. Exterior steel doors and frames.
 - b. Interior steel doors and frames.
 - c. Interior steel structure, joists and deck.
 - d. Interior C.M.U.
 - e. Gypsum drywall walls, ceilings, bulkheads and soffits.
 - f. Louvers and Vents
 - g. Handrails, guards and steel stair components
 - h. Plumbing, Mechanical and Electrical equipment and access panels.
3. In rooms or spaces where exposed roof deck and steel joists are scheduled to be painted, joist and deck may be scheduled to receive different colors. Exposed ductwork and diffusers may be scheduled to be painted different colors than the exposed deck. Conduit and piping to be painted to match adjacent wall or roof deck.
4. Contractor shall include in his Base Bid, the following sample paint areas:
 - a. Four (4) wall sample paint colors – 50 square feet each. Colors shall be selected by Architect.
 - b. Three (3) ceiling sample paint colors – 50 square feet each. Colors shall be selected by Architect.

K. STORAGE

1. Store materials where directed by the Architect. Oily rags, waste and empty cans shall be removed from the building each night. They shall not be kept in unventilated rooms, and they shall not be permitted to accumulate.
2. Proper fire extinguishers shall be placed near storage area.

L. PROJECT CONDITIONS

1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits. This specification does not take into consideration wet areas or areas needing high performance coatings.

M. EXAMINATION

1. Do not begin application of coatings until substrates have been properly prepared. Notify Architect of unsatisfactory conditions before proceeding.
2. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
3. Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

N. PROTECTIONS

1. Before applying any paint, cover and protect all finished surfaces and equipment with clean drop cloths or with heavy gauge visqueen as directed. All surfaces or equipment discolored or otherwise damaged under this section, shall be repaired or replaced at no expense to the Owner.
2. Place "fresh paint" signs in conspicuous places at all unguarded points where fresh or undried paint occurs.
3. Use no plumbing fixture or pipe whatsoever for disposing of waste or mixed materials.

O. PREPARATION

1. Painting Contractor shall provide adequate light in all areas of painting.

2. All coats to be applied at proper temperature, in accordance with coating manufacturer's printed recommendations.
3. All surfaces to receive finish coatings shall be prepared in accordance with coating manufacturer's printed recommendations, including methods of cleaning and acceptable surface conditions.
4. Do not apply to wet or damp surfaces.
 - a. Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days.
5. Unpainted and shop coated steel and iron shall be washed clean with Pratt and Lambert Duosol Reducer. Remove any rust which may have formed and spot prime.
6. Galvanized metal shall be cleaned thoroughly with Pratt and Lambert Duosol.
7. Drywall imperfections shall be spackled and sanded smooth. Nail holes, splits or scratches shall be puttied or spackled smooth after the prime coat.
8. The Painting Contractor is completely responsible for the satisfactory condition of his finished work. He shall notify the Architect if he considers any surface unsuitable for a proper finish. The starting of work by this Contractor will be considered as evidence that all surfaces are acceptable to him.

P. INSTALLATION/WORKMANSHIP

1. No exterior painting shall be done in rainy or freezing weather and no painting shall be done in dirty or dusty surrounding.
2. Mix and thin coatings according to manufacturer's printed recommendations.
3. All work shall be done by skilled mechanics. Paint shall be brushed, rolled or sprayed, then immediately rolled on walls.
4. All materials shall be applied and cut in neatly so as to dry uniformly to the color and sheen specified, free from runs, sags, wrinkles, shiners, streaks, and brush marks.
5. All materials shall be applied in accordance with the manufacturer's printed directions. Minimum drying time between coats shall be as specified by the manufacturer.
6. Paint top and bottom edges of all doors the same as the vertical surfaces after hardware and doors are fitted.
7. Dark Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
8. Protect finished coatings from damage until completion of project.
9. Touch-up damaged coatings after substantial completion, following manufacture's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.
10. This Contractor shall remove all paint spots, rags, and discarded material from the areas in which he has been conducting his work and shall leave these spaces clean and orderly.

END OF SECTION 09 91 23

SECTION 10 14 16 - CAST PLAQUES

A. SUMMARY

1. Related Documents: Provisions established within the General and Supplementary Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.
2. Section Includes: Cast metal plaques.

B. QUALITY ASSURANCE

1. Supplier: Obtain all products in this section from a single supplier.
2. Installer: Installation shall be performed by installer specialized and experienced in work similar to that required for this project.

C. SUBMITTALS

1. Submit in accordance with requirements of Division 1.
2. Product Data: Submit product data for specified products. Include material details for each sign specified.
3. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including dimensions, anchorage, and accessories.
4. Samples: Submit supplier's standard color chart for selection purposes and selected colors for verification purposes.
5. Installation: Submit supplier's installation instructions.
6. Closeout Submittals:
 - a. Submit operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods.
 - b. Submit warranty documents specified herein.

D. DELIVERY, STORAGE, AND HANDLING

1. Comply with requirements of Division 1.
2. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
3. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
4. Store products protected from weather, temperature, and other harmful conditions as recommended by supplier.
5. Handle products in accordance with manufacturer's instructions.

E. WARRANTY

1. Project Warranty: Comply with requirements of Division 1.
2. Manufacturer's Warranty: Submit manufacturer's standard warranty document executed by authorized company official.
 - a. Warranty Period: One year from product ship date.

F. CAST PLAQUES

1. Acceptable Manufacturers:
 - a. A.R.K. Ramos
 - b. ASI Sign Systems
 - c. Gemini Incorporated
 - d. Metal Arts
2. Product: Cast Bronze Plaques.

G. FABRICATION

1. General: Cast free from pits, gas holes, and warped surfaces.
2. Cast Plaque:
 - a. Material: Bronze.
 - b. Size: 24" X 36"
 - c. Border: Raised single line.
 - d. Letter Style: See Drawings
 - e. Mounting: Blind stud mount.
 - f. Artwork and Copy: See Drawings
 - g. Finishes:
 1. Background: Pebble, Standard Bronze
 2. Borders, letters, and raised artwork: Satin.

H. EXAMINATION

1. Site Verification of Conditions: Verify installation conditions previously established under other sections are acceptable for product installation in accordance with manufacturer's instructions.
2. Scheduling of installation implies that substrate and conditions are prepared and ready for product installation. Proceeding with installation implies installer's acceptance of substrate and conditions.

I. INSTALLATION

1. Install product in accordance with supplier's instructions.
2. Install product in locations indicated using mounting methods recommended by sign manufacturer and free from distortion, warp, or defect adversely affecting appearance.
3. Install product level, plumb, and at heights indicated.
4. Install product at heights to conform to Americans with Disabilities Act Accessibility Guidelines (ADAAG) and applicable local amendments and regulations.

J. CLEANING, PROTECTION, AND REPAIR

1. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 3 feet.
2. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project in accordance with provisions in Division 1.

END OF SECTION 10 14 16

SECTION 10 21 13 - TOILET PARTITIONS

A. SUMMARY

1. Furnish, deliver and install all Toilet Partitions as indicated on the drawings and as required by actual conditions at the building. The Toilet Partitions shall include the furnishing of all necessary screws, special screws, bolts, special bolts, expansion shields and all other devices necessary for the proper installation and application of the Toilet Partitions.

B. REFERENCES

1. All toilet partitions must be scheduled, supplied and installed in accordance with:
 - a. Ohio Building Code
 - b. ANSI (American National Standards Institute)
 - c. ADA (Americans with Disabilities Act)
2. In all cases the above references shall be taken to mean the latest edition of that particular standard including all revisions.

C. SUBMITTALS

1. Provide all submittals in accordance with Section 01 30 00.
2. Shop Drawings: Submit PDF file of detailed shop drawings for the Architect's review.
3. Product Data: Submit PDF file of product sheets and/or catalogue cuts, of all products listed in the shop drawings.
4. Samples: Submit (3) sets of actual samples of metal and finish colors for Architect's selection and verification. Include all samples in manufacturer's complete range of colors.
5. Operations and Maintenance Data: At completion of the job, furnish to the General Trades Prime Contractor, complete Owners Operation and Maintenance Manual information, in quantities specified for inclusion in Project Manual, to be provided to the Owner.

D. QUALITY ASSURANCE

1. Supplier Qualifications: Toilet Partition shop drawings and Toilet Partitions shall be procured from a single source. Supplier is responsible for the complete Toilet Partition subcontract.

E. DELIVERY, STORAGE AND HANDLING

1. Toilet Partitions shall be delivered to the job site in the manufacturers' original packages and marked to correspond with the approved shop drawings.
2. Toilet Partitions shall be delivered at appropriate time, in proper sequence of construction activities, as coordinated with the General Trades Prime Contractor.

F. WARRANTY

1. The Toilet Partition manufacturer shall guarantee all Solid Plastic Toilet Partitions by written certification, for a period of (25) years from date of certified substantial completion of the project, against breakage, delamination, and corrosion of solid plastic parts. Warranty is for manufacturer's material only and does not include installation errors, improper usage or vandalism. Any defects as described will be replaced by the manufacturer at no additional cost to the owner.

G. MAINTENANCE

1. Upon request, at completion of the project, the Toilet Partition supplier may be required to brief Owner's maintenance staff regarding proper care of Toilet Partitions, such as: required lubrications, adjustments, cleaning, etc.

H. MANUFACTURERS

1. Provide solid plastic toilet partitions as manufactured by one of the following:
 - a. ASI Global Partitions
 - b. Comtec Industries
 - c. General Partitions Manufacturing Company
 - d. Hadrian Inc.
 - e. Metpar Corporation
 - f. The Mills Company

I. PRODUCTS

1. Construction: Doors, panels and pilasters shall be certified CLASS B polyethylene or 100% post-consumer recycled polyethylene solid plastic. The material shall contain no foaming agents, which can cause the formation of air pockets. The self-lubricating surface is resistant to marking and can be maintained effectively with ordinary household cleaners. Material is ideal for toilet partition installations, especially in high abuse and high moisture environments.
2. Doors: Shall be 1" thick by 55" high straight cut with fine radius edges.
3. Panels: Shall be 1" thick by 55" high straight cut with fine radius edges.
4. Pilasters: Shall be 1" thick by 82" high straight cut with fine radius edges.
5. Headrail: Shall be 1.25" by 1.75" extruded anodized aluminum with anti-grip design. Wall thickness to be 0.060" and shall be securely attached to wall and pilasters with manufacturer's fittings in such a way as to make a rigid installation. All joints in headrails shall be made at a pilaster.
6. Hardware and Fittings: Doors are installed with 1/8" thick heavy extruded clear anodized aluminum hinges, which wrap around both the door and pilaster. Hinges are fastened to door and pilaster with tamper-proof 6-lobe security head stainless steel thru-bolts and fastened to the edge of the door and pilaster with a #10 x 1" screw. Top hinges have adjustable nylon cams. Strike-keeper and throw latch are extruded clear anodized aluminum. Three heavy-duty aluminum brackets are used at the panel to wall connection and a full-height continuous aluminum channel is used at the panel to pilaster connection. Inswing doors shall be fitted with a zinc die cast, #4 brushed combined coat hook and bumper. Outswing doors shall be fitted with a #4 brushed stainless steel flat coat hook. Fasteners are theft-proof 6-lobe security head stainless steel screws. Pilasters shall be securely and rigidly fastened to the floor with 3" (76mm) high stainless steel anchor shoes.

J. FINISH

1. Doors, panels, and pilasters shall be certified CLASS B polyethylene or 100% post-consumer recycled polyethylene with uniform color throughout. Color shall be as selected from manufacturer's complete range of colors.

K. EXAMINATION

1. The contractor must examine all site conditions that would prevent the proper application and installation of Toilet Partitions. Any defect must be immediately identified and corrected, prior to the installation of the Toilet Partitions.

L. INSTALLATION

1. Install partitions rigid, straight, plumb and level in accordance with manufacturer's printed instructions. Set units with not more than 1/2" between pilasters and panels, and not more than 1" clearances between panels and walls.
2. Adjust and lubricate hardware for proper operation after installation.
 - a. Set hinges on in-swing doors to hold open approx. 30 deg. from the closed position when unlatched.
 - b. Set hinges on out-swing doors to return to fully closed position.
3. After installation has been completed, inspect all Toilet Partitions to determine that all items have been supplied and installed in accordance with the drawings and specifications. Verify the operation and

adjustment of all Toilet Partitions. Any discrepancies, or malfunctioning product, must be reported to the Architect immediately.

M. ADJUSTMENT AND CLEANING

1. At final completion, Toilet Partitions shall be left clean and free from disfigurement. Make all final adjustments. Where Toilet Partitions are found defective, repair or replace or otherwise correct as directed.

N. PROTECTION

1. The Contractor must provide for the proper protection of all Toilet Partitions until the owner accepts the project as complete.

END OF SECTION 10 21 13

SECTION 10 28 13 – TOILET ROOM ACCESSORIES

A. SUMMARY

1. Section Includes the following Toilet Room Accessories:
 - a. Grab bars. (Provided and installed by Contractor)
 - b. Mirrors. (Provided and installed by Contractor)
 - c. Soap dispensers (Provided by Owner, Installed by Contractor).
 - d. Toilet tissue dispensers. (Provided by Owner; Installed by Contractor)
 - e. Paper Towel Dispensers. (Provided by Owner; Installed by Contractor)
 - f. Shower rods and curtains. (Provided and installed by Contractor).
 - g. Hooks - Towel Hook. (Provided and installed by Contractor).
 - h. Surface Mounted Soap Dish (Provided and installed by Contractor).
2. See Drawings for locations.

B. RELATED REQUIREMENTS

1. Section 04 20 00 – Unit Masonry.
2. Section 10 21 13 - Toilet Partitions.

C. REFERENCES

1. ASTM International:
 - a. ASTM A123/A123M – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - b. ASTM A153/A153M – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Hardware.
 - c. ASTM A269 – Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for general Service.
 - d. ASTM A653/A653M – Standard Specification Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron-Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - e. ASTM A666 – Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 - f. ASTM B456 – Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - g. ASTM C1036 – Standard Specification for Flat Glass.
2. Federal Specification Unit: FS A-A-3002 – Mirrors, Glass.
3. ANSI A117- 1986 Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
4. OBC – Chapter 11, *Accessibility*.
5. ADA, *Accessibility Guidelines for Buildings and Facilities*

D. SUBMITTALS

1. Product Data: Submit manufacturer's data sheets for each product specified.
2. Sample Warranty: Submit for each product specified.

E. QUALITY ASSURANCE

1. Manufacturer: Provide products manufactured by a company with a minimum of 10 years successful experience manufacturing similar products.
2. Single Source Requirements: To the greatest extent possible provide products from a single manufacturer.
3. Accessibility Requirements: Comply with requirements applicable in the jurisdiction of the project, including but not limited to ADA and ICC/ANSI A117.1 requirements as applicable.

F. DELIVERY, STORAGE, AND HANDLING

1. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations. Protect from damage.

G. WARRANTY

1. Manufacturer's Warranty for Washroom Accessories: Manufacturer's standard warranty for materials and workmanship.
2. Mirrors: Manufacturer's 15-Year warranty against silver spoilage of mirrors.

H. MANUFACTURER

1. Standard Specified: Bobrick Washroom Equipment, Inc.
2. Acceptable Manufacturers:
 - a. Bobrick Washroom Equipment, Inc.
 - b. American Specialties, Inc.
 - c. Bradley Corp.

I. PRODUCTS

1. **Toilet Room Stainless Steel Grab Bars: With snap flange covers.**

- a. Bobrick Model B-6806 (x36; x 42; x 18)
- b. Compliance: Universal/accessibility design, including ADA-ABA and ICC/ANSI. for structural strength.
 1. Capacity: Designed to support 900 lbs in compliant installations.
- c. Description: Grab bar with 90 degree return to flange. Clearance between grab bar and finished wall is 1-1/2 inches (38mm).
- d. Grab Bar Materials: 18-8, Type 304, 18 gauge stainless steel tubing with satin finish, ends of grab bar pass through flanges and are heliarc welded to flanges to form one structural unit, outside diameter 1-1/2 inches.
- e. Mounting Flanges: Concealed, 18-8, Type 304, 1/8 inch thick, stainless steel plate.
 1. End Flanges: 2 inches x 3-1/8 inches with two holes for attachment to wall.
 2. Intermediate Flanges: 2-5/8 inches x 3-1/8 inches wide x 3-1/8 inch diameter.
- f. Snap Flange Covers: 18-8, Type 304, 22 gauge drawn stainless steel with satin finish, 3-1/4 inch diameter x 1/2 inches deep; snap over mounting flange to conceal mounting screws.
- g. Mounting Accessories: Provide mounting accessories as required for complete installation.

2. **Shower Stall Stainless Steel Grab Bars: Horizontal two-wall, with snap flange covers.**

- a. Bobrick Model B-6861 Grab Bar for 36 inch x 36 inch Shower Stall.
 1. Finish: Satin finish.
 2. Size: 15-7/8 inches x 30-7/8 inch.
 3. Diameter: 1-1/2 inches.
 4. Size: 15-7/8 inches x 30-7/8 inch.
- b. Compliance: Universal/accessibility design, including ADA-ABA and ICC/ANSI. for structural strength.
 1. Capacity: Designed to support 900 lbs in compliant installations.
- c. Description: Grab bar with 90 degree return to flange. Clearance between grab bar and finished wall is 1-1/2 inches.
- d. Grab Bar Materials: 18-8, Type 304, 18 gauge stainless steel tubing with satin finish, ends of grab bar pass through flanges and are heliarc welded to flanges to form one structural unit, outside diameter 1-1/2 inches.
- e. Mounting Flanges: Concealed, 18-8, Type 304, 1/8 inch thick, stainless steel plate.

1. End Flanges: 2 inches x 3-1/8 inches with two holes for attachment to wall.
2. Intermediate Flanges: 2-5/8 inches x 3-1/8 inches wide x 3-1/8 inch diameter.
- f. Snap Flange Covers: 18-8, Type 304, 22 gauge drawn stainless steel with satin finish, 3-1/4 inch diameter x 1/2 inches deep; snap over mounting flange to conceal mounting screws.
- g. Mounting Accessories: Provide mounting accessories as required for complete installation.

3. Stainless Steel, Welded, Angle Frame Mirrors:

- a. Bobrick Model B-290; 2436.
- b. Angle Frame:
 1. Materials: Type 304 stainless steel angle 3/4 inch x 3/4 inch (19 x19mm), with satin finish with vertical grain on exposed surfaces.
 2. Construction: One-piece, roll-formed construction with continuous integral stiffener.
 3. Design: Beveled design on front of angle to hold mirror tightly against frame; prevents exposure to sharp edges.
 4. Corners: Heliarc welded, ground, and polished smooth.
- c. Mirror:
 1. No. 1 quality, 1/4 inch float/plate glass.
 2. Edges: Protected with plastic filler strips.
 3. Back of Mirror: Protected by full-size, shock-absorbing, water-resistant, non-abrasive 3/16 inch thick polyethylene padding.
- d. Mounting: Removable, galvanized steel back with integral horizontal hanging brackets located at top and bottom for mounting on Concealed one-piece rectangular wall hanger(s); galvanized steel back fastened to frame with Concealed screws to permit glass replacement; attachment by rivets or tabs is not acceptable; Concealed Phillips head locking setscrews secure mirror to wall hanger in bottom of frame.

4. Shower Rods and Curtains

- a. Shower Curtain Hooks: Bobrick Part No. 204-1 Shower Curtain Hook.
 1. Materials: 18-8, Type 304, 0.09 inch diameter stainless steel.
 2. Operation: Can be used with 1 inch and 1-1/4 inch diameter rods.
- b. Vinyl Shower Curtains: Bobrick Model 204-2.
 1. Width: 42 inch, requires 7 hooks.
 2. Curtain: Opaque, matte white, 0.008 inch thick vinyl containing antibacterial and flame-retardant agents; hemmed bottom and sides.
 3. Grommets: Nickel-plated brass, along top edge every 6 inches.
 4. Height: 72 inches.
- c. Shower Curtain Rods: Bobrick Model B-6047 x 36.
 1. Length: 36 inches.
 2. Curtain Rod: 18-8, Type 304, 18 gauge stainless steel tubing with satin finish.
 3. Outside Diameter: 1-1/4 inches.
 4. Flanges: One-piece, die-formed, 18-8, Type 304, 20 gauge stainless steel with satin finish.

5. Towel Hooks: Bobrick Model B-983.

- a. Mounting: Secured from front.
- b. Projection from Wall: 2-1/8 inch.
- c. Faceplate: Drawn, one-piece, seamless construction 14 gauge, 18-8, Type 304 stainless steel with satin finish on exposed surfaces.
- d. Hooks: Snap down for safety if excessively loaded.
- e. Fasteners: Tamper-resistant, flat-head, hex-socket, stainless steel machine screws.

6. Surface Mounted Soap Dish: Bobrick Model B-6807

- a. One-piece stainless steel soap dish welded to support arm.
- b. 4-1/4" wide; 2" high; projects 3-3/8" from wall.
- c. One per shower stall.
- d. Location for installation to be directed in the field.

J. INSTALLATION

1. Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:
 - a. Verify blocking has been installed properly.
 - b. Verify location does not interfere with door swings or use of fixtures.
 - c. Comply with manufacturer's recommendations for backing and proper support.
 - d. Use fasteners and anchors suitable for substrate and project conditions.
 - e. Install units rigid, straight, plumb, and level, in accordance with manufacturer's installation instructions and approved shop drawings.
 - f. Conceal evidence of drilling, cutting, and fitting to room finish.
 - g. Test for proper operation.

K. CLEANING AND PROTECTION

1. Clean exposed surfaces of compartments, hardware, and fittings using methods acceptable to the manufacturer.
2. Touch-up, repair or replace damaged products until Substantial Completion.

END OF SECTION 10 28 13

SECTION 10 44 16 - PORTABLE FIRE EXTINGUISHERS

A. DESCRIPTION OF WORK

1. Furnish and install portable fire extinguishers and cabinets at locations shown on plans.

B. QUALITY ASSURANCE

1. Unless otherwise acceptable to the Architect, furnish portable fire extinguishers and accessories by only one manufacturer.
2. Provide portable fire extinguishers manufactured by one of the following:
 - a. W. D. Allen Mfg. Company
 - b. General Fire Extinguisher Corp.
 - c. Walter Kidde and Company
 - d. Larsen's Mfg. Company

C. SUBMITTALS

1. For information only, submit two copies of manufacturer's technical data and installation instructions for all portable fire extinguishers and cabinets required. Transmit copy of each instruction to the installer.

D. MATERIALS

1. Fire Extinguishers:
 - a. Provide fire extinguishers for each extinguisher cabinet and other locations as shown on the Drawings. Furnish only new fire extinguishers which are approved and labeled by Underwriter's Laboratories.
 - b. Provide colors and finishes of materials for portable fire extinguishers as selected by the Architect from manufacturer's standard.
 - c. Multipurpose dry chemical: 10 lbs. capacity, enameled steel container with pressure- indicating gauge, for Classes A, B, and C fires.
2. Fire Extinguisher Cabinets:
 - a. Provide fire extinguisher cabinets suitable for housing one of the size fire extinguishers specified above, unless otherwise indicated as follows:
 1. Semi-recessed AND Surface Mounted: 2-1/2" rolled edge trim for shallow wall installation.
 2. Box: 20 gauge.
 3. Trim frame: 18 gauge.
 4. Tubular door perimeter frame: 20 gauge.
 5. Door Panel: Bubble type, one piece molded clear plastic with catch.
 6. Construction: One piece tubular door frames, mitered and welded. One piece metal trim frame, to suit cabinet style required. Weld all joints and grind smooth. Provide manufacturer's standard steel box with white baked enamel interior finish and primed exterior finish.
 7. Steel door frame and trim: Manufacturer's standard, prime coat finished, steel door frame and trim style as specified.
 8. Door hardware: Continuous type hinge permitting door to open 180 degrees. Provide either lever handle with cam action latch, or door pull and friction latch.

E. EXECUTION

1. Installer must examine the substrate and conditions under which the fire-fighting devices are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
2. Install in locations and at mounting height to comply with governing authorities. Securely fasten to structure, square and plumb, in accordance with manufacturer's instructions.

END OF SECTION 10 44 16

SECTION 12 24 13 - WINDOW SHADES

A. SUMMARY

1. Provide all material, labor, tools and equipment necessary to furnish and install manually operated roll-up fabric interior window shades as indicated on the drawings and specified herein. Include all mounting and operating hardware.

B. RELATED SECTIONS

1. Section 06 10 0 - Rough Carpentry: Blocking for support of window shade hardware.
2. Section 07 92 00 - Joint Treatment
3. Section 09 21 16 - Gypsum Board Assemblies
4. Section 09 51 13 – Acoustical Ceiling Systems

C. REFERENCES

1. NFPA 701-99 - Fire Tests for Flame-Resistant Textiles and Films.

D. SUBMITTALS

1. General: Submit under provisions of Section 01 33 00 - Submittal Procedures.
2. Product Data: Manufacturer's data sheets on each product specified, including:
 - a. Preparation instructions and recommendations.
 - b. Installation and maintenance instructions.
 - c. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
 - d. Storage and handling requirements and recommendations.
 - e. Mounting details and installation methods.
3. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances and relationship to adjacent work.
4. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings, field verified window dimensions, quantities, type of shade, controls, fabric, and color, and include opening sizes and key to typical mounting details.
5. Selection Samples: For each finish product specified, two complete sets of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.
6. Verification Samples: For each finish product specified, two complete sets of shade components, unassembled, demonstrating compliance with specified requirements. Shade fabric sample and aluminum finish sample as selected, representing actual product, color, and patterns. Mark face of material to indicate interior faces.
7. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.
8. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

E. QUALITY ASSURANCE

1. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.
2. NFPA Flame-Test: Passes NFPA 701. Materials tested shall be identical to products proposed for use.

F. DELIVERY, STORAGE, AND HANDLING

1. Do not deliver window shades until building is enclosed and construction within spaces where shades will be installed is substantially complete.
2. Deliver products in manufacturer's original, unopened, undamaged containers with labels intact.

3. Label containers and shades according to Window Shade Schedule.
4. Store products in manufacturer's unopened packaging until ready for installation.

G. SEQUENCING

1. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
2. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

H. PROJECT CONDITIONS

1. Install roller shades after finish work and ambient temperature, humidity and ventilation conditions are maintained at levels recommended for project upon completion.

I. WARRANTY

1. Hardware and Shade Fabric: Manufacturer's standard twenty-five year limited warranty.

J. PRODUCTS

1. Standard Specified: FlexShade, as manufactured by Draper, Inc.
 - a. Manually operated, vertical roll-up, fabric window shade with components necessary for complete installation.
 1. Operation: Bead chain and clutch operating mechanism allowing shade to stop when chain is released. Designed never to need adjustment or lubrication. Provide limit stops to prevent shade from being raised or lowered too far.
 - a. Clutch mechanism: Fabricated from high carbon steel and molded fiberglass reinforced polyester or injected molded nylon.
 - b. Bead chain loop: Stainless steel bead chain hanging at side of window.
 - c. Idler Assembly: Provide roller idler assembly of molded nylon with adjustable length idler pin to facilitate easy installation, and removal of shade for service.
 2. Mounting:
 - a. Mounting brackets.
 - b. Endcaps and fascia.
 3. Roller Tube: Fabricated from extruded aluminum, galvanized steel, or enameled steel. Diameter, wall thickness, and material selected by manufacturer to accommodate shade type and size. Fabric connected to the roller tube with LSE (low surface energy) double sided adhesive specifically developed to attach coated textiles to metal. Adhesive attachment to eliminate horizontal impressions in fabric.
 4. Brackets: Plated stamped steel. Provide size compatible with roller size.
 - a. Mounted to wall.
 5. Shade slat: Slat encased in heat seamed hem.
 6. Fascia: L shaped aluminum extrusion to conceal shade roller and hardware.
 - a. Attachment: Snaps onto endcaps without requiring exposed fasteners of any kind. Fascia can be mounted continuously across two or more shade bands.
 - b. Finish: Clear anodized.
 - b. Fabric: Shear Weave SW2900 - Color as selected by Architect, unless noted otherwise.

K. EXAMINATION

1. Do not begin installation until substrates have been properly prepared.
2. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

L. INSTALLATION

1. Install in accordance with manufacturer's instructions.
2. Install roller shades level, plumb, square, and true. Allow proper clearances for window operation hardware.

M. TESTING AND DEMONSTRATION

1. Demonstrate operation of shades to Owner's designated representatives.

N. PROTECTION

1. Protect installed products until completion of project.
2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 12 24 13

SECTION 21 05 01

BASIC FIRE SUPPRESSION REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. All work of Division 21 is subject to the General Conditions, Supplementary Conditions, Instructions to Bidders, and Division 01 - General Requirements for the entire project. Contractor shall refer to these sections elsewhere in the project manual for exact requirements and details.
- B. The contractor shall be responsible for providing a complete operational Fire Suppression system installed as indicated on the drawings and within the Division 21 technical specifications. This provision shall include furnishing all materials and installation labor unless noted otherwise as well as testing, start-up and commissioning of all equipment and systems including proper system fill and venting.
- C. The contractor shall refer to work in all other Divisions for coordination with Division 21. Conflicts and interferences shall be immediately brought to the attention of the Architect-Engineer's representative for resolution so as to aid in rapid completion of the overall project.
- D. The complete Fire Suppression system installation shall be performed by skilled tradesman experienced in the work involved. The work shall be arranged and scheduled with the General Contractor for compliance with the overall construction schedule and coordination of openings and chases within the building.

1.2 CODES AND STANDARDS

- A. The Fire Suppression system installation shall be in full compliance with the following codes and standards:
 - 1. The Ohio Building Code
 - 2. The Ohio Plumbing Code
 - 3. The Ohio Mechanical Code
 - 4. NFPA (Applicable Sections)
 - 5. FM Global
 - 6. National Electric Code
 - 7. Ohio Department of Health

8. Municipal and County codes and ordinances
9. Municipal and County health Agencies
10. Others as indicated within specific specification sections

B. Every effort is made on the part of the Architect-Engineer to comply with the listed codes and standards. Where the drawings and/or specifications of design exceed the requirements of the applicable codes and standards; the installation shall be per the design requirements. No work shall be installed contrary to or below minimum requirements of the codes and standards.

1.3 PERMITS AND FEES

- A. The contractor shall obtain and pay for all permits and licenses, both temporary and permanent, required by law as part of the installation work indicated on the drawings and within the specifications.

1.4 INSPECTIONS AND TESTS

- A. The contractor shall provide all necessary equipment, materials, and labor to conduct all tests as required by codes, local ordinances, utility companies, and rules and regulations of public authorities having jurisdiction. All inspection fees and other costs associated with the tests and inspections shall be the responsibility of the contractor.
- B. The contractor shall notify the representative of the authority having jurisdiction and the Architect-Engineer at least twenty-four hours prior to testing. Test shall be maintained until officially inspected and approved. This contractor shall obtain written approval from the authority having jurisdiction for submission to the Architect-Engineer.
- C. The contractor shall promptly repair any defects discovered during testing and repeat the test to the satisfaction of the representative of the authority having jurisdiction and the Architect-Engineer.

1.5 DRAWINGS AND SPECIFICATIONS

- A. Drawings and specifications are to be considered cooperative. Anything appearing in the specifications but not on the drawings, or vice versa, shall be considered to be part of the contract.

- B. In the event of a difference between the drawings and specifications, the more rigid requirement shall prevail.
- C. Drawings are basically diagrammatic and indicate the general arrangement of systems and components. Unless exact locations of piping and fixtures are dimensioned or annotated on the contract drawings; they must be worked out in the field with coordination of all trades.
- D. Installation of the Fire Suppression system shall be in general conformance to the contract drawings. Contractor shall submit detailed layouts of major proposed departures to the Architect-Engineer for approval. Written consent by the Architect-Engineer shall be required before such work is installed.
- E. The scheduled manufacturer for each item shall be considered as basis of design. Performance characteristics, electrical characteristics, and dimensional and spatial requirements for this item have already been considered in the design. Additional acceptable manufacturers as listed in the specifications have not been checked for such detail and are only listed to indicate manufacturers of similar type of items with equivalent standards of quality. The additional acceptable manufacturers listed must meet all the scheduled and specified performance requirements and possess features similar to those which are standard on the items which are basis of design. This contractor shall be responsible for all coordination and costs of necessary modifications required to install any equipment other than that which is basis of design.
- F. Any errors or omissions discovered by the bidding contractors prior to bid opening shall be called to the immediate attention of the Architect-Engineer. Any changes in drawings or specifications resulting from such errors or omissions shall be in effect only when corrected by the Architect-Engineer by means of an Addendum issued to all bidding contractors prior to bid opening.

1.6 SHOP DRAWINGS

- A. The contractor shall submit for review by the Architect-Engineer, copies of manufacturer's drawings, cut sheets, and application specific performance data in accordance with the requirements of Division 01 for each of the following items.
 - 1. Fire protection design documents
 - 2. Sprinkler heads
 - 3. Valves
 - 4. Additional items as required by individual specification sections

- B. Shop drawing submittals shall include the project name, the Architect-Engineer's project number, the applicable specification section and or drawing number as well the contractor's approval stamp.
 - 1. Each specific type of Fire Protection item shall be submitted as an individual electronic Portable Document Format (PDF). Grouping of different types of items into a single PDF will delay review and may be cause for return/rejection.
 - 2. Each item submittal shall be clearly marked or highlighted indicating the exact make, model, performance and options provided. If submittal does not clearly indicate these parameters than it shall be rejected. Rejected submittals may hold up contractor pay application.
- C. Shop drawings shall be submitted to Architect-Engineer within thirty working days of award of contract. Contractor shall not install any applicable materials and/or equipment without prior review as indicated on the Architect-Engineer's review stamp.
 - 1. If shop drawings are unacceptable after two submissions; both the contractor and his supplier shall present all subsequent submissions in person to the Engineer in the Engineer's office at a mutually agreeable time.
- D. Review by the Engineer does not relieve the contractor of responsibility to comply with the requirements of the contract documents.

1.7 WARRANTIES

- A. The contractor shall guarantee the complete Fire Suppression system installation as installed by him or his sub-contractors to be free from defects in materials and workmanship for a period of one year from the date of final acceptance (unless a longer period is specified for specific items elsewhere). Deviations from this may occur on larger items of equipment used during beneficial occupancy before the total system is accepted. Such a matter must have prior approval and be made a matter of written record by the Architect-Engineer's representative.
- B. The contractor shall repair or replace at his own expense any materials or equipment found to be defective within the warranty period and shall be held financially responsible for any property damages arising from such defects or the correction of such defects.

- C. The contractor shall guarantee that all equipment supplied by him or his sub-contractors shall develop capacities and have characteristics as scheduled or specified.
- D. The contractor shall submit written warranty certificates for his installation work and from each manufacturer of equipment supplied on the project to the Engineer.

1.8 SUPERVISION

- A. The contractor shall include the service of an experienced superintendent who shall be continuously in charge of the work, together with qualified tradesman, helpers, and laborers, required to properly unload, install, connect, adjust, start, operate, and test the work involved including noted equipment and materials furnished by others.
 - 1. The superintendent shall be able to communicate via cell phone while on the project site for any project related issues and emergency situations.

1.9 INSPECTION OF SITE

- A. The contractor shall inspect the site of proposed project construction and shall compare conditions with the work shown on the drawings and become thoroughly familiar with the conditions which will affect the work prior to procurement of materials or equipment and prior to commencement of work.

1.10 COORDINATION OF FIRE SUPPRESSION WORK

- A. Installing contractor shall coordinate the design intent of the contract documents with the actual field conditions making minor deviations and adjustments as required for a complete operational system. Exact locations of Fire Suppression system components shall be determined by the contractor. Such determination shall give consideration to the building structural and spatial limitations, to coordination with work of other trades and disciplines, and to the necessary clearance requirements (both of the item being installed and of all adjacent items) to accommodate manufacturer's installation requirements, to satisfy code clearance requirements and to facilitate system operation and maintenance. Unless noted otherwise, Fire Suppression systems shall be installed to provide maximum clearance above the finished floor.

- B. The contractor shall coordinate delivery and storage of his materials and equipment with the on going work of all other trades.
- C. Unless noted otherwise, each system component shall be independently supported from the building structure.
- D. Contractor shall coordinate shutdown of any existing Fire Suppression systems and/or utilities with the owner. Shutdown shall be during periods of minimal occupancy and work shall be so coordinated to minimize the disruption to normal building routines and occupancy. Contractor shall anticipate that shutdown will need to take place during evenings and weekends.
- E. Contractor shall be responsible for the removal, storage and reinstallation of lay-in ceilings as required to accomplish his scope of work. Upon completion of work, ceiling shall be restored to its original condition. Quantity and location of existing damaged or stained tiles shall be documented by the contractor prior to commencement of work with a written record and signature acknowledgment of the owner.

1.11 CUTTING AND PATCHING

- A. Unless noted otherwise, the contractor shall be responsible for all cutting and patching of existing walls, floors, and roofs which is required for the installation of his work as indicated below:
 - 1. Cutting and patching as required due to ill-timed work which otherwise could have been built in by the General Contractor.
 - 2. Cutting and patching as required to remove and replace defective work or work which does not meet the requirements of the contract documents.
 - 3. Cutting and patching as required to install materials and equipment in existing buildings.
- B. Pipe openings in floors and walls shall be core drilled if not sleeved during construction.
- C. The contractor shall be responsible for maintaining roof warranties for all cutting and patching of existing roofs. Roof work shall be sub-contracted by this contractor as required to maintain existing warranties. This contractor shall supply roof inspection / warranty certificate in the O&M manual at the completion of the project.
- D. The contractor shall not cut any reinforcing or structural building members without specific permission in writing from the Architect-Engineer.

- E. Patching shall include finish of surfaces to match those of adjacent areas. Patch and repair work is subject to approval by the Owner / Architect / Engineer.

1.12 TEMPORARY SERVICES

- A. Unless noted otherwise, contractor shall provide temporary Fire Suppression services in accordance with the requirements of the General Conditions, Supplementary Conditions and Division 01 General Requirements.
- B. Contractor may use permanent Fire Suppression equipment for temporary services when approved by the Architect-Engineer. Such approval is conditioned by the following requirements:
 - 1. The contractor shall maintain the equipment for release to owner at time of final acceptance in "New" condition.
 - 2. Warranty period for the owner shall not begin until the date of final system acceptance.

1.13 DAMAGES

- A. The contractor shall be held responsible for any damages incurred during the installation of his work to the existing grounds, walks, roads, building, plumbing systems, HVAC systems, and electric systems as well as all new construction work by other trades. He shall repair at his expense all such damages for restoration to the original conditions to the satisfaction of the Architect-Engineer and owner.
- B. The contractor shall be responsible for protecting the materials, equipment and installation of his work from damage due to weather and construction job site conditions.

1.14 CLEANUP

- A. All trash resulting from the installation of work within this specification shall be removed from the premises and disposed of in a responsible fashion by the contractor who generates it.
- B. The area of construction shall be kept in an orderly fashion. Trash shall not be allowed to accumulate so as to become a safety hazard or to impede the project progress.

- C. Upon completion of the work, the contractor and his sub-contractors shall remove from site all tools, equipment, surplus materials, and trash associated with his work.
- D. The contractor shall cooperate with the General Contractor in Final Cleaning, General Conditions.

1.15 ELECTRICAL COORDINATION

- A. Unless noted otherwise on the plans or in specific specification sections, Electrical labor and material shall be coordinated as follows:

FIRE SUPPRESSION CONTRACTOR

- 1. Furnish and install motors which are integral to or scheduled in conjunction with Fire Suppression equipment.
- 2. Furnish factory installed equipment starters and switches as scheduled and/or specified.
- 3. Furnish and install other electrical/electronic components and wiring where specified as part of the temperature control systems.

ELECTRICAL CONTRACTOR

- 1. Furnish and install power wiring to Fire Suppression equipment.
 - 2. Furnish mount and wire separate starters and disconnects for Fire Suppression equipment.
- B. The contractor shall furnish to the electrical contractor all power, motor, and control wiring diagrams and equipment / motor nameplate data.
 - C. The contractor shall provide electrical equipment to operate satisfactorily on plus or minus 10% of nominal system voltage supplied to the equipment.
 - 1. Motors for other than 120 volt operation shall be designed for and have nameplate stamped for nominal system voltage. (I.E. 208 volt system requires 208 volt nameplate; not 220, 230, or 240 volt.)

1.16 RECORD DRAWINGS

- A. The contractor shall maintain a set of prints at the construction site to record in red any deviations in the actual Fire Suppression system installation from the

design drawings. These record drawings shall be submitted to the Architect-Engineer upon completion of the project.

1.17 OPERATING INSTRUCTIONS

- A. The contractor shall provide personal instruction to the owner's operating staff on the proper operation and maintenance of the Fire Suppression system.
- B. The contractor shall provide three (3) sets of operation and maintenance manuals for the owner's use upon completion of the project. Operation and maintenance manuals shall be submitted to the Architect-Engineer for approval.
- C. Operation and maintenance manuals shall include the following:
 - 1. Name and service telephone number of the installing company.
 - 2. General description of how the system should operate.
 - 3. Manufacturer's operation and maintenance instructions.
 - 4. Copy of approved shop drawings.
 - 5. Lubrication schedule.
 - 6. Valve chart.
 - 7. Spare parts list.
 - 8. Warranty Certificates.
- D. The contractor shall instruct the owner's maintenance personnel in the proper operation and maintenance of the entire Fire Suppression system installation including all associated equipment items.

1.18 USE OF HEI ENGINEERING GROUP, INC. ELECTRONIC DOCUMENTS

- A. HEI Engineering Group, Inc. will make available to the contractor, for a nominal fee, use of HEI CAD plans for contractor's use in Coordination work.
- B. HEI schedules and details will NOT be made available in CAD format.
- C. Release and use of CAD documents shall be in accordance with HEI Engineering Group, Inc. Electronic Document Release Form. (See Attached.)

PART 2 – PRODUCTS - NOT APPLICABLE

PART 3 – EXECUTION - NOT APPLICABLE

END OF SECTION
(HEI Electronic Document Request / Release Form on Next Page)

HEI Engineering Group, Inc. Electronic Document Request / Release Form

REFERENCE PROJECT: _____

REQUESTOR NAME: _____

REQUESTOR ADDRESS _____

REQUESTOR EMAIL _____

This form is to verify that electronic copies of the following engineering documents for the referenced project are requested by the above named requestor and that by signing below the requestor agrees to the following conditions of release:

1. The electronic documents depict engineering work which remains intellectual property of HEI Engineering Group, Inc. Electronic copies will be stripped of and not include HEI Engineering Group, Inc. Title Block Information, Engineering Seal, Standard Details or Equipment Schedules.
2. The requestor shall honor the original document copyright (which will be removed from the electronic copy) and not make electronic or paper copies of the documents for use other than
 - a. Maintenance, Reference, or Renovation relating to the subject project.
 - b. Coordination and "As Built" drawings.
 - c. Fire Protection Design Reference.
 - d. Building Automation System diagrams.
3. The electronic plans are generated in DWG Format and are compiled thru xref's of multiple files. Any Cad consulting in reference to their use will be billed at our current standard billing rates.
4. When Electronic plans are requested for Coordination Drawings, the requestor shall agree to keep all "AS BUILT" records for final submission in AutoCAD format.
5. Requestor shall hold HEI Engineering Group, Inc., Daniel R. Evans, PE, and Stacey Lloyd, PE harmless in any future engineering analysis or design work based upon these documents by any party other than HEI Engineering Group, Inc.
6. Unless waived by HEI Engineering Group, Inc., the requestor shall agree to pay in advance a processing fee of \$300.00. A check made payable to HEI Engineering Group, Inc. shall accompany this signed form prior to processing of the request.

Documents

AGREEMENT OF REQUEST / RELEASE IS INDICATED BY SIGNING BELOW

(Authorized Signature) (Printed Name) (Title) (Date)

SECTION 21 05 02

BASIC FIRE SUPPRESSION MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to Specification Section 21 05 01 "Basic Fire Suppression Requirements".
- C. Unless noted otherwise, the contractor shall provide and install all new materials, equipment, components, and fixtures as indicated or specified.
- D. The contractor shall install piping specialties as indicated on the drawings and as specified in this specification.
- E. Unless noted otherwise, the contractor shall perform all excavation and backfilling required for the installation of Fire Suppression work.
- F. Unless noted otherwise, all required painting of the building surfaces and of exposed piping in finished areas shall be by the general contractor. Painting requirements are as indicated in this specification section, individual specification sections and as noted on the drawings.
- G. Unless noted otherwise, the contractor shall provide and install all miscellaneous support steel as required for the installation of the complete Fire Suppression system.
- H. Unless noted otherwise, the contractor shall coordinate exact size and locations of all concrete foundations, curbs and pads as indicated to support Fire Suppression equipment with the General Contractor for installation by the General Contractor.
 - 1. Any concrete work indicated on the contract drawings to be performed by the Division 21 contractor shall be installed in accordance with Division 3 - Concrete specifications.

- I. The contractor shall provide and install sealing materials for Fire Suppression system penetrations through building walls, floors, ceilings, and roofs. Exterior penetrations shall be weather proof and vermin proof; interior penetrations shall have sound stopping. Penetrations through fire and smoke barriers shall have firestopping.
- J. Unless noted otherwise, the contractor shall perform all demolition work associated with the new Fire Suppression work. Demolition work includes removal of all demolished materials from the site and disposal of same in an appropriate manner.

PART 2 - PRODUCTS

2.1 PIPE SLEEVES

- A. Pipe sleeves shall be provided and installed where pipes pass through walls, floors, and ceilings. Sleeves shall be sufficiently large enough to allow for fire and sound stopping between the inside sleeve wall and the pipe or insulation surface as well as allow for thermal expansion and contraction of piping.
 - 1. Sleeves shall be large enough to allow pipe insulation to be continuous through the wall.
 - 2. Length of sleeves shall be equal to the thickness of the building construction element penetrated for a flush finish on both sides except for floor sleeves which shall extend 2" above the finish floor. Install iron-pipe sleeves in exterior wall penetrations and steel-pipe sleeves elsewhere unless noted otherwise.

2.2 ESCUTCHEON PLATES

- A. Escutcheon plates shall be installed on all pipe penetrations through walls, floors, and ceilings where exposed to view and on the building exterior. Escutcheon plate shall be secured to pipe or insulation and completely cover the hole penetration.
 - 1. Escutcheon plates on the building exterior and in equipment rooms shall be made of brass. All other escutcheon plates shall be chrome plated sheet steel.
 - 2. Escutcheon plates shall be as manufactured by one of the following:

Chicago Specialty Mfg. Co.
Producers Specialty & Mfg. Corp.
Sanitary-Dash Mfg. Co.

2.3 ACCESS DOORS

- A. Access doors shall be provided and installed by the Division 21 contractor where shown on the drawings in non accessible walls, and ceilings which conceal Plumbing items which require service or inspection such as valves and dampers.
 - 1. Unless specific door size is indicated, door shall be provided of size adequate to serve the applicable concealed item.
 - 2. Access doors shall be of painted steel construction with concealed hinge and keyed lock. All access doors provided shall be keyed alike with a minimum of two keys provided to the owner.
 - a. Access doors for installation in ceilings shall have a recessed face for field installation of finished ceiling material.
 - 3. Access doors for installation in fire rated walls and ceilings shall be UL listed and labeled with applicable fire resistant rating.
 - 4. Access doors shall be as manufactured by one of the following:
 - a. CESCO Products
 - b. Elmdor
 - c. Milcor
 - d. Kees

2.4 PAINT

- A. All paint products shall be specifically selected for their intended application in regards to type of surface application and interior or exterior location.
- B. Paint application shall consist of a primer coat and two finish coats.
- C. Paint color shall be as selected by the Architect.

2.5 FIRESTOPPING

- A. Firestopping shall be installed in all Fire Suppression System penetrations thru fire-resistance-rated walls, partitions, floors and roofs.
- B. Shop Drawing Data shall be submitted to include manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer's installation instructions.
- C. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- D. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- E. Use only firestop products that have been UL 1479, ASTM E 814, or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- F. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E 814 which is equal to the time rating of construction being penetrated.
- G. Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction being penetrated.
- H. Firestopping materials shall be as manufactured by one of the following:
 - 1. 3M Fire Protection Products
 - 2. Hilti Corporation
 - 3. Tremco, Inc.

PART 3 - EXECUTION

3.1 PIPING SPECIALTIES

- A. Contractor shall install all piping specialties as coordinated with the field conditions in accordance with the manufacturer's recommendations.

3.2 UTILITIES

- A. The approximate location of all known underground utilities within the project area shall be determined and marked prior to performing any excavation.
- B. The proper authorities shall be contacted to aid in locating all underground utilities and to notify them of intention to excavate.
- C. Existing underground utilities shall be properly supported and protected during excavation. Should any utilities be damaged during construction, the respective utility shall be contacted immediately.
- D. Existing utilities shall not be interrupted without prior approval of the Architect-Engineer or the owner. Interruptions shall be coordinated so as to minimize the frequency of occurrence and the length of downtime.
- E. All new utilities and piping containing water, steam or condensate shall have a 42" minimum depth of burial.

3.3 EXCAVATION, TRENCHING AND BACKFILLING

- A. All trench excavation and backfill for fire service shall be the responsibility of the Division 21 contractor.
- B. Excavations shall have sides sloped, shored, and braced in accordance with local codes and ordinances and as required for safety of workers.
- C. Contractor shall protect excavations from rain water, surface water and ground water as much as possible. All water shall be removed from the excavations prior to laying of the underground piping.
- D. Unless noted otherwise, all trenches for underground piping shall be backfilled so that the run of pipe shall be laid on 4" of sand and backfilled to 6" above crown of pipe with sand. Thereafter, backfill shall be compacted with mechanical tampers in no greater than 6" layers of suitable excavated material free of large stones until proper grade is attained.

- E. Trenches parallel to footers or outside bearing walls shall maintain three feet of clearance from the footers or walls. Excavation for such trenches below the elevation of the bottom of a footer shall maintain a horizontal separation distance so as not to disturb soil within a zone 45 degrees off of the bottom edge of the footer.
- F. All excavation for trenches within paved areas, sidewalks, etc., shall be backfilled the width of the trench plus five feet beyond each side with good fill sand to the underside of the base course of the paving material.
- G. Any and all excavated materials which are not used for backfill shall become the property of this contractor and shall be removed from the site at his expense. (If excess excavation materials are suitable, Architect-Engineer may allow for the materials to be distributed on site.)
- H. Trenches shall not be backfilled until all piping within the trench has been tested and/or inspected and approved by the local authorities having jurisdiction.
- I. Where trenches cross streets, walks, or public thoroughfares, the contractor shall be responsible for and provide suitable barricades and bridges, adequately protected by signs or red flags during the day and by lights at night.
- J. All streets, parking lots, sidewalks, sod, etc., which are disturbed by the excavation process shall be restored by the contractor at his expense to the original site condition to the satisfaction of the Architect-Engineer, the owner and the authorities having jurisdiction.
- K. If observable subsidence is noted in the areas of excavation for Fire Suppression work during the project warranty period, the contractor shall remove the surface finish, fill in the subsidence and restore the surface finish to the intended condition.
- L. Contractor shall refer to Division 02 - Site Work; for additional excavation, trenching and backfill requirements.

3.4 PAINTING

- A. Existing building surfaces and auxiliary equipment and finishes marred during installation of Fire Suppression work shall be touched up and repainted by the Division 21 contractor to the satisfaction of the Architect-Engineer.

- B. Factory applied paint finishes on Fire Suppression equipment marred during installation of work shall be touched up and repainted by the contractor to the satisfaction of the Architect-Engineer. Touch up paint shall be in accordance with the equipment manufacturer's recommendations.
- C. The Division 21 contractor shall paint all iron pipe fittings and valve bodies, all support steel installed as part of his scope of work and all exposed piping on the exterior of the building.
- D. All painting shall be done in accordance with the paint manufacturer's instructions including surface preparation and conditions of ambient temperature and humidity.
- E. Environmental conditions in the area of painting work shall comply with the paint manufacturer's recommendations and all governing regulations.
- F. Contractor shall refer to Division 09 - Finishes.

3.5 FIRESTOPPING

- A. The contractor shall seal all fire / smoke rated wall and floor penetrations for Fire Suppression System components with fire and smoke stopping materials so as to maintain the fire resistance rating of the wall or floor penetrated.
 - 1. Firestopping compound, pipe sleeves, and piping and insulation shall be installed so as the complete penetration assembly is classified by UL as listed in the UL Building Materials Directory.
 - 2. Installation shall be in full compliance with the firestop material manufacturer's installation instructions and recommendations
 - 3. Installer shall verify that penetrations are properly sized and in suitable condition for application of firestopping materials.
 - 4. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, water repellents, and any other substances that may affect proper adhesion.
 - 5. Installation conditions shall be in compliance with the manufacturer's recommendations for temperature and humidity before, during and after installation of firestopping.

END OF SECTION

SECTION 21 05 29

FIRE SUPPRESSION HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 21 Specification Section 21 05 01 "Basic Fire Suppression Requirements" and 21 05 02 "Basic Fire Suppression Materials and Methods".
- C. This contractor shall provide and install piping and equipment hanger and support devices as indicated on the contract drawings and specified in this section. Hangers and supports shall secure piping and equipment in place, shall prevent the transmission of vibration, shall provide for vertical adjustment to level equipment and to maintain required pipe slope and shall provide / allow for expansion and contraction.
- D. This contractor shall provide and install all supplementary angles, channels, plates, etc., where supports are required between the building structural members, spanning the space and attached to the structural members by welding, or mechanical fasteners.
- E. This contractor shall provide and install miscellaneous fabricated structural steel supports for equipment as indicated on the contract drawings or as required per the equipment manufacturer.

PART 2 – PRODUCTS

2.1 COMPONENTS

- A. Hangers, supports and components shall be factory fabricated according to MSS SP-58, the latest edition.
- B. Concrete inserts into poured concrete floor systems are not permitted.
- C. Beam clamps, trapeze hangers and clevis hangers shall be permitted.

2.2 PIPE HANGERS AND SUPPORTS

- A. All horizontal piping shall be installed with factory fabricated hangers and supports attached to the building substrate with suitable expansion shells, inserts, or beam clamps. Hangers shall be selected to exactly fit pipe size for bare piping and to exactly fit around piping insulation with saddle or shield for insulated piping. Copper plated hangers and supports shall be utilized for all copper piping systems. Perforated strap hangers and "C" clamp attachments are prohibited.
1. Unless noted otherwise, all horizontal pipe 2" and smaller shall be supported by individual adjustable swivel split ring pipe hangers.
 2. Unless noted otherwise, all horizontal pipe 2-1/2" and larger shall be supported by individual adjustable steel clevis pipe hangers.
 3. Pipe support spacing and hanger rod sizing shall be in accordance with NFPA standards Unless Noted Otherwise. (FM Global Standards??)
 4. Additional hangers shall be installed at change in pipe direction and at concentrated load points such as in-line pumps and large valves or strainers.
- B. All vertical piping shall be installed with factory fabricated piping clamps attached to the building substrate with suitable expansion shells, inserts, or beam clamps. Clamps shall be selected to exactly fit bare pipe size. Copper plated clamps shall be utilized for all copper piping systems.
1. Support vertical piping at each floor line.
 2. Support base of each vertical pipe riser.

2.3 EQUIPMENT HANGERS

- A. Hangers for Fire Suppression equipment shall consist of structural steel shapes or steel rods attached to the building substrate with suitable expansion shells, inserts, or beam clamps. Hangers shall be selected to adequately support the static and dynamic loads of the equipment as indicated by the equipment manufacturer. Isolation type hangers shall be used to support all overhead mechanical equipment with rotating parts. Isolators shall be installed as close to the overhead structure as possible.

2.4 MANUFACTURER

- A. Piping and Equipment Hangers, Supports, Saddles, Shields, Clamps, Attachments, etc. shall be as manufactured by one of the following :
1. Anvil International
 2. Cooper B-Line, Inc.
 3. Globe Pipe Hanger Products, Inc.
 4. Michigan Hanger Co.
 5. Pentair & Subsidiaries
 6. PHD Manufacturing, Inc.
 7. The Modern Pipe Supports Corporation

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all inserts, hangers and supports in complete accordance with the manufacturer's recommendations.
- B. Install all inserts, hangers and supports so as to adequately support the equipment in accordance with the equipment manufacturer's requirements.
- C. Install all inserts, hangers and supports so as not to have a detrimental effect on the building substrate to which they are attached.
- D. Support from steel joist panel point is required.
- E. Supports from roof decking systems are not permitted.
- F. Bending of threaded hanger rods to account for sloping roof steel is not permitted.

END OF SECTION

SECTION 21 05 53

FIRE SUPPRESSION IDENTIFICATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 21 Specification Section 21 05 01 "Basic Fire Suppression Requirements" and 21 05 02 "Basic Fire Suppression Materials and Methods".
- C. This contractor shall provide and install permanent identification markers for the Fire Suppression system components as indicated below:
 - 1. Each scheduled item of equipment
 - 2. Piping
 - 3. Valves
- D. Identification markers shall comply with ANSI A13.1 requirements for lettering size, length of color field, colors and viewing angles.

1.2 QUALITY ASSURANCE

- A. Identification requirements shall meet ASME A13.1.

PART 2 - PRODUCTS

2.1 EQUIPMENT MARKERS

- A. Fire Suppression equipment shall be identified with with aluminum engraved or stamped nameplates permanently fastened to equipment. Marker shall identify equipment with nomenclature as indicated on the contract drawings. Identification shall utilize 3/16" high text.

2.2 PIPING MARKERS

- A. Fire Suppression piping shall be identified with self-adhesive, flexible vinyl, preprinted, color coded plastic pipe markers indicating the piping service and the direction of flow.

2.3 VALVE MARKERS

- A. Valves shall be identified with 1-1/2" square x 1/16" thick engraved plastic laminated tag markers. Valves shall be numbered consecutively for each piping system. Marker shall identify piping system (HWS, CWS, ETC...) with 1/4" high text and identify the valve number with 1/2" high text. The marker shall have a hole for fastening the tag to the valve with a flexible bead chain.

2.4 VALVE CHART

- A. A type written valve chart shall be installed in an equipment room in a wood or aluminum frame with a plexiglass cover. A copy of the valve charts shall also be included in the maintenance and operating manuals.
- B. A valve chart shall be furnished by each contractor and shall include the following items:
 - a. Valve Identification
 - b. Location
 - c. Purpose

2.5 MANUFACTURERS

- A. Identification Markers shall be as manufactured by one of the following:
 - 1. Allen Systems, Inc.
 - 2. Brady Co.
 - 3. Marking Services, Inc.
 - 4. Seton Name Plate Corp.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Contractor shall install Identification Markers in accordance with the manufacturer's installation instructions.

- B. Install pipe markers wherever piping is exposed to view in accessible spaces. Locate markers approximately 25 feet on center and near each wall, floor, and ceiling penetration. In addition, locate markers near points of piping origin, points of piping termination and points of piping connection to major equipment.
- C. Piping, equipment and valve identification shall be completed prior to issuance of substantial completion.

END OF SECTION

SECTION 21 13 00

FIRE SUPPRESSION SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 21 Specification Section 21 05 01 "Basic Fire Suppression Requirements" and 21 05 02 "Basic Fire Suppression Materials and Methods".
- C. This contractor shall be responsible for the complete design and installation of the fire suppression systems as indicated on the drawings and in accordance with the following:
 - 1. OBC ARTICLE 9 (4101:2-9)
 - 2. NFPA 13 (edition referenced by OBC)
 - 3. NFPA 14 (edition referenced by OBC)
 - 4. Owners Insurance Company
 - 5. Local Fire Department Requirements
- D. This contractor shall be responsible for coordination and rough-in of his work with all other trades for best utilization of the congested ceiling spaces. The installing contractor shall be certified with the Fire Marshall.
- E. The design of the fire suppression system shall be by either a registered engineer or a certified sprinkler system designer in accordance with OBC Article 1 (4101:2-1-22-D).
 - 1. The design shall include all layout drawings, installation details, water supply information, and hydraulic calculations as required per NFPA and OBC for approval by the authority having jurisdiction.
 - 2. The fire suppression sprinkler system design shall include layout of sprinkler heads, layout of water distribution piping, and sizing all piping based on hydraulic calculations as described in NFPA 13.
 - 3. The design shall include a water flow test to determine / verify the available water supply volume and pressure to the satisfaction of the authority having jurisdiction.

- F. Unless noted otherwise on the drawings, design requirements for sprinkler head spacing and flow density shall be as determined by NFPA 13 in accordance with the occupancy hazard classification indicated on the drawings.
- G. Automatic sprinkler heads shall be installed in a symmetrical pattern within rooms whenever possible.
 - 1. Heads in corridors shall be centered between the corridor walls.
 - 2. Heads in finished spaces shall be located within 6" of the ceiling grid.
 - 3. Heads shall be centered in the ceiling tile for 24" * 24" lay-in ceiling tiles.
 - 4. Heads shall be centered in the ceiling tile or in one half of the full tile for 24" * 48" lay-in ceiling tiles.
- H. All fire suppression system components (mechanical pipe couplings, pipe hangers, valves, tamper switches, flow switches, fire department connections, sprinkler heads, etc...) shall be UL and FM listed and labeled.
- I. Product data for each type of fire suppression system component along with a complete set of design documents which have already been approved and stamped by the authority having jurisdiction shall be submitted for the Architect-Engineer's review.

PART 2 - PRODUCTS

2.1 PIPING

- A. Type "L" hard copper pipe with wrought copper fittings for brazed joints shall be acceptable for pipes sized 2" and smaller. Copper pipe shall be in accordance with the latest revision of ASTM B-88. Wrought copper fittings shall be in accordance with the latest revision of ANSI B16.22. Brazing filler metals shall be in accordance with AWS A5.8, Classification BAg1 (silver). Copper piping connections to steel or iron pipe shall be made with dielectric unions.
- B. Schedule 40 seamless black steel pipe with ANSI B16.4 Class 125 cast iron threaded fittings or ANSI B16.3 Class 150 malleable iron threaded fittings for screwed joints shall be acceptable for pipes sized 2" and smaller. Pipe shall be in accordance with ASTM A135 or A795 black steel pipe. Threaded pipe joints shall be in accordance with ANSI B1.20.1.
- C. Schedule 40 seamless black steel pipe with grooves rolled on the ends and dimensionally compatible grooved mechanical couplings shall be acceptable for 1-1/2" and 2" pipe. Pipe shall be in accordance with ASTM A135 or ASTM A795 black steel pipe. Mechanical fittings shall be ductile or malleable iron with synthetic rubber gaskets and associated hardware to secure grooved pipe and

fittings. Mechanical couplings and fittings shall be Victaulic style 77 Standard or Victaulic Firelock Series or equivalent by Grinnell Corp. or Stockham.

- D. Schedule 40 seamless black steel pipe with grooves rolled on the ends and dimensionally compatible grooved mechanical couplings shall be acceptable for pipes sized 2-1/2" and larger. Pipe shall be in accordance with ASTM A135 or ASTM A795 black steel pipe. Mechanical fittings shall be ductile or malleable iron with synthetic rubber gaskets and associated hardware to secure grooved pipe and fittings. Mechanical couplings and fittings shall be Victaulic style 77 Standard or Victaulic Firelock Series or equivalent by Grinnell Corp. or Stockham.

2.2 GENERAL VALVES

- A. All valves of the same type shall be of the same manufacturer. Valve bodies shall be clearly marked with the manufacturers name or trademark and the pressure rating.
- B. Valves shall comply with ANSI B16.10 "Face-to-Face and End to End Dimensions of Ferrous Valves. Valve size shall be same size as the pipe in which it is installed unless noted otherwise.
- C. Where indicated or where required by codes and standards, valves shall be supplied complete with a supervisory switch with SPDT Form "C" contacts rated at 0.25 amp for 24 volt DC to signal whenever the valve is not completely open. Supervisory switch shall be UL listed and be compatible with the Fire Alarm system.
- D. Gate Valves 2" and smaller shall be rated for 175 psi or greater non-shock cold water working pressure with body and bonnet of cast bronze construction with threaded ends and OS&Y design with rising stem. Valves shall be UL listed and be in compliance with MSS-SP80. Valves shall be as manufactured by one of the following:

Grinnell
Jenkins
Nibco
Stockham

- E. Ball Valve 2" and smaller shall be rated for 175 psi or greater non-shock cold water working pressure with body of bronze construction with threaded ends and TFE seats and packing. Valves shall be UL listed and be in compliance with MSS-SP110. Valves shall be as manufactured by one of the following:

Grinnell
Nibco
Victaulic

- F. Gate Valve 2-1/2" and larger shall be rated for 175 psi or greater non-shock cold water working pressure with body and bonnet of cast iron alloy with bronze trim and with OS&Y for flanged or grooved mechanical type pipe connections. Valves shall be UL listed and be in compliance with MSS-SP70. Valves shall be as manufactured by one of the following:

Grinnell
Jenkins
Nibco
Stockham

- G. Butterfly Valve 2-1/2" and larger shall be rated for 175 psi or greater non-shock cold water working pressure with lug type ductile or cast iron body with bronze or EPDM encapsulated brass disc, EPDM seats, a 400 series stainless steel stem and a gear operator with handwheel and raised position indicator. Valves shall be UL listed and be in compliance with MSS-SP67. Valves shall be as manufactured by one of the following:

Grinnell
Nibco
Victaulic

- H. Swing Check Valves shall be rated for 175 psi or greater non-shock cold water working pressure with cast iron body with bronze trim and rubber to metal seating for flanged type pipe connections. Valves shall be UL listed and be in compliance with MSS-SP71. Valves shall be as manufactured by one of the following:

Grinnell
Jenkins
Nibco
Stockham

2.3 SPECIALTY VALVES AND DEVICES

- A. Flexible Sprinkler Drops shall be UL Listed and FM approved, rated for 175 psi maximum working pressure and 225 F maximum ambient temperature rating. Flexible Sprinkler Drops shall be of stainless steel with an internal corrugated hose and an exterior braided jacket complete with applicable bracket for installation in ceiling, sidewall etc... Manufacture of Flexible Sprinkler Drops

shall be in accordance with ASTM C635. Installation of Flexible Sprinkler Drops shall be in accordance with ASTM C636. Flexible Sprinkler Drops shall be as manufactured by one of the following:

Anvil International
Easyflex USA
Reliable Sprinkler
Victaulic
Viking

- B. Backflow Preventers shall be UL and FM approved, rated for 175 psi or greater non-shock cold water working pressure with bronze or cast-iron bodies and corrosion resistant interior components for threaded (2" and smaller) or flanged (2-1/2" and greater) type pipe connections. Preventer shall be of the Double-Check type in accordance with ASSE 1015 consisting of shutoff valves with tamper switches on the inlet and outlet, a strainer on the inlet, two positive seating check valves, and test cocks. Maximum pressure drop shall be 5 psig through the middle 1/3 of the flow range. Backflow Preventers shall be as manufactured by one of the following:

Cla-Val Co.
Febco
Grinnell Corp.
Hersey Products, Inc.
Watts Regulator Co.

- C. Water Flow Indicators (flow switch) shall be of the vane type designed for horizontal or vertical installation and rated for 250 psig. Indicator shall include two SPDT Form "C" contacts for an isolated local alarm and for integration into the fire alarm system. Contact for the local alarm shall be rated at 7 amp for 125 volt AC and contact for fire alarm shall be 0.25 amp for 24 volt DC. A factory-set, field-adjustable retard element to prevent false signals and a tamper proof cover shall be included. Water Flow Indicators shall be as manufactured by one of the following:

Grinnell
Potter-Roemer, Inc.
Reliable Automatic Sprinkler Co., Inc.
Victaulic Company of America
Viking Corp.

- D. Wet Pipe Sprinkler Alarm Check Valve shall have a divided seat ring and a rubber faced clapper and be rated for 250 psig. Valve assembly shall be complete with a pressure retard chamber and variable pressure trim as well as a test and drain valve. Valve shall also include two SPDT Form "C" contacts for an

isolated local alarm and for integration into the fire alarm system. Contact for the local alarm shall be rated at 7 amp for 125 volt AC and contact for fire alarm shall be 0.25 amp for 24 volt DC. Alarm Check Valves shall be as manufactured by one of the following:

Grinnell
Potter-Roemer, Inc.
Reliable Automatic Sprinkler Co., Inc.
Victaulic Company of America
Viking Corp.

- E. Fire Department Connection shall be of the flush wall type siamese of polished chrome plated cast brass construction with wall escutcheon. The two inlet connections shall be 2-1/2" with female threads conforming to the NH thread standard or as required by the local fire department and each include a clapper valve and a chrome plated plug and chain. The outlet shall be 6" nominal pipe size. The wall escutcheon plate shall include the following words of identification in raised letters; "AUTO SPKR - FIRE DEPT CONNECTION" or "STANDPIPE - FIRE DEPT CONNECTION" OR "AUTO SPKR & STANDPIPE - FIRE DEPT CONNECTION". Fire department connections shall be as manufactured by one of the following:

Crocker
Guardian Fire Equipment, Inc.
Potter-Roemer, Inc.
Reliable Automatic Sprinkler Co., Inc.
Viking Corp.

- F. Hose Outlet Valves shall be 2-1/2" polished chrome plated brass angle valve rated for 300 psig. Valve shall include a removable 2-1/2" * 1-1/2" reducer, a hose connector coupling, and an adjustable pressure restriction device. The valve and the coupling shall have male threads conforming to the NH thread standard or as required by the local fire department. A spanner wrench shall be provided for removal of the reducer coupling. Hose outlet valves shall be as manufactured by one of the following:

Grinnel Corp.
Guardian Fire Equipment, Inc.
Potter-Roemer, Inc.

- G. Fire hoses shall be 1-1/2" nominal size * fifty foot long rated for 300 psig. Hose shall be constructed of 100% polyester jacket with synthetic rubber liner with a chrome plated quick disconnect coupling and a red injection molded

polycarbonate combination nozzle adjustable for straight stream to fog to shut-off. Hose shall be UL listed and labeled and comply with NFPA 1961. Hose shall be as manufactured by one of the following:

Grinnel Corp.
Guardian Fire Equipment, Inc.
Potter-Roemer, Inc.

- H. Hose, Valve, and Extinguisher Cabinets shall be provided and installed as indicated on the drawings. Cabinets shall be as manufactured by one of the following:

Johnson-Lee, Division of W. F. Lee Corp.
Larsen's Mfg. Co.
Potter-Roemer, Inc.

2.4 AUTOMATIC SPRINKLERS

- A. Unless noted otherwise, all sprinkler heads shall be of the fusible link or frangible bulb, spray type with a nominal 1/2" discharge orifice for "ordinary" temperature range.

1. In unfinished exposed spaces and mechanical spaces, sprinkler heads shall be of the upright type with a brass or rough bronze finish.
2. In finished spaces with ceilings, sprinkler heads shall be painted white or chrome plated of the semi-recessed type with a white escutcheon ring. Projection of the heads below the ceiling line shall be uniform throughout.
3. In corridors, locker/shower rooms and restrooms, sprinkler heads shall be concealed type with a rough brass finish and a white cover plate.
4. In gymnasiums or where exposed in locker/shower rooms, each sprinkler head shall be protected with a wire guard.

- B. This contractor shall provide one sprinkler head wrench and six extra sprinkler heads for each type of head installed in each building. Wrenches and heads shall be turned over to the owner in a finished steel hinged cover cabinet suitable for wall mounting.

- C. Sprinkler heads shall be as manufactured by one of the following:

Ansul Incorporated
Automatic Sprinkler Corp.
Central Sprinkler Corp. (Tyco Fire Products)
Gem Sprinkler Corp. (Tyco Fire Products)
Grinnell Corporation

Reliable Sprinkler Corporation
Star Sprinkler Corp. (Tyco Fire Products)
Viking Corp.

PART 3 - EXECUTION

3.1 PIPING

- A. Piping installation shall be laid out and arranged with the best standards of design and practice with risers plumb and horizontal mains and branches run parallel or perpendicular to the building walls.
- B. The piping installation shall be in complete compliance with NFPA 13 and NFPA 14. Pipe hanger and support spacing and locations shall be in accordance with NFPA 13 installation requirements. In addition, piping joined by grooved mechanical couplings shall be installed in accordance with the manufacturer's instructions.
- C. Piping installation shall provide the means to drain the entire system in accordance with NFPA 13.
- D. Copper piping connections to steel or iron pipe shall be made with dielectric unions.
- E. Test connections shall be sized and located as shown on the drawings and additionally as required by NFPA 13. Test connections shall be complete with a shut-off valve. Test connections may also serve as drain pipes.
- F. A pressure gage shall be installed on the riser or feed main at or near each test connection.
- G. Filled piping installation shall be protected from freezing until acceptance from owner of the entire construction project.
- H. Piping shall be cleaned to prevent MIC (microbially influenced corrosion).
- I. A free standing siamese post type remote fire department connection shall be supplied, installed and piped by the site contractor for connection to the Automatic Sprinkler system just outside of the building by the Fire Protection Contractor.

3.2 VALVES

- A. All fire suppression general and specialty valves shall be installed in accordance with the manufacturer's instructions, NFPA 13 and NFPA 14, and the authority having jurisdiction.
 - 1. Valves shall be installed in accessible locations
 - 2. Valves in horizontal piping shall be installed so as to have their stems pointing vertically upward whenever possible; but in no case shall stems be installed more than 90 degrees from the vertically upward position.
- B. A supervised-open gate, butterfly, or ball valve shall be installed in all fire protection water supply lines (except the fire department connection) to act as an automatic sprinkler control valve. Control valves shall be labeled for identification of zone served.
- C. All valves shall be removable from the piping system by use of unions, flanges, or grooved mechanical couplings.
- D. A check valve shall be installed in each water supply connection.
- E. When indicated on the plans, a supervised-open wall indicator gate valve for shut-off of the sprinkler system water supply shall be installed at the point of connection to the water service.

3.3 BACK FLOW PREVENTERS

- A. Backflow preventers shall be installed in accordance with the manufacturer's instructions, the plumbing code, and the authority having jurisdiction.

3.4 FIRE DEPARTMENT CONNECTIONS

- A. An automatic drip valve shall be installed at the check valve in the fire department connection piping to the fire protection mains.
- B. A mechanical sleeve and seal shall be provided at the pipe penetration through the exterior wall.

3.5 AUTOMATIC SPRINKLERS

- A. Sprinkler heads shall be installed in accordance with the manufacturer's instructions and with the proper tools to prevent damage during installation.

3.6 TESTING

- A. Upon completion of piping installation this contractor shall be flush, test, and inspect the entire system in accordance with the requirements of NFPA 13, the owners insurance company, and the authority having jurisdiction.
- B. This contractor shall notify the Owner, the Architect-Engineer, and the Authority having jurisdiction at least twenty-four hours prior to testing. The test shall be maintained until officially inspected and approved. Written approval shall be submitted to the Architect-Engineer.
- C. Sprinkler system components which do not pass the test shall be replaced. The portion of the system affected shall be retested.

END OF SECTION

SECTION 22 05 01

BASIC PLUMBING REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. All work of Division 22 is subject to the General Conditions, Supplementary Conditions, Instructions to Bidders, and Division 01 - General Requirements for the entire project. Contractor shall refer to these sections elsewhere in the project manual for exact requirements and details.
- B. The contractor shall be responsible for providing a complete operational Plumbing system installed as indicated on the drawings and within the Division 22 technical specifications. This provision shall include furnishing all materials and installation labor unless noted otherwise as well as testing, start-up and commissioning of all equipment and systems including proper system fill and venting.
- C. The contractor shall refer to work in all other Divisions for coordination with Division 22. Conflicts and interferences shall be immediately brought to the attention of the Architect-Engineer's representative for resolution so as to aid in rapid completion of the overall project.
- D. The complete Plumbing system installation shall be performed by skilled tradesman experienced in the work involved. The work shall be arranged and scheduled with the General Contractor for compliance with the overall construction schedule and coordination of openings and chases within the building.

1.2 CODES AND STANDARDS

- A. The Plumbing system installation shall be in full compliance with the following codes and standards:
 - 1. The Ohio Building Code
 - 2. The Ohio Plumbing Code
 - 3. The Ohio Mechanical Code
 - 4. NFPA (Applicable Sections)
 - 5. National Electric Code
 - 6. Ohio Department of Health
 - 7. Municipal and County codes and ordinances

8. Municipal and County health Agencies
9. Others as indicated within specific specification sections

- B. Every effort is made on the part of the Architect-Engineer to comply with the listed codes and standards. Where the drawings and/or specifications of design exceed the requirements of the applicable codes and standards; the installation shall be per the design requirements. No work shall be installed contrary to or below minimum requirements of the codes and standards.

1.3 PERMITS AND FEES

- A. The contractor shall obtain and pay for all permits and licenses, both temporary and permanent, required by law as part of the installation work indicated on the drawings and within the specifications.

1.4 INSPECTIONS AND TESTS

- A. The contractor shall provide all necessary equipment, materials, and labor to conduct all tests as required by codes, local ordinances, utility companies, and rules and regulations of public authorities having jurisdiction. All inspection fees and other costs associated with the tests and inspections shall be the responsibility of the contractor.
- B. The contractor shall notify the representative of the authority having jurisdiction and the Architect-Engineer at least twenty-four hours prior to testing. Test shall be maintained until officially inspected and approved. This contractor shall obtain written approval from the authority having jurisdiction for submission to the Architect-Engineer.
- C. The contractor shall promptly repair any defects discovered during testing and repeat the test to the satisfaction of the representative of the authority having jurisdiction and the Architect-Engineer.

1.5 DRAWINGS AND SPECIFICATIONS

- A. Drawings and specifications are to be considered cooperative. Anything appearing in the specifications but not on the drawings, or vice versa, shall be considered to be part of the contract.
- B. In the event of a difference between the drawings and specifications, the more rigid requirement shall prevail.

- C. Drawings are basically diagrammatic and indicate the general arrangement of systems and components. Unless exact locations of piping and fixtures are dimensioned or annotated on the contract drawings; they must be worked out in the field with coordination of all trades. (Contractor shall refer to Architectural drawings for exact locations of plumbing fixtures.)
- D. Installation of the Plumbing system shall be in general conformance to the contract drawings. Contractor shall submit detailed layouts of major proposed departures to the Architect-Engineer for approval. Written consent by the Architect-Engineer shall be required before such work is installed.
- E. The scheduled manufacturer for each item shall be considered as basis of design. Performance characteristics, electrical characteristics, and dimensional and spatial requirements for this item have already been considered in the design. Additional acceptable manufacturers as listed in the specifications have not been checked for such detail and are only listed to indicate manufacturers of similar type of items with equivalent standards of quality. The additional acceptable manufacturers listed must meet all the scheduled and specified performance requirements and possess features similar to those which are standard on the items which are basis of design. This contractor shall be responsible for all coordination and costs of necessary modifications required to install any equipment other than that which is basis of design.
- F. Any errors or omissions discovered by the bidding contractors prior to bid opening shall be called to the immediate attention of the Architect-Engineer. Any changes in drawings or specifications resulting from such errors or omissions shall be in effect only when corrected by the Architect-Engineer by means of an Addendum issued to all bidding contractors prior to bid opening.

1.6 SHOP DRAWINGS

- A. The contractor shall submit for review by the Architect-Engineer, copies of manufacturer's drawings, cut sheets, and application specific performance data in accordance with the requirements of Division 01 for each of the following items.
 - 1. Plumbing fixtures and equipment
 - 2. Additional items as required by individual specification sections
- B. Shop drawing submittals shall include the project name, the Architect-Engineer's project number, the applicable specification section and or drawing number as well the contractor's approval stamp.

1. Each specific type of Plumbing item shall be submitted as an individual electronic Portable Document Format (PDF). Grouping of different types of items into a single PDF will delay review and may be cause for return/rejection.
 2. Each item submittal shall be clearly marked or highlighted indicating the exact make, model, performance and options provided. If submittal does not clearly indicate these parameters than it shall be rejected. Rejected submittals may hold up contractor pay application.
- C. Shop drawings shall be submitted to Architect-Engineer within thirty working days of award of contract. Contractor shall not install any applicable materials and/or equipment without prior review as indicated on the Architect-Engineer's review stamp.
1. If shop drawings are unacceptable after two submissions; both the contractor and his supplier shall present all subsequent submissions in person to the Engineer in the Engineer's office at a mutually agreeable time.
- D. Review by the Engineer does not relieve the contractor of responsibility to comply with the requirements of the contract documents.

1.7 WARRANTIES

- A. The contractor shall guarantee the complete Plumbing system installation as installed by him or his sub-contractors to be free from defects in materials and workmanship for a period of one year from the date of final acceptance (unless a longer period is specified for specific items elsewhere). Deviations from this may occur on larger items of equipment used during beneficial occupancy before the total system is accepted. Such a matter must have prior approval and be made a matter of written record by the Architect-Engineer's representative.
- B. The contractor shall repair or replace at his own expense any materials or equipment found to be defective within the warranty period and shall be held financially responsible for any property damages arising from such defects or the correction of such defects.
- C. The contractor shall guarantee that all equipment supplied by him or his sub-contractors shall develop capacities and have characteristics as scheduled or specified.

- D. The contractor shall submit written warranty certificates for his installation work and from each manufacturer of equipment supplied on the project to the Engineer.

1.8 SUPERVISION

- A. The contractor shall include the service of an experienced superintendent who shall be continuously in charge of the work, together with qualified tradesman, helpers, and laborers, required to properly unload, install, connect, adjust, start, operate, and test the work involved including noted equipment and materials furnished by others.

- 1. The superintendent shall be able to communicate via cell phone while on the project site for any project related issues and emergency situations.

1.9 INSPECTION OF SITE

- A. The contractor shall inspect the site of proposed project construction and shall compare conditions with the work shown on the drawings and become thoroughly familiar with the conditions which will affect the work prior to procurement of materials or equipment and prior to commencement of work.

1.10 COORDINATION OF PLUMBING WORK

- A. Installing contractor shall coordinate the design intent of the contract documents with the actual field conditions making minor deviations and adjustments as required for a complete operational system. Exact locations of Plumbing system components shall be determined by the contractor. Such determination shall give consideration to the building structural and spatial limitations, to coordination with work of other trades and disciplines, and to the necessary clearance requirements (both of the item being installed and of all adjacent items) to accommodate manufacturer's installation requirements, to satisfy code clearance requirements and to facilitate system operation and maintenance. Unless noted otherwise, Plumbing systems shall be installed to provide maximum clearance above the finished floor.
- B. The contractor shall coordinate delivery and storage of his materials and equipment with the on going work of all other trades.
- C. Unless noted otherwise, each Plumbing system component shall be independently supported from the building structure.

- D. Unless noted otherwise, contractor(s) shall coordinate Plumbing and HVAC installation so as to maintain at least ten feet of clearance from all outdoor air intakes and building openings to any plumbing vents (existing and new) exhaust air outlets or other noxious conditions.
- E. Contractor shall coordinate shutdown of any existing Plumbing systems and/or utilities with the owner. Shutdown shall be during periods of minimal occupancy and work shall be so coordinated to minimize the disruption to normal building routines and occupancy. Contractor shall anticipate that shutdown will need to take place during evenings and weekends.
- F. Contractor shall be responsible for the removal, storage and reinstallation of lay-in ceilings as required to accomplish his scope of work. Upon completion of work, ceiling shall be restored to its original condition. Quantity and location of existing damaged or stained tiles shall be documented by the contractor prior to commencement of work with a written record and signature acknowledgment of the owner.

1.11 CUTTING AND PATCHING

- A. Unless noted otherwise, the contractor shall be responsible for all cutting and patching of existing walls, floors, and roofs which is required for the installation of his work as indicated below:
 - 1. Cutting and patching as required due to ill-timed work which otherwise could have been built in by the General Contractor.
 - 2. Cutting and patching as required to remove and replace defective work or work which does not meet the requirements of the contract documents.
 - 3. Cutting and patching as required to install materials and equipment in existing buildings.
- B. Pipe openings in floors and walls shall be core drilled if not sleeved during construction.
- C. The contractor shall be responsible for maintaining roof warranties for all cutting and patching of existing roofs. Roof work shall be sub-contracted by this contractor as required to maintain existing warranties. This contractor shall supply roof inspection / warranty certificate in the O&M manual at the completion of the project.
- D. The contractor shall not cut any reinforcing or structural building members without specific permission in writing from the Architect-Engineer.

- E. Patching shall include finish of surfaces to match those of adjacent areas. Patch and repair work is subject to approval by the Owner / Architect / Engineer.

1.12 TEMPORARY SERVICES

- A. Unless noted otherwise, contractor shall provide temporary Plumbing services in accordance with the requirements of the General Conditions, Supplementary Conditions and Division 01 General Requirements.
- B. Contractor may use permanent Plumbing equipment for temporary services when approved by the Architect-Engineer. Such approval is conditioned by the following requirements:
 - 1. The contractor shall maintain the equipment for release to owner at time of final acceptance in "New" condition.
 - 2. Warranty period for the owner shall not begin until the date of final system acceptance.

1.13 DAMAGES

- A. The contractor shall be held responsible for any damages incurred during the installation of his work to the existing grounds, walks, roads, building, plumbing systems, HVAC systems, and electric systems as well as all new construction work by other trades. He shall repair at his expense all such damages for restoration to the original conditions to the satisfaction of the Architect-Engineer and owner.
- B. The contractor shall be responsible for protecting the materials, equipment and installation of his work from damage due to weather and construction job site conditions.

1.14 CLEANUP

- A. All trash resulting from the installation of work within this specification shall be removed from the premises and disposed of in a responsible fashion by the contractor who generates it.
- B. The area of construction shall be kept in an orderly fashion. Trash shall not be allowed to accumulate so as to become a safety hazard or to impede the project progress.

- C. Upon completion of the work, the contractor and his sub-contractors shall remove from site all tools, equipment, surplus materials, and trash associated with his work.
- D. The contractor shall cooperate with the General Contractor in Final Cleaning, General Conditions.

1.15 ELECTRICAL COORDINATION

- A. Unless noted otherwise on the plans or in specific specification sections, Electrical labor and material shall be coordinated as follows:

PLUMBING CONTRACTOR

- 1. Furnish and install motors which are integral to or scheduled in conjunction with Plumbing equipment.
- 2. Furnish factory installed equipment starters and switches as scheduled and/or specified.
- 3. Furnish and install other electrical/electronic components and wiring where specified as part of the temperature control systems.

ELECTRICAL CONTRACTOR

- 1. Furnish and install power wiring to Plumbing equipment.
 - 2. Furnish mount and wire separate starters and disconnects for Plumbing equipment.
- B. The contractor shall furnish to the electrical contractor all power, motor, and control wiring diagrams and equipment / motor nameplate data.
 - C. The contractor shall provide electrical equipment to operate satisfactorily on plus or minus 10% of nominal system voltage supplied to the equipment.
 - 1. Motors for other than 120 volt operation shall be designed for and have nameplate stamped for nominal system voltage. (I.E. 208 volt system requires 208 volt nameplate; not 220, 230, or 240 volt.)

1.16 RECORD DRAWINGS

- A. The contractor shall maintain a set of prints at the construction site to record in red any deviations in the actual Plumbing system installation from the design drawings. In addition, actual installed inverts shall be recorded for each

underground sanitary, storm, water, and gas service. These record drawings shall be submitted to the Architect-Engineer upon completion of the project.

1.17 COMMISSIONING OF PLUMBING EQUIPMENT AND SYSTEMS

- A. Contractor shall commission the plumbing system to ensure that the plumbing systems operate properly along with other associated building systems to accomplish the design intent and the owner's operational requirements.
- B. Contractor shall provide all labor, material and test equipment necessary to perform system commissioning.
- C. Contractor shall verify that the plumbing system installation is complete in accordance with the plans, specifications, the manufacturer's requirements / recommendations as well industry standards and best practices.
- D. Contractor shall verify that all of the plumbing system equipment has undergone proper start-up in accordance with the manufacturer's recommendations and with the approval of the manufacturer or the manufacturer's authorized representative.
- E. Contractor shall verify that each of the individual components of the plumbing system all function and interact with each other properly.
- F. Contractor shall verify that plumbing systems function properly under both part-load and peak operating conditions.
- G. Contractor shall make all corrective actions / modifications determined by the commissioning process as necessary to achieve proper system operation and specified performance.
- H. When the project has a dedicated Commissioning Agent, this contractor shall perform the above commissioning services as well as provide assistance and services necessary in accordance with separate Commissioning Specifications (01 91 00) by the Commissioning Agent.

1.18 OPERATING INSTRUCTIONS

- I. The contractor shall provide personal instruction to the owner's operating staff on the proper operation and maintenance of the Plumbing system.

J. The contractor shall provide three (3) sets of operation and maintenance manuals for the owner's use upon completion of the project. Operation and maintenance manuals shall be submitted to the Architect-Engineer for approval.

K. Operation and maintenance manuals shall include the following:

1. Name and service telephone number of the installing company.
2. General description of how the system should operate.
3. Manufacturer's operation and maintenance instructions.
4. Copy of approved shop drawings.
5. Lubrication schedule.
6. Valve chart.
7. Spare parts list.
8. Warranty Certificates.

L. The contractor shall instruct the owner's maintenance personnel in the proper operation and maintenance of the entire Plumbing system installation including all associated equipment items.

1.19 USE OF HEI ENGINEERING GROUP, INC. ELECTRONIC DOCUMENTS

- A. HEI Engineering Group, Inc. will make available to the contractor, for a nominal fee, use of HEI CAD plans for contractor's use in Coordination work.
- B. HEI schedules and details will NOT be made available in CAD format.
- C. Release and use of CAD documents shall be in accordance with HEI Engineering Group, Inc. Electronic Document Release Form. (See Attached.)

PART 2 – PRODUCTS - NOT APPLICABLE

PART 3 – EXECUTION - NOT APPLICABLE

END OF SECTION
(HEI Electronic Document Request / Release Form on Next Page)

HEI Engineering Group, Inc. Electronic Document Request / Release Form

REFERENCE PROJECT: _____

REQUESTOR NAME: _____

REQUESTOR ADDRESS _____

REQUESTOR EMAIL _____

This form is to verify that electronic copies of the following engineering documents for the referenced project are requested by the above named requestor and that by signing below the requestor agrees to the following conditions of release:

1. The electronic documents depict engineering work which remains intellectual property of HEI Engineering Group, Inc. Electronic copies will be stripped of and not include HEI Engineering Group, Inc. Title Block Information, Engineering Seal, Standard Details or Equipment Schedules.
2. The requestor shall honor the original document copyright (which will be removed from the electronic copy) and not make electronic or paper copies of the documents for use other than
 - a. Maintenance, Reference, or Renovation relating to the subject project.
 - b. Coordination and "As Built" drawings.
 - c. Fire Protection Design Reference.
 - d. Building Automation System diagrams.
3. The electronic plans are generated in DWG Format and are compiled thru xref's of multiple files. Any Cad consulting in reference to their use will be billed at our current standard billing rates.
4. When Electronic plans are requested for Coordination Drawings, the requestor shall agree to keep all "AS BUILT" records for final submission in AutoCAD format.
5. Requestor shall hold HEI Engineering Group, Inc., Daniel R. Evans, PE, and Stacey Lloyd, PE harmless in any future engineering analysis or design work based upon these documents by any party other than HEI Engineering Group, Inc.
6. Unless waived by HEI Engineering Group, Inc., the requestor shall agree to pay in advance a processing fee of \$300.00. A check made payable to HEI Engineering Group, Inc. shall accompany this signed form prior to processing of the request.

Documents

AGREEMENT OF REQUEST / RELEASE IS INDICATED BY SIGNING BELOW

(Authorized Signature)

(Printed Name)

(Title)

(Date)

CITY OF CANTON WATER DEPARTMENT
SERVICE SHOP ADDITION AND RENOVATIONS
FEBRUARY 1, 2024

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SEC. 22 05 01 BASIC PLUMBING
REQUIREMENTS

443 W. Liberty St. PO Box 996 Wooster, OH 44691

Tel. 330-262-0042

www.hei-ohio.com

SECTION 22 05 02

BASIC PLUMBING MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to Specification Section 22 05 01 "Basic Plumbing Requirements".
- C. Unless noted otherwise, the contractor shall provide and install all new materials, equipment, components, and fixtures as indicated or specified.
- D. The contractor shall install piping specialties as indicated on the drawings and as specified in this specification.
- E. Unless noted otherwise, the contractor shall perform all excavation and backfilling required for the installation of Plumbing work.
- F. Unless noted otherwise, all required painting of the building surfaces and of exposed piping in finished areas shall be by the general contractor. Painting requirements are as indicated in this specification section, individual specification sections and as noted on the drawings.
- G. Unless noted otherwise, the contractor shall provide and install all miscellaneous support steel as required for the installation of the complete Plumbing system.
- H. Unless noted otherwise, the contractor shall coordinate exact size and locations of all concrete foundations, curbs and pads as indicated to support Plumbing equipment with the General Contractor for installation by the General Contractor.
 - 1. Any concrete work indicated on the contract drawings to be performed by the Division 22 contractor shall be installed in accordance with Division 3 - Concrete specifications.
- I. The contractor shall provide and install sealing materials for Plumbing system penetrations through building walls, floors, ceilings, and roofs. Exterior penetrations shall be weather proof and vermin proof; interior penetrations shall

have sound stopping. Penetrations through fire and smoke barriers shall have firestopping.

- J. Unless noted otherwise, the contractor shall perform all demolition work associated with the new Plumbing work. Demolition work includes removal of all demolished materials from the site and disposal of same in an appropriate manner.

PART 2 - PRODUCTS

2.1 PIPE SLEEVES

- A. Pipe sleeves shall be provided and installed where pipes pass through walls, floors, and ceilings. Sleeves shall be sufficiently large enough to allow for fire and sound stopping between the inside sleeve wall and the pipe or insulation surface as well as allow for thermal expansion and contraction of piping.
 - 1. Sleeves shall be large enough to allow pipe insulation to be continuous through the wall.
 - 2. Length of sleeves shall be equal to the thickness of the building construction element penetrated for a flush finish on both sides except for floor sleeves which shall extend 2" above the finish floor. Install iron-pipe sleeves in exterior wall penetrations and steel-pipe sleeves elsewhere unless noted otherwise.

2.2 ESCUTCHEON PLATES

- A. Escutcheon plates shall be installed on all pipe penetrations through walls, floors, and ceilings where exposed to view and on the building exterior. Escutcheon plate shall be secured to pipe or insulation and completely cover the hole penetration.
 - 1. Escutcheon plates on the building exterior and in equipment rooms shall be made of brass. All other escutcheon plates shall be chrome plated sheet steel.
 - 2. Escutcheon plates shall be as manufactured by one of the following:

Chicago Specialty Mfg. Co.
Producers Specialty & Mfg. Corp.
Sanitary-Dash Mfg. Co.

2.3 SHOCK ABSORBERS

A. Shock absorbers shall be installed on cold water service lines to all batteries of flush valve fixtures and elsewhere as indicated on the drawings.

1. Shock Absorbers shall be rated and applied in accordance with the Plumbing & Drainage Institute.
2. Shock Absorbers shall be as manufactured by one of the following:

Jay R. Smith
PPP (Precision Plumbing Products)
Sioux Chief
Wade
Zurn

2.4 VACUUM BREAKERS

A. Vacuum breakers shall be installed where specified in the plumbing fixture schedule, on all hose end outlets and equipment connections, where required by code, and where indicated on the plans.

2.5 ACCESS DOORS

A. Access doors shall be provided and installed by the Division 22 contractor where shown on the drawings in non accessible walls, and ceilings which conceal Plumbing items which require service or inspection such as valves and dampers.

1. Unless specific door size is indicated, door shall be provided of size adequate to serve the applicable concealed item.
2. Access doors shall be of painted steel construction with concealed hinge and keyed lock. All access doors provided shall be keyed alike with a minimum of two keys provided to the owner.
 - a. Access doors for installation in ceilings shall have a recessed face for field installation of finished ceiling material.
3. Access doors for installation in fire rated walls and ceilings shall be UL listed and labeled with applicable fire resistant rating.

4. Access doors shall be as manufactured by one of the following:

- a. CESCO Products
- b. Elmdor
- c. Milcor
- d. Kees

2.6 PAINT

- A. All paint products shall be specifically selected for their intended application in regards to type of surface application and interior or exterior location.
- B. Paint application shall consist of a primer coat and two finish coats.
- C. Paint color shall be as selected by the Architect.

2.7 FIRESTOPPING

- A. Firestopping shall be installed in all Plumbing System penetrations thru fire-resistance-rated walls, partitions, floors and roofs.
- B. Shop Drawing Data shall be submitted to include manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer's installation instructions.
- C. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- D. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- E. Use only firestop products that have been UL 1479, ASTM E 814, or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

- F. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E 814 which is equal to the time rating of construction being penetrated.
- G. Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction being penetrated.
- H. Firestopping materials shall be as manufactured by one of the following:
 - 1. 3M Fire Protection Products
 - 2. Hilti Corporation
 - 3. Tremco, Inc.

PART 3 - EXECUTION

3.1 PIPING SPECIALTIES

- A. Contractor shall install all piping specialties as coordinated with the field conditions in accordance with the manufacturer's recommendations.

3.2 UTILITIES

- A. The approximate location of all known underground utilities within the project area shall be determined and marked prior to performing any excavation.
- B. The proper authorities shall be contacted to aid in locating all underground utilities and to notify them of intention to excavate.
- C. Existing underground utilities shall be properly supported and protected during excavation. Should any utilities be damaged during construction, the respective utility shall be contacted immediately.
- D. Existing utilities shall not be interrupted without prior approval of the Architect-Engineer or the owner. Interruptions shall be coordinated so as to minimize the frequency of occurrence and the length of downtime.
- E. All new utilities and piping containing water, steam or condensate shall have a 42" minimum depth of burial.

3.3 EXCAVATION, TRENCHING AND BACKFILLING

- A. All trench excavation and backfill for layout and installation of interior underground sanitary, storm, vent, gas, and water piping; as well as exterior water service, fire service, gas service, sanitary and storm sewers shall be the responsibility of the Division 22 contractor.
- B. Excavations shall have sides sloped, shored, and braced in accordance with local codes and ordinances and as required for safety of workers.
- C. Contractor shall protect excavations from rain water, surface water and ground water as much as possible. All water shall be removed from the excavations prior to laying of the underground piping.
- D. Unless noted otherwise, all trenches for underground piping shall be backfilled so that the run of pipe shall be laid on 4" of sand and backfilled to 6" above crown of pipe with sand. Thereafter, backfill shall be compacted with mechanical tampers in no greater than 6" layers of suitable excavated material free of large stones until proper grade is attained.
- E. Trenches parallel to footers or outside bearing walls shall maintain three feet of clearance from the footers or walls. Excavation for such trenches below the elevation of the bottom of a footer shall maintain a horizontal separation distance so as not to disturb soil within a zone 45 degrees off of the bottom edge of the footer.
- F. All excavation for trenches within paved areas, sidewalks, etc., shall be backfilled the width of the trench plus five feet beyond each side with good fill sand to the underside of the base course of the paving material.
- G. Any and all excavated materials which are not used for backfill shall become the property of this contractor and shall be removed from the site at his expense. (If excess excavation materials are suitable, Architect-Engineer may allow for the materials to be distributed on site.)
- H. Trenches shall not be backfilled until all piping within the trench has been tested and/or inspected and approved by the local authorities having jurisdiction.
- I. Where trenches cross streets, walks, or public thoroughfares, the contractor shall be responsible for and provide suitable barricades and bridges, adequately protected by signs or red flags during the day and by lights at night.
- J. All streets, parking lots, sidewalks, sod, etc., which are disturbed by the excavation process shall be restored by the contractor at his expense to the original site condition to the satisfaction of the Architect-Engineer, the owner and the authorities having jurisdiction.

- K. If observable subsidence is noted in the areas of excavation for Plumbing work during the project warranty period, the contractor shall remove the surface finish, fill in the subsidence and restore the surface finish to the intended condition.
- L. Contractor shall refer to Division 2 - Site Work; for additional excavation, trenching and backfill requirements.

3.4 PAINTING

- A. Existing building surfaces and auxiliary equipment and finishes marred during installation of Plumbing work shall be touched up and repainted by the Division 22 contractor to the satisfaction of the Architect-Engineer.
- B. Factory applied paint finishes on Plumbing equipment marred during installation of work shall be touched up and repainted by the contractor to the satisfaction of the Architect-Engineer. Touch up paint shall be in accordance with the equipment manufacturer's recommendations.
- C. The Division 22 contractor shall paint all iron pipe fittings and valve bodies, all support steel installed as part of his scope of work and all exposed piping on the exterior of the building.
- D. All painting shall be done in accordance with the paint manufacturer's instructions including surface preparation and conditions of ambient temperature and humidity.
- E. Environmental conditions in the area of painting work shall comply with the paint manufacturer's recommendations and all governing regulations.
- F. Contractor shall refer to Division 09 - Finishes.

3.5 FIRESTOPPING

- A. The contractor shall seal all fire / smoke rated wall and floor penetrations for Plumbing system components with fire and smoke stopping materials so as to maintain the fire resistance rating of the wall or floor penetrated.
 - 1. Firestopping compound, pipe sleeves, and piping and insulation shall be installed so as the complete penetration assembly is classified by UL as listed in the UL Building Materials Directory.

2. Installation shall be in full compliance with the firestop material manufacturer's installation instructions and recommendations
3. Installer shall verify that penetrations are properly sized and in suitable condition for application of firestopping materials.
4. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, water repellents, and any other substances that may affect proper adhesion.
5. Installation conditions shall be in compliance with the manufacturer's recommendations for temperature and humidity before, during and after installation of firestopping.

3.6 DEMOLITION

- A. The demolition drawings are based on the original construction documents and/or limited field design observation and therefore may not reflect the actual existing conditions. The contractor shall coordinate demolition work required with both the new work indicated and the actual field conditions encountered.
- B. Unless noted otherwise, inactive / obsolete piping, fittings, supports, specialties, equipment, controls, etc. associated with the Plumbing systems being installed or renovated shall be demolished by the contractor.
- C. All equipment and materials to be demolished shall first be offered to the owner for his retention. If the owner does not want the demolished materials, they shall be removed from the site and legally disposed of by the contractor.
- D. Existing Plumbing system components enclosed within floors, walls, or ceilings or which are not readily accessible for other reasons, may be abandoned in place if they do not interfere with the new work. All such items shall be capped water tight within the building element so as the general contractor may provide a flush finish.
- E. Unless noted otherwise, piping indicated for demolition shall be removed back to the nearest main. Main (or other noted termination point) shall be capped water tight. Piping within walls which are to remain may be capped in the wall and abandoned within the wall. Services must be capped far enough in the wall to allow for flush patching and finishing of the wall.
- F. This contractor shall coordinate shutdown of any Plumbing systems required as part of the demolition work with the owner prior to interruption of services.

- G. The contractor shall provide full height temporary dust partitions as indicated or as required to prevent the transmission of dust from the construction zone to the occupied zone.
- H. If any material is encountered in the course of demolition work which the contractor, subcontractor, or tradesman suspects to be asbestos, then the work in the area shall cease until the owner or owner's representative is contacted for a determination of whether the material is safe, should be tested, or should be removed. The contractor shall be responsible for notifying all tradesman on the job of the potential presence and hazard of asbestos materials.

END OF SECTION

SECTION 22 05 03

PLUMBING PIPING AND FITTINGS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 22 Specification Section 22 05 01 "Basic Plumbing Requirements" and 22 05 02 "Basic Plumbing Materials and Methods".
- C. Related Work Specified Elsewhere:
 - 1. Plumbing Hangers and Supports: 22 05 29
 - 2. Plumbing Identification: 22 05 53
 - 3. Plumbing Insulation: 22 07 00

PART 2 - PRODUCTS

2.1 MATERIAL STANDARDS

- A. Steel Pipe:
 - 1. Size 2" and larger to be ASTM A53, grade B seamless carbon steel or electric resistance welded
 - 2. Size 1-1/2" and smaller to be ASTM A120 butt welded carbon steel.
- B. Cast Iron Soil Pipe shall be in accordance with the latest revision of ASTM A74 and associated compression joints with ASTM C564.
- C. No-Hub Cast Iron Soil Pipe shall be in accordance with the latest revision ASTM A888 and the latest revision of the Cast Iron Soil Pipe Institute standard CISPI 301. Associated No-Hub Couplings shall be in accordance with the latest revision ASTM C1277 and the associated Rubber Gaskets with ASTM C564.

- D. Ductile Iron Pipe shall be in accordance with the latest revision of AWWA C151 and associated cement lining with AWWA C104 and fittings with AWWA C110 and C111.
- E. Copper pipe shall be in accordance with the latest revision of ASTM B-88.
- F. PVC (Polyvinyl Chloride) drain, waste and vent (DWV) pipe and fittings shall be solid wall schedule 40 in accordance with the latest revision of ASTM D 2665 and associated solvent cement with ASTM D 2564.
- G. ABS (Acrylonitrile-Butadiene-Styrene) drain, waste and vent (DWV) pipe shall be solid wall schedule 40 in accordance with the latest revision of ASTM D 2661 and associated solvent cement with ASTM D 2235.
- H. PVC (Polyvinyl Chloride) sewer pipe shall be in accordance with the latest revision of ASTM D 3034 and associated solvent cement with ASTM D 2564 and associated gaskets with ASTM F 477.
- I. ABS (Acrylonitrile-Butadiene-Styrene) sewer pipe shall be in accordance with the latest revision of ASTM D 2751 and associated solvent cement with ASTM D 2235 and associated gaskets with ASTM F 477.
- J. HDPE (High Density Polyethylene) storm sewer pipe shall be in accordance with the latest revision of ASTM F2648 and fittings conforming to ASTM F 2306 with bell & spigot joints and gaskets when applicable shall meet the requirements of ASTM F477. Pipe shall have a smooth interior and annular exterior corrugations with a Manning's "n" value of 0.012.
- K. Threaded pipe joints shall be in accordance with the American tapered pipe thread standard ASA-B2.1-1060.
- L. Mechanical Joints for copper water piping shall be Anvil 6400, Grinnell 672 or Victaulic Style 607. (All Mechanical Joint components and products utilized for the entire project shall be supplied by the same manufacturer and shall be installed in strict accordance with the manufacturer's published instructions. Gaskets shall be rated for 250F.
- M. Mechanical Joints for galvanized steel water piping shall be flexible type; Grinnell 707, Gruvlok 7001 or Victaulic Style 77. (All Mechanical Joint components and products utilized for the entire project shall be supplied by the same manufacturer and shall be installed in strict accordance with the manufacturer's published instructions. Gaskets shall be rated for 250F.

- N. Press connection joints for copper water piping shall utilize Viega / Rigid ProPress XL fittings with EPDM O-Rings. Joints shall be made in accordance with the manufacturer's installation instructions.

2.2 PIPING SYSTEMS

A. Domestic Water Piping:

1. Within building 6" and smaller:

Type "L" hard copper pipe with wrought copper fittings for solder joints

Type "L" hard copper pipe with Viega ProPress XL fittings with EPDM O-Rings for press connection joints.

Type "L" hard copper pipe with Grooved-End copper fittings for mechanical joints.

2. Underground outside of building 2" and smaller:

Type "K" seamless annealed temper copper tube with wrought copper fittings for solder joints

Type "K" hard copper pipe with wrought copper fittings for solder joints

3. Underground outside of building 3" and larger:

AWWA C151-CL.53 ductile iron cement lined pipe and fittings for compression joints

AWWA C151-CL.53 ductile iron cement lined pipe and fittings for mechanical joints

B. Natural Gas Piping:

1. Within building 2" and smaller:

Schedule 40 black steel pipe with 125 pound malleable iron fittings for screwed joints

2. Within building 2-1/2" to 10":

Schedule 40 black steel pipe with schedule 40 factory formed fittings for welded joints

3. Underground outside of building:

Schedule 40 steel PVC coated pipe with schedule 40 factory formed fittings for welded and taped joints

Polyethylene plastic piping with fusion welded joints may be used when approved by the local utility company

C. Sanitary Drain Piping:

1. Above ground within building

Service weight, coated and labeled cast iron pipe with no-hub, service weight coated and labeled cast iron fittings for no-hub joints

2. Below ground within building

Service weight, coated and labeled cast iron pipe with service weight coated and labeled cast iron, hub & spigot fittings for compression gasket joints

3. Below ground outside of building

Service weight, coated and labeled cast iron pipe with service weight coated and labeled cast iron, hub & spigot fittings for compression gasket joints (4"-12")

Reinforced concrete pipe and fittings for compression gasket joints (15" & larger)

D. Sanitary Vent Piping:

Service weight, coated and labeled cast iron pipe with no-hub, service weight coated and labeled cast iron fittings for no-hub joints

E. Storm Water Piping:

1. Above ground within building

Schedule 40 galvanized steel pipe with no-hub, service weight coated and labeled cast iron fittings for mechanical joints

Service weight, coated and labeled cast iron pipe with mechanical fittings for no-hub joints

2. Below ground within building

Service weight, coated and labeled cast iron pipe with service weight coated and labeled cast iron, hub & spigot fittings for compression gasket joints

3. Below ground outside of building

Service weight, coated and labeled cast iron pipe with service weight coated and labeled cast iron, hub & spigot fittings for compression gasket joints (4"-12")

Reinforced concrete pipe and fittings for compression gasket joints (15" & larger)

PART 3 - EXECUTION

3.1 GENERAL

- A. Piping materials shall be of the type indicated for each service. Where more than one type is indicated the installing contractor shall select from the indicated options according to his preference. (Unless noted otherwise on the contract drawings.) If a type is not indicated, the installer shall provide proper selection for architect / engineer's review in accordance with industry standards and government regulations.
- B. Piping installation shall not require springing or forcing. Piping offsets, loops and/or expansion joints shall be provided (whether shown or not) to limit stress due to thermal expansion.
- C. Piping materials shall be clean prior to and during installation. Upon completion of piping installation; but prior to final connections, the entire system shall be flushed with a cleaning solution which will not harm either the piping, equipment or users.

- D. Drain valves shall be provided at all low points and manual air vents shall be provided at all high points.
- E. Equipment connections shall include unions provided between a piping service shut-off valve and each equipment connection. Piping offsets shall be provided to permit removal of all equipment.
- F. Copper piping connections to steel or iron pipe shall be made with dielectric unions.
- G. Standard increaser and reducer pipe fittings shall be used to join pipes of different sizes.
- H. Mechanical joints shall be installed in strict accordance with the manufacturer's guidelines and recommendations. All mechanical joint couplings and fittings shall be supplied by a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components. The gasket style and elastomeric material/grade shall be field verified for suitability in the intended service. Grooved ends shall be clean and free of indentations, projections and roll marks in the area from the pipe end to the groove for proper gasket sealing. A factory trained representative shall provide on-site training to the installing personnel in the proper use of grooving tools and installation of grooved piping products. A factory trained representative shall periodically make on-site inspections to observe the work in progress to affirm proper installation. Installing contractor shall remove and replace any improperly installed products.

3.2 DOMESTIC WATER PIPING

- A. Solder joints shall be lead-free using 95-5 tin-antimony solder and appropriate flux.
- B. Pipe nipples between copper piping and fixture fittings shall be brass.
- C. Press connection joints for copper water piping shall utilize Viega / Rigid ProPress XL fittings. Joints shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool approved by the manufacturer.
- D. Mechanical formed tees by "T-Drill" for brazed joints may be used for copper tube and piping in lieu of copper tee fittings when such application is approved by the

authorities having jurisdiction. System shall extract a drawn collar onto the pipe main of height equal to not less than three times the branch wall pipe thickness. In addition the system shall prepare the branch pipe / tube end by notching to conform with the inner curve of the main pipe and by dimpling a depth stop to insure proper penetration of the pipe branch into the collar. Brazing shall be in accordance with the "Copper Development Association Copper Tube Handbook" using BCuP series filler metal. System shall be UL Listed and comply with ASME Code for Pressure Piping ANSI B31.5.C.

- E. Domestic hot water pipes shall be installed with an allowance of 1-1/4" per 100 feet of pipe for thermal expansion.
- F. Filled piping installation shall be protected from freezing until acceptance from owner of the entire construction project.
- G. Upon completion of the domestic water piping installation, the entire system shall be flushed, disinfected, and flushed again in accordance with the latest AWWA standards. Upon completion of the disinfection process; bacteriological tests shall be performed in accordance with AWWA standards and the local health department to verify satisfactory water quality.

3.3 SANITARY DRAIN AND VENT PIPING

- A. All drain and vent piping shall be run as direct as possible within the actual building conditions.
- B. Branch drains shall be installed with a minimum slope of 1/4" per foot. Main drains shall be installed with a minimum slope of 1/8" per foot. Vent piping shall be continuously sloped when other than vertical.
- C. All changes in direction of drain piping shall be made with 1/6, 1/8, or 1/16 bends or "Y" branches. Sanitary tees and 1/4 bends may be used for horizontal to vertical flow sections.
- D. Cleanouts shall be provided at the base of all stacks, at changes in direction greater than 45 degrees, at spacings of 100 ft on center maximum and as shown on the contract drawings. Cleanout shall be of the same size as the pipe on which it serves up to a maximum cleanout size of 6".
- E. Vent pipe terminations shall be extended at least 12" above the roof. Roof penetrations shall be made water tight with flashing of sheet lead (3 lb / sq ft) or sheet copper (8 oz / sq ft) with minimum base of 16" diameter and collar full height of pipe.

- F. During installation drain and vent piping shall be plugged whenever work is not in progress.

3.4 NATURAL GAS PIPING

- A. All gas piping shall be installed in accordance with the State of Ohio Pressure Piping Systems, Chapter 4101:8 and The ICC International Fuel Gas Code.
- B. Any gas piping in a non accessible space shall be of all welded construction.
- C. Any gas piping in a return air plenum shall be of all welded construction.
- D. The entire existing gas piping system shall be purged prior to extension of or connection to new work. Upon completion of installation, inspections, and tests all existing and new pilot lights shall be lit by this contractor.
- E. Comply with the local utility company for any additional requirements.
- F. Contractor is to make final gas connections to all plumbing, HVAC, and owner supplied equipment noted on the contract drawings. Gas connection piping shall include an accessible AGA approved shut-off valve, a full size tee with a 6" dirt leg, and a union. The union shall be between the shut-off valve and the equipment. An AGA approved flexible gas connector shall be utilized for all equipment with un-isolated rotating or reciprocating parts. Pipe reducer/increaser fittings shall be installed at point of equipment connection as required.
- G. All exposed gas piping on the exterior of the building shall be painted by the installing contractor with a prime coat and two finish coats of weather resistant paint.

END OF SECTION

SECTION 22 05 23

PLUMBING VALVES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 22 Specification Section 22 05 01 "Basic Plumbing Requirements" and 22 05 02 "Basic Plumbing Materials and Methods".
- C. All valves of the same type shall be of the same manufacturer.
- D. Valve bodies shall be clearly marked with the manufacturers name or trademark and the pressure rating.
- E. Valves shall comply with ANSI B16.10 "Face-to-Face and End to End Dimensions of Ferrous Valves.
- F. Related Work Specified Elsewhere:
 - 1. Plumbing Piping and Fittings: 22 05 03
 - 2. Plumbing Identification: 22 05 53
- G. Quality Assurance
 - 1. Ball Valves shall meet MSS SP-110-92.
 - 2. Cast Iron Globe and Angle Valves shall meet MSS SP-85-85.
 - 3. Bronze Gate, Globe and Check Valves shall meet MSS SP-80-87.
 - 4. Cast Iron Plug Valves shall meet MSS SP-78-92.
 - 5. Cast Iron Gate Valves shall meet MSS SP-70-90.
 - 6. Butterfly Valves shall meet MSS SP-67-90.
 - 7. Grooved end valves and couplings for the entire project shall be supplied by the same manufacturer.

PART 2 - PRODUCTS

2.1 GENERAL DUTY VALVES

- A. Valves shall be factory fabricated for selection and installation by the contractor in accordance with the manufacturer's recommendations for the intended service.
- B. Valve size shall be same size as the pipe in which it is installed unless noted otherwise.
- C. Valve shall be supplied as manufactured by from one of the following:

- 1. Gate Valves

- Crane
 - Hammond
 - Jenkins
 - Lunkenheimer
 - Milwaukee
 - Nibco
 - Stockham

- 2. Globe Valves

- Crane
 - Hammond
 - Jenkins
 - Lunkenheimer
 - Milwaukee
 - Nibco
 - Stockham

- 3. Ball Valves

- Apollo
 - Hammond
 - Jamesbury
 - Jenkins
 - Milwaukee
 - Nibco
 - Stockham
 - Victaulic
 - Watts

- 4. Butterfly Valves

Crane
Centerline
DeZurik
Grinnell
Gruvlok Series B680
Nibco
Victaulic Series 608

5. Check Valves

Crane
Hammond
Jenkins
Lunkenheimer
Milwaukee
Mueller
Nibco
Powell
Stockham

6. Strainers

Armstrong
Crane
Mueller
Sarco

7. Plug Valves

American Valve
FMC Crosby Valve
DeZurick
Red-White Valve Corp.

D. Valves shall be provided and installed as indicated on the contract drawings in accordance with the following schedule.

1. Copper water piping 2" and smaller; Nibco valves or listed equivalent as follows:

- a. Gate Valve: 125 WSP; bronze body with rising stem, union bonnet, single wedge disc for solder joint pipe connections. Valves shall conform to ASTM specification WW-V-54d, Class A, Type II.
(Nibco #S-134)

- b. Globe Valve: 125 WSP; bronze body with rising stem, union bonnet, and ANSI 420-S stainless steel tapered plug and seat for solder joint pipe connections. Valves shall conform to ASTM specification B-62 and federal specification WW-V-51, Class A, Type I and II. (Nibco S-211-Y)
 - c. Check Valve: 125 WSP; bronze, swing check for solder joint pipe connections. Valves shall conform to ASTM specification B-62 and federal specification WW-V-51d, Type IV, Class C. (Nibco #S-413-Y)
 - d. Ball Valve: 150 psi SWP and 600 psi non shock WOG; two piece bronze body with chrome plated ball, TFE seats, full port, stem packing, anti-blow-out stems for solder joint pipe connections. (Nibco #S-585-70)
 - e. Strainers: 125 WSP all bronze body Y-pattern with 20 mesh stainless steel screens. Strainers shall conform to federal specification WW-V-51d Class A, Type IV.
2. Steel water piping 2-1/2" and greater; Nibco valves or listed equivalent as follows:
- a. Gate Valve: 125 WSP; cast iron body with bronze trim, outside screw and yoke, rising stem, bolted bonnet for flanged joint pipe connections. Valves shall conform to ASTM specification A-126 Class B. (Nibco #F-617-0)
 - b. Globe Valve: 125 WSP; cast iron body with bronze trim, outside screw and yoke, rising stem, bolted bonnet for flanged joint pipe connections. Valves shall conform to ASTM specification A-126 Class B. (Nibco #F-718-B)
 - c. Check Valve: 125 WSP; cast iron body with bronze trim for flanged joint pipe connections. Valves shall conform to ASTM specification A-126. (Nibco #F-918-B)
 - d. Butterfly Valve: 200 psi non shock cold water working pressure; lug type ductile or cast iron body with extended neck for insulating, aluminum bronze alloy disc, EPDM rubber seats and seals, a 400 series stainless steel stem and a ten position lever lock handle. (Nibco #LD-2000 Series)

3. Gas piping; DeZurick valves or listed equivalent as follows:

- a. 2" and smaller: 175# WOG cast iron body for screwed joint pipe connections. Valves shall be UL listed for gas service. (DeZurick Series 425 with RS-49 plug seals and lever handle)
- b. 2-1/2" to 4": 175# WOG cast iron body for flanged joint pipe connections. Valves shall be UL listed for gas service. (DeZurick Series 425 with RS-49 plug seals and lever handle)
- c. 6" and greater: 175# WOG cast iron body for flanged joint pipe connections. Valves shall be UL listed for gas service. (DeZurick Series 100 with RS-49 plug seals and lever handle).

2.2 SPECIAL DUTY PLUMBING VALVES

A. Thermostatic Mixing Valves:

1. Thermostatic Mixing Valve Assemblies shall be of bronze body construction with corrosion-resistant interior components rated for 125 psig working pressure. See drawings and plumbing schedules for additional requirements.
2. Thermostatic Mixing Valve Assembly shall meet the requirements of ASSE 1017.
3. Thermostatic Mixing Valve Assemblies shall be supplied as manufactured by from one of the following:
 - a. Armstrong International, Inc.
 - b. Conbraco Industries, Inc.
 - c. Lawler
 - d. Leonard Valve
 - e. Powers
 - f. Symmons Industries, Inc.
 - g. Taco
 - h. Watts Industries, Inc.
 - i. Zurn Plumbing Products

B. Water Hammer Arresters:

1. Water Hammer Arresters shall be of the copper tube with piston type. See drawings and plumbing schedules for additional requirements.

2. Water Hammer Arresters shall meet the requirements of ASSE 1010 or PDI-WH 201.
3. Water Hammer Arresters shall be supplied as manufactured by from one of the following:
 - a. AMTROL, Inc.
 - b. Jay R. Smith
 - c. Josam Company
 - d. MIFAB, Inc.
 - e. PPP Inc.
 - f. Sioux Chief Manufacturing Company, Inc.
 - g. Wade
 - h. Watts Industries, Inc.
 - i. Zurn Plumbing Products

PART 3 - EXECUTION

3.1 VALVE INSTALLATION

- A. Valves shall be installed in accordance with the manufacturer's recommendations in accessible locations so as to facilitate valve operation, system maintenance and to accommodate removal of plumbing equipment.
- B. Valves in horizontal piping shall be installed so as to have their stems pointing vertically upward whenever possible; but in no case shall stems be installed more than 90 degrees from the vertically upward position.
- C. Valves with threaded joints shall be installed with a piping union on the downstream side of the valve.
- D. Valves shall be installed in the cold water, hot water and gas piping to isolate each piece of equipment connected to the plumbing system.
- E. Valves shall be of material compatible with the piping system in which they are installed.
- F. Unless noted otherwise, only ball valves shall be installed for domestic water piping 2" and smaller.

END OF SECTION

SECTION 22 05 29

PLUMBING HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 22 Specification Section 22 05 01 "Basic Plumbing Requirements" and 22 05 02 "Basic Plumbing Materials and Methods".
- C. This contractor shall provide and install piping and equipment hanger and support devices as indicated on the contract drawings and specified in this section. Hangers and supports shall secure piping and equipment in place, shall prevent the transmission of vibration, shall provide for vertical adjustment to level equipment and to maintain required pipe slope and shall provide / allow for expansion and contraction.
- D. This contractor shall provide and install all supplementary angles, channels, plates, etc., where supports are required between the building structural members, spanning the space and attached to the structural members by welding, or mechanical fasteners.
- E. This contractor shall provide and install miscellaneous fabricated structural steel supports for equipment as indicated on the contract drawings or as required per the equipment manufacturer.

PART 2 – PRODUCTS

2.1 COMPONENTS

- A. Hangers, supports and components shall be factory fabricated according to MSS SP-58, the latest edition.
- B. Concrete inserts into poured concrete floor systems are not permitted.
- C. Beam clamps, trapeze hangers and clevis hangers shall be permitted.

2.2 PIPE HANGERS AND SUPPORTS

A. All horizontal piping shall be installed with factory fabricated hangers and supports attached to the building substrate with suitable expansion shells, inserts, or beam clamps. Hangers shall be selected to exactly fit pipe size for bare piping and to exactly fit around piping insulation with saddle or shield for insulated piping. Copper plated hangers and supports shall be utilized for all copper piping systems. Perforated strap hangers and "C" clamp attachments are prohibited.

1. Unless noted otherwise, all horizontal pipe 3" and smaller shall be supported by individual adjustable steel clevis hangers.
2. Unless noted otherwise, all horizontal pipe 4" and larger (and all horizontal pipe 2" and larger which conveys a fluid above 150° F) shall be supported by adjustable roller type hangers.
3. Parallel piping may also be supported together on a trapeze type hanger as long as all piping is adequately supported and individual thermal pipe movement is accounted for.
4. Pipe support spacing and hanger rod sizing shall be as follows except for cast iron pipe which shall be supported at a maximum interval of 5'-0" on center and plastic piping which shall be supported at a maximum interval of 4'-0" on center:

PIPE SIZE	ROD DIA	MAX SPACING ON CENTER
1/2" TO 1-1/4"	3/8"	6'-0"
1-1/2" TO 2"	3/8"	9'-0"
2-1/2" TO 3"	1/2"	11'-0"
4" TO 6"	3/4"	12'-0"
8"	7/8"	12'-0"
10" TO 12"	7/8"	12'-0"
14" TO 16"	1"	12'-0"

5. Additional hangers shall be installed at change in pipe direction and at concentrated load points such as in-line pumps and large valves or strainers.

B. All vertical piping shall be installed with factory fabricated piping clamps attached to the building substrate with suitable expansion shells, inserts, or beam clamps.

Clamps shall be selected to exactly fit bare pipe size. Copper plated clamps shall be utilized for all copper piping systems.

1. Support vertical piping at each floor line.
2. Support base of each vertical pipe riser.

2.3 EQUIPMENT HANGERS

- A. Hangers for Plumbing equipment shall consist of structural steel shapes or steel rods attached to the building substrate with suitable expansion shells, inserts, or beam clamps. Hangers shall be selected to adequately support the static and dynamic loads of the equipment as indicated by the equipment manufacturer. Isolation type hangers shall be used to support all overhead mechanical equipment with rotating parts. Isolators shall be installed as close to the overhead structure as possible.

2.4 ROOFTOP EQUIPMENT SUPPORTS AND CURBS

- A. Prefabricated 12" high 18 gauge galvanized steel roof equipment supports shall be utilized to support all rooftop equipment and piping.
- B. Where tapered roof insulation is utilized or existing, the contractor shall either provide extended height roof curbs and equipment supports or provide wood blocking below curbs, to elevate curbs a minimum of 8" above the finished roof. The General Contractor shall be responsible for the installation of the blocking furnished by this contractor.

2.5 PIPE AND EQUIPMENT SUPPORTS ON EXISTING ROOFS

- A. Rooftop pipe and equipment supports on existing roofs shall be of a standard manufactured product line with the following characteristics:
 1. Base shall be manufactured of UV stable polymer materials with non-abrasive bottom surface compatible with the roof membrane for resting directly on the membrane surface. Base shall be of sufficient size to properly distribute the load without damaging the roof membrane or insulation beneath.
 2. For direct pipe or equipment support without elevation or level adjustment; base shall include an integral hot dipped galvanized steel clamp channel for use with appropriate hot dipped galvanized steel retainer hardware, straps, etc....

3. For piping or equipment elevated above the roof and/or for slightly sloped roof applications requiring support leveling; base shall include an integral vertical strut attachment for use with appropriate hot dipped galvanized vertical steel struts, posts, cross channels etc...
4. Unless noted otherwise, all horizontal pipe 4" and larger shall be supported by adjustable roller type hangers.
5. Parallel piping may be supported together on a trapeze type hangers as long as individual thermal pipe movement is accounted for and all piping is adequately supported.
6. Pipe and/or equipment support spacing shall be at a maximum interval of 6'-0" on center. Additional supports shall be installed at change in pipe direction and at concentrated load points.

2.6 MANUFACTURER

- A. Piping and Equipment Hangers, Supports, Saddles, Shields, Clamps, Attachments, etc. shall be as manufactured by one of the following :
 1. Anvil International
 2. Cooper B-Line, Inc.
 3. Globe Pipe Hanger Products, Inc.
 4. Michigan Hanger Co.
 5. Pentair & Subsidiaries
 6. PHD Manufacturing, Inc.
 7. The Modern Pipe Supports Corporation
- B. Rooftop Equipment Supports and Curbs shall be as manufactured by one of the following :
 1. Pate Company
 2. Roof Products and Systems
 3. Thycurb Div.; of Thybar Corp.
- C. Pipe and Equipment supports for existing roofs shall be as manufactured by:
 1. Eberl Iron Works, Rooftop Support Systems
 2. ERICO Caddy Pyramid
 3. IPS Roofing Products
 4. MAPA Products
 5. PHP Systems/Design

6. Unistrut

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all inserts, hangers and supports in complete accordance with the manufacturer's recommendations.
- B. Install all inserts, hangers and supports so as to adequately support the equipment in accordance with the equipment manufacturer's requirements.
- C. Install all inserts, hangers and supports so as not to have a detrimental effect on the building substrate to which they are attached.
- D. Supports and curbs for standing seam roofs are provided and installed by the General Contractor. All other curbs are provided and installed by this Contractor for counter flashing to roof by the General Contractor.
- E. Support from steel joist panel point is required.
- F. Supports from roof decking systems are not permitted.
- G. Bending of threaded hanger rods to account for sloping roof steel is not permitted.

END OF SECTION

SECTION 22 05 53

PLUMBING IDENTIFICATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 22 Specification Section 22 05 01 "Basic Plumbing Requirements" and 22 05 02 "Basic Plumbing Materials and Methods".
- C. This contractor shall provide and install permanent identification markers for the Plumbing system components as indicated below:
 - 1. Each scheduled item of equipment
 - 2. Piping
 - 3. Valves
- D. Identification markers shall comply with ANSI A13.1 requirements for lettering size, length of color field, colors and viewing angles.

1.2 QUALITY ASSURANCE

- A. Identification requirements shall meet ASME A13.1.

PART 2 - PRODUCTS

2.1 EQUIPMENT MARKERS

- A. Plumbing equipment shall be identified with aluminum engraved or stamped nameplates permanently fastened to equipment. Marker shall identify equipment with nomenclature as indicated on the contract drawings. Identification shall utilize 3/16" high text.

2.2 PIPING MARKERS

- A. Plumbing piping shall be identified with self-adhesive, flexible vinyl, preprinted, color coded plastic pipe markers indicating the piping service and the direction of flow.

2.3 VALVE MARKERS

- A. Valves shall be identified with 1-1/2" square x 1/16" thick engraved plastic laminated tag markers. Valves shall be numbered consecutively for each piping system. Marker shall identify piping system (HWS, CWS, ETC...) with 1/4" high text and identify the valve number with 1/2" high text. The marker shall have a hole for fastening the tag to the valve with a flexible bead chain.

2.4 VALVE CHART

- A. A type written valve chart shall be installed in an equipment room in a wood or aluminum frame with a plexiglass cover. A copy of the valve charts shall also be included in the maintenance and operating manuals.
- B. A valve chart shall be furnished by each contractor and shall include the following items:
 - 1. Valve Identification
 - 2. Location
 - 3. Purpose

2.5 CEILING TILE MARKERS

- A. Identification stickers / dots shall be adhered to the lay-in ceiling tile to locate access to Plumbing system components concealed above. The following system components shall be identified:
 - 1. Plumbing Isolation Valves
 - 2. Plumbing Mixing Valves
 - 3. Plumbing Inline pumps
 - 4. Etc...

2.6 MANUFACTURERS

- A. Identification Markers shall be as manufactured by one of the following:

1. Allen Systems, Inc.
2. Brady Co.
3. Marking Services, Inc.
4. Seton Name Plate Corp.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Contractor shall install Identification Markers in accordance with the manufacturer's installation instructions.
- B. Install pipe markers wherever piping is exposed to view in accessible spaces. Locate markers approximately 25 feet on center and near each wall, floor, and ceiling penetration. In addition, locate markers near points of piping origin, points of piping termination and points of piping connection to major equipment.
- C. Piping, equipment and valve identification shall be completed prior to issuance of substantial completion.

END OF SECTION

SECTION 22 07 00

PLUMBING INSULATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 22 Specification Section 22 05 01 "Basic Plumbing Requirements" and 22 05 02 "Basic Plumbing Materials and Methods".

1.2 QUALITY ASSURANCE

- A. Insulation systems shall be provided and installed by firms who have been regularly engaged in insulation systems of similar type for at least three years.
- B. The materials and methods for the complete insulation system installation shall be tested, rated, and installed in accordance with the following codes and standards.
 - 1. OBC
 - 2. NFPA 90A
 - 3. ASTM E-84 (NFPA 255)
- C. The composite insulation system installation including all insulation materials, adhesives, sealers, coverings, etc...shall have flame-spread and smoke-developed indices as indicated below:
 - 1. Indoor installations shall have flame-spread index of 25 or less, and a smoke-developed index of 50 or less.
 - 2. Outdoor installations shall have flame-spread index of 75 or less, and a smoke-developed index of 150 or less.

1.3 SCOPE OF WORK

- A. Insulation work shall include but not be limited to the following types of systems.

1. Piping
2. Equipment

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Insulation products shall be supplied as manufactured by one of the following:

1. Fiber glass equipment insulation.

CertainTeed Corporation
Knauf Fiber Glass
Owens-Corning Fiberglas Corp.
Schuller International

2. Fiber glass piping insulation.

CertainTeed Corporation
Knauf Fiber Glass
Owens-Corning Fiberglas Corp.
Schuller International

3. Flexible unicellular insulation.

Armacell Engineered Foams
Armstrong World Industries
Halstead Industries, Inc
K-Flex USA

4. Calcium silicate insulation.

Owens-Corning Fiberglas Corp.
PABCO Insulation Div., Fiberboard Corp.
Schuller International

5. Insulation fasteners and adhesives

Childers Products Co.
Duro-Dyne Corp.
Gripnail Corp.
H. B. Fuller Co.
Halstead Industries, Inc.

Hardcast, Inc.
Mon-Eco Industries, Inc
TRW Nelson Stud Welding Division
Vimasco

2.2 INSULATION MATERIAL STANDARDS

- A. Fiber glass pipe insulation with an all service jacket. Insulation shall be of thickness as indicated in this specification or on the drawings, with a thermal conductivity "k" factor of 0.24 at 75 degree F mean temperature suitable for applications up to 350 degrees F. Insulation shall be Owens-Corning Type ASJ/SSL-II or equivalent by other listed manufacturer.
- B. Semi-rigid fiber glass insulation batts or rolls with a field applied glass cloth lagging. Insulation shall be of thickness as indicated in this specification or on the drawings, with a thermal conductivity "k" factor of 0.27 at 75 degree F mean temperature suitable for applications up to 1000 degrees F. Insulation shall be Owens-Corning Type TIW (Thermal Insulating Wool) or equivalent by other listed manufacturer.
- C. Asbestos free calcium silicate insulation with a field applied glass cloth lagging. Insulation shall be of thickness as indicated in this specification or on the drawings, with a density of between 13 pcf and 15 pcf, with a thermal conductivity "k" factor of 0.40 at 200 degree F mean temperature suitable for applications up to 1200 degrees F. Insulation shall be Owens-Corning Type Kaylo or equivalent by other listed manufacturer.

2.3 INSULATION APPLICATIONS

- A. Plumbing Piping Systems
 - 1. All domestic cold water piping 1-1/4" and smaller shall be insulated with 1/2" thick fiber glass pipe insulation with an all service jacket.
 - 2. All domestic cold water piping 1-1/2" and larger shall be insulated with 1" thick fiber glass pipe insulation with an all service jacket.
 - 3. All domestic hot water piping and recirculating hot water piping 1-1/4" and smaller shall be insulated with 1" thick fiber glass pipe insulation with an all service jacket.
 - 4. All domestic hot water piping 1-1/2" and larger shall be insulated with 1-1/2" thick fiber glass pipe insulation with an all service jacket.

5. All roof drain bodies and horizontal storm drain piping above grade shall be insulated with 1" thick fiber glass pipe insulation with an all service jacket.

B. Cold Equipment

1. All cold equipment shall be insulated with 2" thick semi-rigid fiber glass insulation batts or rolls with a field applied glass cloth lagging.

C. Hot Equipment

1. All hot equipment up to 250 degrees F. shall be insulated with 3" thick semi-rigid fiber glass insulation batts or rolls with a field applied glass cloth lagging.
2. All hot equipment above 250 degrees F. shall be insulated with 4-1/2" thick asbestos free calcium silicate insulation with a field applied glass cloth lagging.

PART 3 - EXECUTION

3.1 GENERAL

- A. Insulation materials shall be of the type indicated for each application. Where more than one type is indicated the installing contractor shall select from the indicated options according to his preference. (Unless noted otherwise on the contract drawings.) If a type is not indicated, the installer shall provide proper selection for architect / engineer's review in accordance with industry standards and government regulations.
- B. Installation personnel shall take all safety precautions to properly protect themselves during installation of insulation systems. Protection shall include the use of respirators, gloves and eye protection.
- C. Insulation materials shall be installed in complete accordance with the manufacturer's recommendations and in conformance with building codes and industry standards.
- D. Insulation systems shall only be installed over clean dry surfaces. Insulation materials must also be dry and in good condition. Insulation shall not be installed until completion of any required pressure testing.

- E. All insulation systems shall be continuous through wall openings, ceiling openings, floor openings, and pipe hangers. A continuous vapor barrier is required.
- F. Fiber glass pipe insulation shall be installed with all joints butted firmly together. Longitudinal joints shall be sealed with jacket laps with factory applied adhesive. All butt joints to be sealed with butt strips having factory applied adhesive. Valves and fittings shall be insulated with mitered sections of pipe insulation equal in density and thickness to the adjoining section, or with insulation cement, or premolded insulation fittings. Valve and fitting insulation shall be covered with an all service jacket or with PVC covers with a flame-spread and smoke-development index as previously indicated. Insulation shall not restrict valve operation.
 - 1. All pipe insulation on the exterior of the building shall be protected with a continuous PVC jacket with all joints and seams sealed with a waterproof sealant. PVC jacket for pipe and fittings shall be 20 mils thick high impact ultra-violet resistant.
- G. Semi-rigid fiber glass insulation batts or rolls for insulating equipment shall be installed by impaling a minimum of two overlapping layers with staggered joints onto welded pins 12" on center and secured to same with self locking caps. All insulation edges and joints shall be firmly butted together. Insulated surfaces shall be covered with a field applied glass cloth lagging and coated with a layer of insulating cement.
- H. Asbestos free calcium silicate insulation shall be installed utilizing two overlapping layers with staggered joints and 16 gauge stainless steel wire or bands securing the insulation to the item being insulated. All insulation edges and joints shall be firmly butted together. Insulated surfaces shall be covered with a field applied glass cloth lagging and coated with a layer of insulating cement.
- I. Insulation materials shall be installed with smooth and even surfaces, with full length units of insulation materials, and with a single cut piece to complete a run. Cut scrap pieces abutting each other shall not be acceptable.
- J. Insulation may be omitted as indicated below:
 - 1. Omit piping insulation on valve bonnets, unions, flanges, strainers, and flexible connectors in heating water piping.
 - 2. Omit insulation for factory insulated equipment such as water heaters.
- K. All pipe insulation ends shall be tapered and sealed.

- L. This contractor shall protect installed insulation throughout the construction project. Damaged insulation shall be replaced prior to acceptance by the owner.
- M. Horizontal storm drain piping (both Primary & Secondary) shall be insulated to the underside of the roof including the drain sump and deck clamps.
- N. Provide proper support at piping hanger systems.

END OF SECTION

SECTION 22 31 00

DOMESTIC WATER SOFTENERS

PART 1 GENERAL

1.1 SUMMARY

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including; General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 22 Specification Section 22 05 01 "Basic Plumbing Requirements" and 22 05 02 "Basic Plumbing Materials and Methods".
- C. Type, quantity, performance and operating characteristics of Domestic Water Softener Equipment shall be as indicated on the Contract Drawings.
- D. Related work specified elsewhere:
 - 1. Plumbing Piping & Accessories 22 05 03
 - 2. Plumbing Valves: 22 05 23
 - 3. Plumbing Hangers and Supports: 22 05 29
 - 4. Electrical Power Wiring: Division 26

1.2 QUALITY ASSURANCE

- A. The water softener shall meet with the approval of the OEPA when installed in association with a water well.
- B. The softener shall be sized to meet the requirements concerning the amount of water to be softened between regenerations based on the grains hardness.

1.3 SUBMITTALS

- A. Product Data: Submit capacity, electrical characteristics and connection requirements. Indicate dimensions of tanks, tank lining methods, anchors, attachments, lifting points, taps, drains, controls, and operating sequence.

PART 2 PRODUCTS

2.1 WATER SOFTENERS

A. Water Softeners Shall be as Manufactured by:

1. CSI Water Treatment Systems
2. Culligan International Company
3. Kinetico
4. Rainsoft
5. US Filter

2.2 WATER SOFTENER SYSTEM

- A. The tank shall be fiberglass, rated for 100 psi working pressure.
- B. The backwash distributor shall be of the radial hub design.
- C. The control valve shall initiate regeneration, backwash, rinse, brine draw and brine tank refill. Initiation of the regeneration sequence shall be by a volumetric water meter coupled to a timer control, preset at a specific gallons used. The timer will not let the regeneration begin until a preset time.
- D. The mineral tank will be provided with a correct amount of resin, having a minimum exchange rate of 30,000 grains when regenerated with 15 lbs of salt per cubic foot.
- E. Water Softener system shall be supplied with a hardness test kit.

PART 3 EXECUTION

3.1 INSTALLATION OF DOMESTIC WATER SOFTENERS & ACCESSORIES

- A. Contractor shall handle and store the Water Softeners and accessory components in accordance with the manufacturer's recommendations. The contractor shall be responsible for protecting the Water Softeners and accessory components from weather, construction dirt and debris, and from physical damage until final acceptance by the owner.
- B. Contractor shall install the Water Softeners and accessory components plumb and level in accordance with the manufacturer's installation instructions. Manufacturer's recommended operating and service clearances shall be maintained.

- C. Coordinate with plumbing piping and related electrical Work to achieve operating system.
- D. Contractor shall install water piping to the Water Softeners connections to include the following devices as well as any additional requirements as indicated on the contract drawings.
 - 1. Inlet and outlet isolation valves and pipe unions.
 - 2. Bypass piping around the inlet and outlet connections.
 - 3. Pressure gages in the inlet and outlet piping.
 - 4. Thermometer in the inlet piping.
 - 5. Strainer in the inlet piping.
 - 6. Sampling tees/valves in the inlet and outlet piping to the mineral tank.
- E. Install drain piping from tanks to nearest floor drain.

3.2 COMMISSIONING

- A. The contractor shall be responsible for coordinating start-up with all associated trades and with the Water Softener manufacturer. The Water Softener manufacturer or their authorized representatives shall provide start up services upon completion of installation. Such service shall include verification of proper installation and performance, verification of operating sequences, and owner training in operating and maintenance procedures.
 - 1. Contractor to verify Domestic Water Softener installation is complete prior to start-up.
 - a. Contractor shall verify that all water piping is properly installed.
 - b. Contractor shall fill Water Softener with initial charge of water softener salt.
 - 2. Manufacturer's start-up representative shall verify that the installation arrangement and controls are satisfactory to assure proper function of Water Softeners.

END OF SECTION

SECTION 22 40 00

PLUMBING FIXTURES, DRAINS AND CLEANOUTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 22 Specification Section 22 05 01 "Basic Plumbing Requirements" and 22 05 02 "Basic Plumbing Materials and Methods".
- C. Contractor shall provide and install all plumbing fixtures and equipment as shown on the contract drawings and listed in the fixture schedule.
- D. Contractor shall provide and install roof drains, floor drains, shower drains, fixture carriers and cleanouts as indicated on the contract drawings and in these specifications.
- E. All similar types of plumbing fixtures and drains shall be supplied by the same manufacturer.
- F. Quality Assurance
 - 1. Floor Drains and Floor Sinks shall meet ASME A112.21.1M.
 - 2. Roof Drains shall meet ASME A112.21.2M.
 - 3. Cleanouts shall meet ASME A112.36.2M
 - 4. Water Closets and Urinals shall meet ANSI A112.19.1M. Trim shall meet ANSI A112.19.5.
 - 5. Lavatories shall meet ANSI A112.19.1M and Z124.3.
 - 6. Mixing valves shall meet ANSI Z 124.3.
 - 7. Drinking water coolers shall meet ANSI A112.19.2M.
 - 8. Sinks shall meet ANSI A112.19.1M and A112.19.2M.
 - 9. Pressure reducing valves shall meet ASSE 1003.
 - 10. Interior wall hydrants shall meet ASSE 1019.
 - 11. Drinking fountains shall meet ANSI A112.19.1 and A112.19.2 or A112.19.9.
 - 12. All fixtures shall meet governmental low-flow operation regulations.

PART 2 - PRODUCTS

2.1 DESCRIPTION

- A. Plumbing Fixtures shall be supplied as manufactured by one of the following:

American Standard
Crane
Eljer
Kohler
Sloan

- B. Stainless Steel Sinks shall be supplied as manufactured by one of the following:

Advance Tabco
American Standard
Elkay
Just
Kohler

- C. Wash Fountains shall be supplied as manufactured by one of the following:

Acorn
Bradley
Intersan
Willoughby

- D. Drinking Fountains and Water Coolers shall be supplied as manufactured by one of the following:

Elkay
Halsey Taylor
Haws
Murdock
Oasis

- E. Mop Basins and Utility Sinks shall be supplied as manufactured by one of the following:

Fiat
Mustee
Stern-Williams

F. Emergency Eye Wash, Face Wash and Showers shall be supplied as manufactured by one of the following:

Bradley
Encon
Haws
Speakman
Water Saver Faucet

G. Faucets and Flush Valves shall have renewable seats and discs and chrome plated trim. All faucets shall be chrome plated cast brass.

1. Faucets shall be supplied as manufactured by one of the following:

American Standard
Chicago Faucet
Delta
Moen
Speakman
T&S Brass

2. Flush valves shall be supplied as manufactured by one of the following:

Moen
Sloan
Zurn

H. Drains, Carriers, and Cleanouts shall be supplied as manufactured by one of the following:

Jay R. Smith
Josam
Mifab
Wade
Watts
Zurn

I. Floor Cleanouts shall be installed flush with the finish floor and be as follows by Jay R. Smith or equivalent by Josam, Mifab, Wade, Watts or Zurn:

1. Concrete Floors #4020 and #4100 (Heavy Duty)
2. Carpeted Floors #4020-X
3. Tile Floors #4140
4. Terrazzo Floors #4180

- J. Wall Cleanouts shall be round stainless steel shallow cover type for mounting on the surface of the finished wall by a screw into a tapping in the cleanout plug. Wall Cleanouts shall be as manufactured by Jay R. Smith, Josam, Mifab, Wade, Watts or Zurn.
- K. Cleanouts on vertical downspouts and sanitary stacks concealed within walls shall be made accessible with a wall cleanout cover plate Jay R. Smith #4710 or equivalent by Josam, Mifab, Wade, Watts or Zurn.
- L. Exterior cleanouts to be round heavy duty cast iron flanged housing with heavy duty secured scoriated cast iron cover Jay R. Smith #4250 or equivalent by Josam, Mifab, Wade, Watts or Zurn.
- M. All exposed piping and stop valves for plumbing fixtures shall be chrome plated. Water stop valves and sanitary drain piping shall be chrome plated brass or bronze. Sanitary traps shall have integral cleanout plugs.

PART 3 - EXECUTION

3.1 DESCRIPTION

- A. Contractor shall install plumbing fixtures to height and location as shown on the Architectural detail drawings. Installed fixtures shall be level and plumb. This contractor shall seal all fixtures to the walls with white waterproof and mildew resistant caulk. A stop valve shall be installed in an accessible location in each water supply for each individual fixture. Immediately after the setting of any fixture, fitting, or piping, this contractor shall take appropriate action and be responsible for the protection of these items throughout construction until acceptance by the owner.
- B. All plumbing fixtures designated as "ADA" or Handi-cap accessible shall be supplied and installed in compliance with the American with Disabilities Act Accessibility Guidelines for buildings and facilities (ADAAG) and with ANSI Standard A117.1-1992.
 - 1. Exposed water and drain pipes beneath lavatories shall be insulated with protective products by Plumberex Specialty Products, McGuire, Skal-Gard or Truebro.
- C. Upon completion of fixture installation, all connecting piping shall be flushed and valves shall be properly adjusted. Labels, plaster, stains and other foreign material shall be removed from all fixtures.

- D. Cleanouts shall be provided at the base of each interior downspout, sanitary stack, and main vent stack. In addition, unless noted otherwise, cleanouts shall be installed in the building drains at one hundred foot maximum intervals and at all changes in direction greater than forty five degrees.
- E. All floor drains which are not located on grade shall have a sheet lead or PVC waterproof membrane 24" in diameter secured to the drain flashing ring.
- F. Flashing for the roof drains shall be 4 lb. sheet lead extending 8" beyond the outer edge of the clamping ring. Connection between flashing and roofing to be made by the roofing sub-contractor.
- G. This contractor shall be responsible for protection of roof drains against pitch, tar, slag etc.. during the roofing application.
- H. Unless noted otherwise, kitchen equipment and fixtures shall be furnished and set in place by the Kitchen Equipment Contractor for plumbing piping and connections by this contractor. This contractor shall coordinate exact locations of supply and drain piping with the Kitchen Equipment Contractor.
 - 1. Sink strainers, tailpieces and supply faucets are to be supplied loose by the Kitchen Equipment Contractor for installation by this contractor.
 - 2. Sanitary drain trap, water supplies and stops and AGA and UL approved gas shut-off valves and flexible connectors are to be provided and installed by this contractor.
- I. Unless noted otherwise, science equipment and fixtures shall be furnished and set in place by the Science Equipment Contractor for plumbing piping and connections by this contractor. This contractor shall coordinate exact locations of supply and drain piping with the Science Equipment Contractor.
 - 1. Sink strainers, tailpieces and supply faucets are to be supplied loose by the Science Equipment Contractor for installation by this contractor.
 - 2. Sanitary drain trap, water supplies and stops and AGA and UL approved gas shut-off valves are to be provided and installed by this contractor.
- J. Plumbing Fixtures and Drains shall be installed in accordance with the manufacturer's recommendations, adapted to the applicable construction and made watertight.

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DRAINS AND
CLEANOUTS

END OF SECTION

SECTION 23 05 01

BASIC HVAC REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. All HVAC work is subject to the General Conditions, Supplementary Conditions, Instructions to Bidders, and Division 01 - General Requirements for the entire project. Contractor shall refer to these sections elsewhere in the project manual for exact requirements and details.
- B. The contractor shall be responsible for providing a complete operational HVAC system installed as indicated on the drawings and within the Division 23 technical specifications. This provision shall include furnishing all materials and installation labor unless noted otherwise as well as testing, start-up and commissioning of all equipment and systems including proper system fill and venting for piping systems.
- C. The contractor shall refer to work in all other Divisions for coordination with Division 23. Conflicts and interferences shall be immediately brought to the attention of the Architect-Engineer's representative for resolution so as to aid in rapid completion of the overall project.
- D. The complete HVAC system installation shall be performed by skilled tradesman experienced in the work involved. The work shall be arranged and scheduled with the General Contractor for compliance with the overall construction schedule and coordination of openings and chases within the building and size and location of concrete housekeeping pads.

1.2 CODES AND STANDARDS

- A. The HVAC system installation shall be in full compliance with the following codes and standards:
 - 1. The Ohio Building Code
 - 2. The Ohio Plumbing Code
 - 3. The Ohio Mechanical Code
 - 4. NFPA (Applicable Sections)
 - 5. National Electric Code
 - 6. Ohio Department of Health
 - 7. Municipal and County codes and ordinances
 - 8. Municipal and County health Agencies

9. Others as indicated within specific specification sections

- B. Every effort is made on the part of the Architect-Engineer to comply with the listed codes and standards. Where the drawings and/or specifications of design exceed the requirements of the applicable codes and standards, the installation shall be per the design requirements. No work shall be installed contrary to or below minimum requirements of the codes and standards.

1.3 PERMITS AND FEES

- A. The contractor shall obtain and pay for all permits and licenses, both temporary and permanent, required by law as part of the installation work indicated on the drawings and within the specifications.

1.4 INSPECTIONS AND TESTS

- A. The contractor shall provide all necessary equipment, materials, and labor to conduct all tests as required by codes, local ordinances, utility companies, and rules and regulations of public authorities having jurisdiction. All inspection fees and other costs associated with the tests and inspections shall be the responsibility of the contractor.
- B. The contractor shall notify the representative of the authority having jurisdiction and the Architect-Engineer at least twenty-four hours prior to testing. Test shall be maintained until officially inspected and approved. This contractor shall obtain written approval from the authority having jurisdiction for submission to the Architect-Engineer.
- C. The contractor shall promptly repair any defects discovered during testing and repeat the test to the satisfaction of the representative of the authority having jurisdiction and the Architect-Engineer.

1.5 DRAWINGS AND SPECIFICATIONS

- A. Drawings and specifications are to be considered cooperative. Anything appearing in the specifications but not on the drawings, or vice versa, shall be considered to be part of the contract.
- B. In the event of a difference between the drawings and specifications, the more rigid requirement shall prevail.

- C. Drawings are basically diagrammatic and indicate the general arrangement of systems and components. Unless exact locations of piping, ductwork, and equipment are dimensioned or annotated on the contract drawings, they must be worked out in the field with coordination of all trades.
- D. Installation of the HVAC equipment and systems shall be in general conformance to the contract drawings. Contractor shall submit detailed layouts of major proposed departures to the Architect-Engineer for approval. Written consent by the Architect-Engineer shall be required before such work is installed.
- E. The scheduled manufacturer for each item shall be considered as basis of design. Performance characteristics, electrical characteristics, and dimensional and spatial requirements for this item have already been considered in the design. Additional acceptable manufacturers as listed in the specifications have not been checked for such detail and are only listed to indicate manufacturers of similar type of items with equivalent standards of quality. The additional acceptable manufacturers listed must meet all the scheduled and specified performance requirements and possess features similar to those which are standard on the items which are basis of design. This contractor shall be responsible for all coordination and costs of necessary modifications required to install any equipment other than that which is basis of design.
- F. Any errors or omissions discovered by the bidding contractors prior to bid opening shall be called to the immediate attention of the Architect-Engineer. Any changes in drawings or specifications resulting from such errors or omissions shall be in effect only when corrected by the Architect-Engineer by means of an Addendum issued to all bidding contractors prior to bid opening.

1.6 SHOP DRAWINGS

- A. The contractor shall submit for review by the Architect-Engineer, copies of manufacturer's drawings, cut sheets, and application specific performance data in accordance with the requirements of Division 01 for each of the following items.
 - 1. HVAC system equipment and system components
 - 2. HVAC ductwork layouts
 - 3. HVAC controls and sequences of operations
 - 4. HVAC test and balance reports
 - 5. Additional items as required by individual specification sections
- B. Shop drawing submittals shall include the project name, the Architect-Engineer's project number, the applicable specification section and or drawing number as well the contractor's approval stamp.

1. Each specific type of HVAC item shall be submitted as an individual electronic Portable Document Format (PDF). Grouping of different types of items into a single PDF will delay review and may be cause for return/rejection.
 2. Each item submittal shall be clearly marked or highlighted indicating the exact make, model, performance and options provided. If submittal does not clearly indicate these parameters than it shall be rejected. Rejected submittals may hold up contractor pay application.
- C. Shop drawings shall be submitted to Architect-Engineer within thirty working days of award of contract. Contractor shall not install any applicable materials and/or equipment without prior review as indicated on the Architect-Engineer's review stamp.
1. If shop drawings are unacceptable after two submissions; both the contractor and his supplier shall present all subsequent submissions in person to the Engineer in the Engineer's office at a mutually agreeable time.
- D. Review by the Engineer does not relieve the contractor of responsibility to comply with the requirements of the contract documents.

1.7 WARRANTIES

- A. The contractor shall guarantee the complete HVAC system installation as installed by him or his sub-contractors to be free from defects in materials and workmanship for a period of one year from the date of final acceptance (unless a longer period is specified for specific items elsewhere). Deviations from this may occur on larger items of equipment used during beneficial occupancy before the total system is accepted. Such a matter must have prior approval and be made a matter of written record by the Architect-Engineer's representative.
- B. The contractor shall repair or replace at his own expense any materials or equipment found to be defective within the warranty period and shall be held financially responsible for any property damages arising from such defects or the correction of such defects.
- C. The contractor shall guarantee that all HVAC equipment supplied by him or his sub-contractors shall develop capacities and have characteristics as scheduled or specified.

- D. The contractor shall submit written warranty certificates for his installation work and from each manufacturer of equipment supplied on the project to the Engineer.

1.8 SUPERVISION

- A. The contractor shall include the service of an experienced superintendent who shall be continuously in charge of the work, together with qualified tradesman, helpers, and laborers, required to properly unload, install, connect, adjust, start, operate, and test the work involved including noted equipment and materials furnished by others.
 - 1. The superintendent shall be able to communicate via cell phone while on the project site for any project related issues and emergency situations.

1.9 INSPECTION OF SITE

- A. The contractor shall inspect the site of proposed project construction and shall compare conditions with the work shown on the drawings and become thoroughly familiar with the conditions which will affect the work prior to procurement of materials or equipment and prior to commencement of work.

1.10 COORDINATION OF HVAC WORK

- A. The contractor shall coordinate the design intent of the contract documents with the actual field conditions making minor deviations and adjustments as required for a complete operational system. Exact locations of HVAC system components shall be determined by the contractor. Such determination shall give consideration to the building structural and spatial limitations, to coordination with work of other trades and disciplines, and to the necessary clearance requirements (both of the item being installed and of all adjacent items) to accommodate manufacturer's installation requirements, to satisfy code clearance requirements and to facilitate system operation and maintenance. Unless noted otherwise, HVAC systems shall be installed to provide maximum clearance above the finished floor.
- B. The contractor shall coordinate delivery and storage of his materials and equipment with the on going work of all other trades.
- C. Unless noted otherwise, each system component shall be independently supported from the building structure.

- D. Unless noted otherwise, contractor(s) shall coordinate HVAC installation so as to maintain at least ten feet of clearance from all outdoor air intakes and building openings to any plumbing vents (existing and new) exhaust air outlets or other noxious conditions.
- E. Unless noted otherwise, all rooftop equipment shall be located so as to maintain at least ten feet of clearance from any roof edge with a drop of 24" or more.
- F. The contractor shall coordinate shutdown of any existing HVAC systems and/or utilities with the owner. Shutdown shall be during periods of minimal occupancy and work shall be so coordinated to minimize the disruption to normal building routines and occupancy. Contractor shall anticipate that shutdown will need to take place during evenings and weekends.
- G. The contractor shall be responsible for the removal, storage and reinstallation of lay-in ceilings as required to accomplish his scope of work. Upon completion of work, ceiling shall be restored to its original condition. Quantity and location of existing damaged or stained tiles shall be documented by the contractor prior to commencement of work with a written record and signature acknowledgment of the owner.

1.11 CUTTING AND PATCHING

- A. Unless noted otherwise, the contractor shall be responsible for all cutting and patching of existing walls, floors, and roofs which is required for the installation of his work as indicated below:
 - 1. Cutting and patching as required due to ill-timed work which otherwise could have been built in by the General Contractor.
 - 2. Cutting and patching as required to remove and replace defective work or work which does not meet the requirements of the contract documents.
 - 3. Cutting and patching as required to install materials and equipment in existing buildings.
- B. Pipe openings in floors and walls shall be core drilled if not sleeved during construction.
- C. The contractor shall be responsible for maintaining roof warranties for all cutting and patching of existing roofs. Roof work shall be sub-contracted by this contractor as required to maintain existing warranties. This contractor shall supply roof inspection / warranty certificate in the O&M manual at the completion of the project.

- D. The contractor shall not cut any reinforcing or structural building members without specific permission in writing from the Architect-Engineer.
- E. Patching shall include finish of surfaces to match those of adjacent areas. Patch and repair work is subject to approval by the Owner / Architect / Engineer.

1.12 TEMPORARY SERVICES

- A. Unless noted otherwise, contractor shall provide temporary HVAC services in accordance with the requirements of the General Conditions, Supplementary Conditions and Division 01 General Requirements.
- B. The contractor may use permanent HVAC equipment for temporary services when approved by the Architect-Engineer. Such approval is conditioned by the following requirements:
 - 1. The contractor shall maintain the equipment for release to owner at time of final acceptance in "new" condition.
 - 2. Warranty period for the owner shall not begin until the date of final system acceptance.

1.13 DAMAGES

- A. The contractor shall be held responsible for any damages incurred during the installation of his work to the existing grounds, walks, roads, building, plumbing systems, HVAC systems, and electric systems as well as all new construction work by other trades. He shall repair at his expense all such damages for restoration to the original conditions to the satisfaction of the Architect-Engineer and owner.
- B. The contractor shall be responsible for protecting the materials, equipment and installation of his work from damage due to weather and construction job site conditions.

1.14 CLEANUP

- A. All trash resulting from the installation of work within this specification shall be removed from the premises and disposed of in a responsible fashion by the contractor who generates it.

- B. The area of construction shall be kept in an orderly fashion. Trash shall not be allowed to accumulate so as to become a safety hazard or to impede the project progress.
- C. Upon completion of the work, the contractor and his sub-contractors shall remove from site all tools, equipment, surplus materials, and trash associated with his work.
- D. The contractor shall cooperate with the General Contractor in Final Cleaning, General Conditions.

1.15 ELECTRICAL COORDINATION

- A. Unless noted otherwise on the plans or in specific specification sections, Electrical labor and material shall be coordinated as follows:

HVAC CONTRACTOR

- 1. Furnish and install motors which are integral to or scheduled in conjunction with HVAC equipment.
- 2. Furnish factory installed equipment starters and switches as scheduled and/or specified.
- 3. Furnish and install other electrical/electronic components and wiring where specified as part of the temperature control systems.

ELECTRICAL CONTRACTOR

- 1. Furnish and install power wiring to HVAC equipment.
 - 2. Furnish mount and wire separate starters and disconnects for HVAC equipment.
- B. The contractor shall furnish to the electrical contractor all power, motor, and control wiring diagrams and equipment / motor nameplate data.
 - C. The contractor shall provide electrical equipment to operate satisfactorily on plus or minus 10% of nominal system voltage supplied to the equipment.
 - 1. Motors for other than 120 volt operation shall be designed for and have nameplate stamped for nominal system voltage. (I.E. 208 volt system requires 208 volt nameplate; not 220, 230, or 240 volt.)

1.16 RECORD DRAWINGS

- A. The contractor shall maintain a set of prints at the construction site to record in red any deviations in the actual HVAC system installation from the design drawings. These record drawings shall be submitted to the Architect-Engineer upon completion of the project.

1.17 COMMISSIONING OF HVAC EQUIPMENT AND SYSTEMS

- A. Contractor shall commission the mechanical system to ensure that the mechanical systems operate properly along with other associated building systems to accomplish the design intent and the owner's operational requirements.
- B. Contractor shall provide all labor, material and test equipment necessary to perform system commissioning.
- C. Contractor shall verify that the mechanical system installation is complete in accordance with the plans, specifications, the manufacturer's requirements / recommendations as well industry standards and best practices.
- D. Contractor shall verify that all of the mechanical system equipment has undergone proper start-up in accordance with the manufacturer's recommendations and with the approval of the manufacturer or the manufacturer's authorized representative.
- E. Contractor shall verify that each of the individual components of the mechanical system all function and interact with each other properly.
- F. Contractor shall verify that mechanical systems function properly under both part-load and peak operating conditions.
- G. Contractor shall make all corrective actions / modifications determined by the commissioning process as necessary to achieve proper system operation and specified performance.
- H. When the project has a dedicated Commissioning Agent, this contractor shall perform the above commissioning services as well as provide assistance and services necessary in accordance with separate Commissioning Specifications (01 91 00) by the Commissioning Agent.

1.18 OPERATING INSTRUCTIONS

- A. The contractor shall provide personal training and instruction to the owner's operating staff on the proper operation and maintenance of the HVAC systems.

1. A minimum of eight (8) hours of training shall be provided.
 2. Training shall be recorded in video format.
 3. Two copies of the training video shall be turned over to the owner in DVD format.
- B. The contractor shall provide three (3) sets of operation and maintenance manuals for the owner's use upon completion of the project. Operation and maintenance manuals shall be submitted to the Architect-Engineer for approval.
- C. Operation and maintenance manuals shall include the following:
1. Name and service telephone number of the installing company.
 2. General description of how the system should operate.
 3. Manufacturer's operation and maintenance instructions.
 4. Copy of approved shop drawings.
 5. Copy of final balance report.
 6. Lubrication schedule.
 7. Valve chart.
 8. Spare parts list.
 9. Warranty Certificates.
- D. The contractor shall instruct the owner's maintenance personnel in the proper operation and maintenance of the entire HVAC system installation including all associated equipment items.

1.19 USE OF HEI ENGINEERING GROUP, INC. ELECTRONIC DOCUMENTS

- A. HEI Engineering Group, Inc. will make available to the contractor, for a nominal fee, use of HEI CAD plans for contractor's use in Coordination work.
- B. HEI schedules and details will NOT be made available in CAD format.
- C. Release and use of CAD documents shall be in accordance with HEI Engineering Group, Inc. Electronic Document Release Form. (See Attached.)

PART 2 – PRODUCTS - NOT APPLICABLE

PART 3 – EXECUTION - NOT APPLICABLE

END OF SECTION
(HEI Electronic Document Request / Release Form on Next Page)

HEI Engineering Group, Inc. Electronic Document Request / Release Form

REFERENCE PROJECT: _____

REQUESTOR NAME: _____

REQUESTOR ADDRESS _____

REQUESTOR EMAIL _____

This form is to verify that electronic copies of the following engineering documents for the referenced project are requested by the above named requestor and that by signing below the requestor agrees to the following conditions of release:

1. The electronic documents depict engineering work which remains intellectual property of HEI Engineering Group, Inc. Electronic copies will be stripped of and not include HEI Engineering Group, Inc. Title Block Information, Engineering Seal, Standard Details or Equipment Schedules.
2. The requestor shall honor the original document copyright (which will be removed from the electronic copy) and not make electronic or paper copies of the documents for use other than
 - a. Maintenance, Reference, or Renovation relating to the subject project.
 - b. Coordination and "As Built" drawings.
 - c. Fire Protection Design Reference.
 - d. Building Automation System diagrams.
3. The electronic plans are generated in DWG Format and are compiled thru xref's of multiple files. Any Cad consulting in reference to their use will be billed at our current standard billing rates.
4. When Electronic plans are requested for Coordination Drawings, the requestor shall agree to keep all "AS BUILT" records for final submission in AutoCAD format.
5. Requestor shall hold HEI Engineering Group, Inc., Daniel R. Evans, PE, and Stacey Lloyd, PE harmless in any future engineering analysis or design work based upon these documents by any party other than HEI Engineering Group, Inc.
6. Unless waived by HEI Engineering Group, Inc., the requestor shall agree to pay in advance a processing fee of \$300.00. A check made payable to HEI Engineering Group, Inc. shall accompany this signed form prior to processing of the request.

Documents

AGREEMENT OF REQUEST / RELEASE IS INDICATED BY SIGNING BELOW

_____ (Authorized Signature)	_____ (Printed Name)	_____ (Title)	_____ (Date)
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443 W. Liberty St. PO Box 996 Wooster, OH 44691 Tel. 330-262-0042 www.hei-ohio.com

SECTION 23 05 02

BASIC HVAC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to Specification Section 23 05 01 "Basic HVAC Requirements".
- C. Unless noted otherwise, the contractor shall provide and install all new materials, equipment, and components as indicated or specified.
- D. The contractor shall install piping specialties as indicated on the drawings and as specified in this specification.
- E. Unless noted otherwise, all required painting of the building surfaces and of exposed ductwork and piping in finished areas shall be by the general contractor. Painting requirements are as indicated in this specification section, individual specification sections and as noted on the drawings.
- F. Unless noted otherwise, the contractor shall provide and install all miscellaneous support steel as required for the installation of the complete HVAC system.
- G. The contractor shall provide and install sealing materials for HVAC system penetrations through building walls, floors, ceilings, and roofs. Exterior penetrations shall be weather proof and vermin proof; interior penetrations shall have sound stopping. Penetrations through fire and smoke barriers shall have firestopping.
- H. Unless noted otherwise, the contractor shall perform all demolition work associated with the new HVAC work. Demolition work includes removal of all demolished materials from the site and disposal of same in an appropriate manner.

PART 2 - PRODUCTS

2.1 PIPE SLEEVES

- A. Pipe sleeves shall be provided and installed where pipes pass through walls, floors, and ceilings. Sleeves shall be sufficiently large enough to allow for fire and sound stopping between the inside sleeve wall and the pipe or insulation surface as well as allow for thermal expansion and contraction of piping.
 - 1. Sleeves shall be large enough to allow pipe insulation to be continuous through the wall.
 - 2. Length of sleeves shall be equal to the thickness of the building construction element penetrated for a flush finish on both sides except for floor sleeves which shall extend 2" above the finish floor. Install iron-pipe sleeves in exterior wall penetrations and steel-pipe sleeves elsewhere unless noted otherwise.

2.2 ESCUTCHEON PLATES

- A. Escutcheon plates shall be installed on all pipe penetrations through walls, floors, and ceilings where exposed to view and on the building exterior. Escutcheon plate shall be secured to pipe or insulation and completely cover the hole penetration.
 - 1. Escutcheon plates on the building exterior and in equipment rooms shall be made of brass. All other escutcheon plates shall be chrome plated sheet steel.
 - 2. Escutcheon plates shall be as manufactured by one of the following:

Chicago Specialty Mfg. Co.
Producers Specialty & Mfg. Corp.
Sanitary-Dash Mfg. Co.

2.3 ACCESS DOORS

- A. Access doors shall be provided and installed by the Division 23 contractor where shown on the drawings in non-accessible walls, and ceilings which conceal HVAC items which require service or inspection such as valves and dampers.

1. Unless specific door size is indicated, door shall be provided of size adequate to serve the applicable concealed item.
2. Access doors shall be of painted steel construction with concealed hinge and keyed lock. All access doors provided shall be keyed alike with a minimum of two keys provided to the owner.
 - a. Access doors for installation in ceilings shall have a recessed face for field installation of finished ceiling material.
3. Access doors for installation in fire rated walls and ceilings shall be UL listed and labeled with applicable fire resistant rating.
4. Access doors shall be as manufactured by one of the following:
 - a. CESCO Products
 - b. Elmdor
 - c. Milcor
 - d. Kees

2.4 PAINT

- A. All paint products shall be specifically selected for their intended application in regards to type of surface application and interior or exterior location.
- B. Paint application shall consist of a primer coat and two finish coats.
- C. Paint color shall be as selected by the Architect.

2.5 FIRESTOPPING

- A. Firestopping shall be installed in all HVAC System penetrations thru fire-resistance-rated walls, partitions, floors and roofs.
- B. Shop Drawing Data shall be submitted to include manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer's installation instructions.
- C. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the

firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

- D. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- E. Use only firestop products that have been UL 1479, ASTM E 814, or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- F. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E 814 which is equal to the time rating of construction being penetrated.
- G. Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction being penetrated.
- H. Firestopping materials shall be as manufactured by one of the following:
 - 1. 3M Fire Protection Products
 - 2. Hilti Corporation
 - 3. Tremco, Inc.

PART 3 - EXECUTION

3.1 PIPING SPECIALTIES

- A. Contractor shall install all piping specialties as coordinated with the field conditions in accordance with the manufacturer's recommendations.

3.2 UTILITIES

- A. Existing utilities shall not be interrupted without prior approval of the Architect-Engineer or the owner. Interruptions shall be coordinated so as to minimize the frequency of occurrence and the length of downtime.

3.3 PAINTING

- A. Existing building surfaces and auxiliary equipment and finishes marred during installation of HVAC work shall be touched up and repainted by the Division 23 contractor to the satisfaction of the Architect-Engineer.
- B. Factory applied paint finishes on HVAC equipment marred during installation shall be touched up and repainted by the contractor to the satisfaction of the Architect-Engineer. Touch up paint shall be in accordance with the equipment manufacturer's recommendations.
- C. The Division 23 contractor shall paint all iron pipe fittings and valve bodies, all support steel installed as part of his scope of work and all exposed piping and ductwork on the exterior of the building.
- D. All painting shall be done in accordance with the paint manufacturer's instructions including surface preparation and conditions of ambient temperature and humidity.
- E. Environmental conditions in the area of painting work shall comply with the paint manufacturer's recommendations and all governing regulations.
- F. The contractor shall refer to Division 09 - Finishes.

3.4 FIRESTOPPING

- A. The contractor shall seal all fire / smoke rated wall and floor penetrations for HVAC system components with fire and smoke stopping materials so as to maintain the fire resistance rating of the wall or floor penetrated.
 - 1. Firestopping compound, pipe sleeves, and piping and insulation shall be installed so as the complete penetration assembly is classified by UL as listed in the UL Building Materials Directory.
 - 2. Installation shall be in full compliance with the firestop material manufacturer's installation instructions and recommendations
 - 3. Installer shall verify that penetrations are properly sized and in suitable condition for application of firestopping materials.

4. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, water repellents, and any other substances that may affect proper adhesion.
5. Installation conditions shall be in compliance with the manufacturer's recommendations for temperature and humidity before, during and after installation of firestopping.

3.5 DEMOLITION

- A. The demolition drawings are based on the original construction documents and/or limited field design observation and therefore may not reflect the actual existing conditions. The contractor shall coordinate demolition work required with both the new work indicated and the actual field conditions encountered.
- B. Unless noted otherwise, inactive / obsolete ductwork, piping, fittings, supports, specialties, equipment, controls, etc. associated with the HVAC systems being installed or renovated shall be demolished by the contractor.
- C. All equipment and materials to be demolished shall first be offered to the owner for his retention. If the owner does not want the demolished materials, they shall be removed from the site and legally disposed of by the contractor.
- D. Existing HVAC system components enclosed within floors, walls, or ceilings or which are not readily accessible for other reasons, may be abandoned in place if they do not interfere with the new work. All such items shall be capped air and water tight within the building element so as the general contractor may provide a flush finish.
- E. Unless noted otherwise, ductwork and piping indicated for demolition shall be removed back to the nearest main. Main (or other noted termination point) shall be capped air/water tight. Ductwork and piping within walls which are to remain may be capped in the wall and abandoned within the wall. Services must be capped far enough in the wall to allow for flush patching and finishing of the wall.
- F. This contractor shall coordinate shutdown of any HVAC systems required as part of the demolition work with the owner prior to interruption of services.
- G. Unless noted otherwise, any existing fire dampers in ductwork which is being demolished shall remain in the existing wall.
- H. Unless noted otherwise, remove any existing smoke dampers in ductwork which is being demolished. Remove associated control/systems wiring back to the

nearest junction box and associated pneumatic tubing back to the nearest main. Openings in walls from removal of smoke dampers shall be repaired / patched by the Division 23 contractor to maintain the fire resistant rating of the wall unless the wall is also being demolished.

- I. The contractor shall provide full height temporary dust partitions as indicated or as required to prevent the transmission of dust from the construction zone to the occupied zone.
- J. Prior to disconnecting or removing any HVAC equipment containing a refrigerant; the contractor shall recover all refrigerant without venting and legally dispose of same in complete compliance with all EPA regulations.
- K. If any material is encountered in the course of demolition work which the contractor, subcontractor, or tradesman suspects to be asbestos, then the work in the area shall cease until the owner or owner's representative is contacted for a determination of whether the material is safe, should be tested, or should be removed. The contractor shall be responsible for notifying all tradesman on the job of the potential presence and hazard of asbestos materials.

END OF SECTION

SECTION 23 05 29

HVAC HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 23 Specification Section 23 05 01 "Basic HVAC Requirements" and 23 05 02 "Basic HVAC Materials and Methods".
- C. This contractor shall provide and install piping and equipment hanger and support devices as indicated on the contract drawings and specified in this section. Hangers and supports shall secure piping and equipment in place, shall prevent the transmission of vibration, shall provide for vertical adjustment to level equipment and to maintain required pipe slope and shall provide / allow for expansion and contraction.
- D. This contractor shall provide and install all supplementary angles, channels, plates, etc., where supports are required between the building structural members, spanning the space and attached to the structural members by welding, or mechanical fasteners.
- E. This contractor shall provide and install miscellaneous fabricated structural steel supports for equipment as indicated on the contract drawings or as required per the equipment manufacturer.

PART 2 – PRODUCTS

2.1 COMPONENTS

- A. Hangers, supports and components shall be factory fabricated according to MSS SP-58, the latest edition.
- B. Beam clamps, trapeze hangers and clevis hangers shall be permitted.

2.2 PIPE HANGERS AND SUPPORTS

- A. All horizontal piping shall be installed with factory fabricated hangers and supports attached to the building substrate with suitable expansion shells, inserts, or beam clamps. Hangers shall be selected to exactly fit pipe size for bare piping and to exactly fit around piping insulation with saddle or shield for insulated piping. Copper plated hangers and supports shall be utilized for all copper piping systems. Perforated strap hangers and "C" clamp attachments are prohibited.

1. Unless noted otherwise, all horizontal pipe 3" and smaller shall be supported by individual adjustable steel clevis hangers.
2. Unless noted otherwise, all horizontal pipe 4" and larger (and all horizontal pipe 2" and larger which conveys a fluid above 150° F) shall be supported by adjustable roller type hangers.
3. Parallel piping may also be supported together on a trapeze type hanger as long as individual thermal pipe movement is accounted for and all piping is adequately supported.
4. Pipe support spacing and hanger rod sizing shall be as follows except for cast iron pipe which shall be supported at a maximum interval of 5'-0" on center and plastic piping which shall be supported at a maximum interval of 4'-0" on center:

PIPE SIZE	ROD DIA	MAX SPACING ON CENTER
1/2" TO 1-1/4"	3/8"	6'-0"
1-1/2" TO 2"	3/8"	9'-0"
2-1/2" TO 3"	1/2"	11'-0"
4" TO 6"	3/4"	12'-0"
8"	7/8"	12'-0"
10" TO 12"	7/8"	12'-0"
14" TO 16"	1"	12'-0"

5. Additional hangers shall be installed at change in pipe direction and at concentrated load points such as in-line pumps and large valves or strainers.

- B. All vertical piping shall be installed with factory fabricated piping clamps attached to the building substrate with suitable expansion shells, inserts, or beam clamps.

Clamps shall be selected to exactly fit bare pipe size. Copper plated clamps shall be utilized for all copper piping systems.

1. Support vertical piping at each floor line.
2. Support base of each vertical pipe riser.

2.3 EQUIPMENT HANGERS

- A. Hangers for HVAC equipment shall consist of structural steel shapes or steel rods attached to the building substrate with suitable expansion shells, inserts, or beam clamps. Hangers shall be selected to adequately support the static and dynamic loads of the equipment as indicated by the equipment manufacturer. Isolation type hangers shall be used to support all overhead HVAC equipment with rotating parts. Isolators shall be installed as close to the overhead structure as possible.

2.4 ROOFTOP EQUIPMENT SUPPORTS AND CURBS

- A. Prefabricated 12" high 18 gauge galvanized steel roof equipment supports shall be utilized to support all rooftop equipment, ductwork, and piping.
- B. Prefabricated 12" high galvanized steel, insulated roof curbs shall be utilized for all rooftop HVAC equipment installations. Curbs shall be tapered to account for roof slope so as equipment shall be level and plumb.
- C. All rooftop equipment with integral compressors (or as noted on the contract drawings) shall be installed on prefabricated vibration isolation type curbs or bases/rails. Isolation shall be through 1" static deflection steel springs sealed from the weather with a continuous neoprene gasket bonded to the upper and lower surfaces. All ductwork and piping connections to such equipment shall be made with flexible connections.
- D. Where tapered roof insulation is utilized or existing, the contractor shall either provide extended height roof curbs and equipment supports or provide wood blocking below curbs, to elevate curbs a minimum of 8" above the finished roof. The General Contractor shall be responsible for the installation of the blocking furnished by this contractor.

2.5 PIPE AND EQUIPMENT SUPPORTS ON EXISTING ROOFS

- A. Rooftop pipe and equipment supports on existing roofs shall be of a standard manufactured product line with the following characteristics:
1. Base shall be manufactured of UV stable polymer materials with non-abrasive bottom surface compatible with the roof membrane for resting directly on the membrane surface. Base shall be of sufficient size to properly distribute the load without damaging the roof membrane or insulation beneath.
 2. For direct pipe or equipment support without elevation or level adjustment; base shall include an integral hot dipped galvanized steel clamp channel for use with appropriate hot dipped galvanized steel retainer hardware, straps, etc....
 3. For piping or equipment elevated above the roof and/or for slightly sloped roof applications requiring support leveling; base shall include an integral vertical strut attachment for use with appropriate hot dipped galvanized vertical steel struts, posts, cross channels etc...
 4. Unless noted otherwise, all horizontal pipe 4" and larger shall be supported by adjustable roller type hangers.
 5. Parallel piping may be supported together on a trapeze type hangers as long as individual thermal pipe movement is accounted for and all piping is adequately supported.
 6. Pipe and/or equipment support spacing shall be at a maximum interval of 6'-0" on center. Additional supports shall be installed at change in pipe direction and at concentrated load points.

2.6 MANUFACTURER

- A. Piping and Equipment Hangers, Supports, Saddles, Shields, Clamps, Attachments, etc. shall be as manufactured by one of the following :
1. Anvil International
 2. Cooper B-Line, Inc.
 3. Globe Pipe Hanger Products, Inc..
 4. Pentair & Subsidiaries.
 5. The Modern Pipe Supports Corporation

B. Rooftop Equipment Supports and Curbs shall be as available from the HVAC equipment manufacturer subject to compliance with this specification section or as manufactured by one of the following :

1. Pate Company
2. Roof Products and Systems
3. Thycurb Div.; of Thybar Corp.

C. Pipe and Equipment supports for existing roofs shall be as manufactured by:

1. Eberl Iron Works, Rooftop Support Systems
2. ERICO Caddy Pyramid
3. IPS Roofing Products
4. MAPA Products
5. PHP Systems/Design
6. Unistrut

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all inserts, hangers and supports in complete accordance with the manufacturer's recommendations.
- B. Install all inserts, hangers and supports so as to adequately support the equipment in accordance with the equipment manufacturer's requirements.
- C. Install all inserts, hangers and supports so as not to have a detrimental effect on the building substrate to which they are attached.
- D. Supports and curbs for standing seam roofs are provided and installed by the General Contractor. All other curbs are provided and installed by this Contractor for counter flashing to roof by the General Contractor.
- E. Support from steel joist panel point is required.
- F. Supports from roof decking systems are not permitted.
- G. Bending of threaded hanger rods to account for sloping roof steel is not permitted.

END OF SECTION

SECTION 23 05 48

HVAC VIBRATION CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 23 Specification Sections 23 05 01 "Basic HVAC Requirements" and 23 05 02 "Basic HVAC Materials and Methods".
- C. Type, quantity, performance and operating characteristics of Vibration Control Items shall be as indicated on the Contract Drawings.
- D. All Vibration Control Items shall be supplied by the same manufacturer.
- E. Application and characteristics shall be in accordance with the following:
 - 1. ASHRAE Handbook - HVAC Applications.
 - 2. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.
- F. Related Work Specified Elsewhere:
 - 1. HVAC Piping and Accessories: 23 05 03
 - 2. HVAC Hangers and Supports: 23 05 29
 - 3. Ductwork: 23 31 00

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Vibration Control Items shall be as manufactured by one of the following:
 - 1. Kinetics
 - 2. Mason Industries
 - 3. Peabody
 - 4. VMC Group (Vibration Mountings and Control)

2.2 VIBRATION ISOLATORS

A. General: Provide vibration isolation on motor driven equipment over 0.5 hp, plus connected piping and ductwork. Provide minimum static deflection of isolators for equipment as follows:

1. Basement, Under 20 hp

- a. 400 - 600 rpm: 1 inch
- b. 600 - 800 rpm: 0.5 inch
- c. 800 - 900 rpm: 0.2 inch
- d. 1100 - 1500 rpm: 0.14 inch
- e. Over 1500 rpm: 0.1 inch

2. Basement, Over 20 hp

- a. 400 - 600 rpm: 2 inch
- b. 600 - 800 rpm: 1 inch
- c. 800 - 900 rpm: 0.5 inch
- d. 1100 - 1500 rpm: 0.2 inch
- e. Over 1500 rpm: 0.15 inch

3. Upper Floors, Normal

- a. 400 - 600 rpm: 3.5 inch
- b. 600 - 800 rpm: 2 inch
- c. 800 - 900 rpm: 1 inch
- d. 1100 - 1500 rpm: 0.5 inch
- e. Over 1500 rpm: 0.2 inch

4. Upper Floors, Critical (Upper floor locations critical, unless otherwise indicated)

- a. 600 - 800 rpm: 3.5 inch
- b. 800 - 900 rpm: 2 inch
- c. 1100 - 1500 rpm: 1 inch
- d. Over 1500 rpm: 0.5 inch

B. Spring Isolators:

1. Color code springs for load carrying capacity.

2. Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection.
3. Furnish with leveling devices, minimum 0.25 inch thick neoprene sound pads, and zinc chromate plated hardware.
4. Size for minimum deflection of 0.05 inch; meet requirements for neoprene pad isolators.
5. Restraint (Where Noted): Vertically restrained, freestanding, laterally stable, steel open spring type. Furnish mounting frame and limit stops.
6. Closed Spring Housings (When Noted): Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators, and neoprene side stabilizers with minimum 0.25 inch clearance.

C. Spring Hangers:

1. Code: Color code springs for load carrying capacity.
2. Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection.
3. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators.
4. Misalignment: Capable of 20 degree hanger rod misalignment.
5. Combination spring and elastomeric hangers with coil spring and elastomeric insert in compression.

D. Neoprene Pad Isolators:

1. Rubber or neoprene-waffle pads.
2. Minimum 1/2 inch thick.
3. Maximum loading 40 psi.
4. 30 durometer.
5. Height of ribs: not to exceed 0.7 times width.

E. Rubber Mount or Hanger: Molded rubber designed for 0.5 inches (13 mm) deflection with threaded insert. Mounts shall be double deflection type.

F. Glass Fiber Pads: Neoprene jacketed pre-compressed molded glass fiber.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Contractor shall handle and store the Vibration Control items in accordance with the manufacturer's recommendations. The contractor shall be responsible for

protecting items from weather, construction dirt and debris, and from physical damage until final acceptance by the owner.

- B. Contractor shall install Vibration Control items without binding for plumb and level equipment, piping and ductwork in accordance with the manufacturer's installation instructions.
- C. Prior to making piping connections to equipment with operating weights substantially different from installed weights, block up equipment with temporary shims to final height. When full load is applied, adjust isolators to load to allow shim removal.
- D. Support piping connections to isolated equipment resiliently as follows:
 - 1. Up to 4 inch Diameter: First three points of support.
 - 2. 5 to 8 inch Diameter: First four points of support.
 - 3. 10 inch Diameter and Over: First six points of support.
 - 4. Select three hangers closest to vibration source for minimum 1.0 inch static deflection or static deflection of isolated equipment. Select remaining isolators for minimum 1.0 inch static deflection or 1/2 static deflection of isolated equipment.

END OF SECTION

SECTION 23 05 53

HVAC IDENTIFICATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 23 Specification Sections 23 05 01 "Basic HVAC Requirements" and 23 05 02 "Basic HVAC Materials and Methods".
- C. This contractor shall provide and install permanent identification markers for the HVAC system components as indicated below:
 - 1. Each scheduled item of equipment
 - 2. Temperature control components
 - 3. Piping
- D. Identification markers shall comply with ANSI A13.1 requirements for lettering size, length of color field, colors and viewing angles.

1.2 QUALITY ASSURANCE

- A. Identification requirements shall meet ASME A13.1.

PART 2 - PRODUCTS

2.1 EQUIPMENT MARKERS

- A. HVAC equipment shall be identified with aluminum engraved or stamped nameplates permanently fastened to equipment. Marker shall identify equipment with nomenclature as indicated on the contract drawings. Identification shall utilize 3/16" high text.

2.2 TEMPERATURE CONTROL COMPONENTS

- A. Temperature control components including but not limited to sensors, actuators, panels etc... shall be identified with aluminum engraved or stamped nameplates permanently fastened to equipment. Marker shall identify equipment with nomenclature as indicated on the contract drawings. Identification shall utilize 3/16" high text. Identification of the components shall match the nomenclature used for the control system installation diagrams and computer operator graphics.

2.3 PIPING MARKERS

- A. HVAC piping shall be identified with self-adhesive, flexible vinyl, preprinted, color coded plastic pipe markers indicating the piping service and the direction of flow.

2.4 CEILING TILE MARKERS

- A. Identification stickers / dots with color coding scheme shall be adhered to the lay-in ceiling tile to locate access to HVAC system components concealed above. The following system components shall be identified:

- 1. VAV Terminal Units

2.5 MANUFACTURERS

- A. Identification Markers shall be as manufactured by one of the following:
 - 1. Allen Systems, Inc.
 - 2. Brady Co.
 - 3. Marking Services, Inc.
 - 4. Seton Name Plate Corp.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. This contractor shall install Identification Markers in accordance with the manufacturer's installation instructions.

- B. Install pipe markers wherever piping is exposed to view in accessible spaces. Locate markers approximately 25 feet on center and near each wall, floor, and ceiling penetration. In addition, locate markers near points of piping origin, points of piping termination and points of piping connection to major equipment.
- C. Piping and equipment identification shall be completed prior to issuance of substantial completion.

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 23 Specification Sections 23 05 01 "Basic HVAC Requirements" and 23 05 02 "Basic HVAC Materials and Methods".
- C. Quality Assurance: Testing, Adjusting and Balancing (TAB) work shall be the responsibility of the HVAC contractor. The HVAC contractor shall sub contract this work out to a Test and Balance Contractor which is AABC or NEBB certified. Field personnel in charge of the TAB procedures shall have a minimum of five years experience in balancing and troubleshooting HVAC systems.
 - 1. Prior to start of construction, the Test and Balance Contractor shall examine documents and advise the HVAC Contractor and the Architect-Engineer of any additional devices that are required or recommended for installation within the mechanical system for successful Test, Adjust and Balance work.
- D. Standards for compliance:
 - 1. AABC / NEBB: All test and balance work shall be in accordance with the latest revision of "AABC National Standards" or "NEBB Procedural Standards" except where specification requirements are more stringent.
 - 2. ASHRAE: All test and balance work shall be in accordance with the latest revision of the ASHRAE Systems Volume for testing, adjusting and balancing recommendations except where specification requirements are more stringent.
 - 3. SMACNA: All test and balance work shall be in accordance with the latest revision of the SMACNA Testing, Adjusting, and Balancing manual except where specification requirements are more stringent.
- E. Submittals:

1. A complete test and balance report on standard AABC or NEBB forms shall be submitted within 14 days of substantial completion of the HVAC systems. Report copies shall be submitted in the same quantity as for shop drawing requirements specified elsewhere. When the report indicates inadequate system performance in comparison to the design requirements an explanation shall accompany the report indicating the probable cause and recommended solution if applicable.
 2. Prior to commencement of work described in this section, the test and balance contractor shall submit verification of his certification to the engineer for acceptance.
 3. Submittal report shall include all associated calculations.
- F. Components: The test and balance contractor shall provide his own properly calibrated equipment to pressure test, to air balance, water balance and to measure electrical characteristics of each piece of HVAC equipment.
- G. All test and balance work shall be performed by one of the following companies. Test and balance work by any other company shall be rejected:
1. Fulton & Associates Balance Company
 2. Kahoe Air Balance Company
 3. Professional Balance Company
 4. RH Cochran & Associates, Inc.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 - EXECUTION

3.1 PRELIMINARY PROCEDURES

- A. The balance contractor shall review all contract documents and become thoroughly familiar with the systems. The same shall then be reviewed with the engineer. The balance contractor shall then inspect the installation to determine variations from design and the scope of their impact.
- B. The balance contractor shall obtain from the HVAC contractor copies of approved shop drawings, temperature control diagrams, and "As Built" ductwork

and piping layouts for use in determining actual required set points and system parameter requirements.

- C. The balance contractor shall check air filters for cleanliness; check fire, smoke, balance, and control dampers to verify correct installation and operating position; check fan belt tension and fan rotation on all fans; and check and set setpoints on all control devices.
- D. The balance contractor shall examine the automatic temperature control system to verify that the controlled devices and their respective controllers are functioning properly in accordance with the Sequence of Operations.
 - 1. Verify that dampers modulate / operate freely between the set minimum and maximum positions.
 - 2. Verify that actual position of damper is as indicated by the controller.
 - 3. Verify that HVAC equipment / system interlocks are functioning properly (both hardware and software interlocks).
 - 4. Verify proper heating and cooling changeover operation of system.

3.2 BALANCE REQUIREMENTS

- A. The test and balance contractor shall perform tests and make all adjustments as required to balance the HVAC systems to within the following tolerances:
 - 1. All fans: 0 – 10% above design
 - 2. Minimum outdoor air: 0 - 5% above design
 - 3. Supply diffusers and registers: 0 - 5% below or 0 - 10% above design
 - 4. Return and exhaust grilles: 0 - 10% below or 0 - 5% above design
- B. The balance contractor shall notify the HVAC contractor of any incomplete work, any additional work, or any rework which needs to be completed in order to balance the systems to within the acceptable criteria. This work shall be completed and accompanying tests and adjustments made prior to the report submission.
- C. The test and balance contractor shall be responsible for the removal and the reinstallation of lay-in ceiling tile as required for the execution of the specified test and balance work.

- D. System balance shall be guaranteed for one year. If an imbalance is discovered during this time which is not attributed to mis-operation or tampering by the user; the balance contractor shall rebalance as required to restore the systems to within the acceptable criteria.
- E. When existing HVAC systems are being modified, the test and balance contractor shall measure and record existing flows to the remainder of the system prior to any system modifications. Upon completion of new installation modifications, the test and balance contractor shall restore the original balance of the unaltered system portions as well as balance the new work to the indicated design requirements.

3.3 AIR BALANCING PROCEDURES

- A. The test and balance contractor shall list fan, motor, and drive data for each piece of air handling equipment. He shall measure motor speed, motor voltage, motor current draw, fan speed, fan volume (by duct traverse), and fan static pressure.
- B. The test and balance contractor shall adjust fan speed to obtain desired results through adjustable pitch sheaves if provided. Otherwise he shall advise the mechanical contractor of the required drive assembly sheave ratio for his change out by the HVAC contractor. Balance contractor shall then verify the results as part of the final report.
- C. The balance contractor shall set the balancing dampers installed in the ductwork system to distribute the proper air flow requirements in each branch to minimize air balance adjustments at the grilles registers and diffusers and also to minimize the fan energy requirements (i.e. excess fan capacity shall not be compensated for by closing down balance dampers).
- D. The balance contractor shall measure air flows at all VAV terminal units and make necessary adjustments to meet minimum and maximum design requirements.
- E. The balance contractor shall measure air flows at all grilles, registers, and diffusers with a flow measuring hood and make adjustments to meet the design requirements.
- F. The balance contractor shall work with the temperature control contractor on site to set the outdoor air damper position to obtain the minimum design requirement on each mixing box. Outdoor air volume shall be determined based on

measurement of total flow, measurement of outdoor and return air temperatures and calculation of mixed air temperature.

- G. The balance contractor shall balance VAV air distribution systems with all terminal units at the maximum flow requirement. Upon completion, the static pressure controllers shall be set by the balance contractor as low as possible so as to still maintain adequate pressure to all zones. Set points shall be recorded in the final report.
- H. The balance report shall indicate both the design and actual conditions for all performance requirements.

3.5 REPORTING

- A. Initial Pre-Construction Phase Report: Based on examination of documents, on adequacy of design for systems balancing devices.
- B. Draft pencil copy report.
- C. Commissioning verification report.
- D. Eleven (11) month warranty walk thru report.

3.6 FOLLOW-UP REQUIREMENTS

- A. The balance contractor shall patch all holes in ductwork and insulation which were made for the aforementioned testing and balancing procedures.
- B. The balance contractor shall permanently mark all final balance settings on equipment and components for future reference.

END OF SECTION

SECTION 23 07 00

HVAC INSULATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 23 Specification Sections 23 05 01 "Basic HVAC Requirements" and 23 05 02 "Basic HVAC Materials and Methods".

1.2 QUALITY ASSURANCE

- A. Insulation systems shall be provided and installed by firms who have been regularly engaged in insulation systems of similar type for at least three years.
- B. The materials and methods for the complete insulation system installation shall be tested, rated, and installed in accordance with the following codes and standards.
 - 1. OBC
 - 2. NFPA 90A
 - 3. ASTM E-84 (NFPA 255)
- C. The composite insulation system installation including all insulation materials, adhesives, sealers, coverings, etc shall have flame-spread and smoke-developed indices as indicated below:
 - 1. Indoor installations shall have flame-spread index of 25 or less, and a smoke-developed index of 50 or less.
 - 2. Outdoor installations shall have flame-spread index of 75 or less, and a smoke-developed index of 150 or less. (Except for insulation products in contact with the airstream which must have the same ratings as the indoor installations.)

D. Insulation thickness shall meet the requirements of ASHRAE 90.1.

1.3 SCOPE OF WORK

A. Insulation work shall include but not be limited to the following types of systems:

1. Piping
2. Ductwork

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Insulation products shall be supplied as manufactured by one of the following:

1. Fiber glass ductwork insulation

CertainTeed Corporation
Knauf Fiber Glass
Owens-Corning Fiberglas Corp.
Schuller International

2. Fiber glass thermal and acoustical duct liner

CertainTeed Corporation
Knauf Fiber Glass
Owens-Corning Fiberglas Corp.
Schuller International

3. Fiber glass piping insulation

CertainTeed Corporation
Knauf Fiber Glass
Owens-Corning Fiberglas Corp.
Schuller International

4. Flexible unicellular insulation

Armacell Engineered Foams
Armstrong World Industries
Halstead Industries, Inc

K-Flex USA

5. Insulation fasteners and adhesives

Childers Products Co.
Duro-Dyne Corp.
Gripnail Corp.
H. B. Fuller Co.
Halstead Industries, Inc.
Hardcast, Inc.
Mon-Eco Industries, Inc
TRW Nelson Stud Welding Division

2.2 INSULATION MATERIAL STANDARDS

- A. Flexible fiber glass duct wrap insulation with foil faced kraft paper vapor seal facing. Insulation shall be of thickness as indicated in this specification or on the drawings, 0.75 pcf density, with a thermal conductivity "k" factor of 0.30 at 75 degree F mean temperature suitable for applications up to 250 degrees F. Insulation shall be Owens-Corning Type 75 or equivalent by other listed manufacturer.
- B. Rigid fiber glass duct board with all-service jacket facing. Insulation shall be of thickness as indicated in this specification or on the drawings, 6.0 pcf density, with a thermal conductivity "k" factor of 0.24 at 75 degree F mean temperature suitable for applications up to 450 degrees F. Insulation shall be Owens Corning Type 705 or equivalent by other listed manufacturer.
- C. Fiber glass duct liner insulation faced with a black fire-resistant coating against the airstream. The coating shall be microbial growth resistant in compliance with ASTM C1071 and the liner material shall be in accordance with ASTM C518. Insulation shall be of thickness as indicated in this specification or on the drawings, with a thermal conductivity "k" factor of 0.25 at 75 degree F mean temperature suitable for applications up to 250 degrees F. Insulation shall be Owens-Corning Type Aeroflex or equivalent by other listed manufacturer.
- D. Fiber glass pipe insulation with an all service jacket. Insulation shall be of thickness as indicated in this specification or on the drawings, with a thermal conductivity "k" factor of 0.23 at 75 degree F mean temperature suitable for applications up to 350 degrees F. Insulation shall be Owens-Corning Type ASJ/SSL-II or equivalent by other listed manufacturer.

- E. Flexible unicellular elastomeric pipe and equipment insulation. Insulation shall be of thickness as indicated in this specification or on the drawings, with a maximum thermal conductivity "k" factor of 0.28 at 75 degree F mean temperature suitable for applications between -40 degree F and 200 degree F.

2.3 INSULATION APPLICATIONS

A. HVAC Ductwork

1. Supply Air and Outside Air ductwork concealed within the building shall be insulated with 1-1/2" thick flexible fiber glass duct wrap insulation with foil faced kraft paper vapor seal facing unless noted otherwise in this specification or on the contract drawings. (Unless ductwork is to have internal duct liner insulation as specified in this specification or on the contract drawings.)
2. Return Air and Exhaust Air ductwork within the building shall in general be uninsulated unless noted otherwise in this specification or on the contract drawings. Except as follows when internally insulated for acoustical considerations with 1/2" thick fiber glass duct liner insulation faced with a black fire-resistant coating against the airstream:
 - a. All return air ductwork in return air plenum applications (the stubbed main, the transfer ducts, and the grille boots) shall be internally insulated.
 - b. The return air main in ducted applications shall be internally insulated for the first twenty feet from the HVAC unit connection.
3. Return Air ductwork concealed within the building but located within an unconditioned space or a space that is heated only such as a Storage Room, Mechanical Room or Ventilated Attic shall be insulated with 1-1/2" thick flexible fiber glass duct wrap insulation with foil faced kraft paper vapor seal facing unless noted otherwise in this specification or on the contract drawings.
4. All Exhaust Air ductwork within the building from the point of termination at the building envelope to a point ten feet upstream shall be insulated with 1-1/2" thick flexible fiber glass duct wrap insulation with foil faced kraft paper vapor seal facing.

5. The first twenty-five feet of Supply Air ductwork downstream of any RTU with a supply air flow greater than 3,000 CFM shall be internally insulated for acoustical considerations with 1" thick fiber glass duct liner insulation faced with a black fire-resistant coating against the airstream.
6. All Supply Air and Return Air ductwork exterior to the building shall be internally insulated with 2" thick fiber glass duct liner insulation faced with a black fire-resistant coating against the airstream.
7. All Supply Air and Return ductwork exposed in a conditioned space need not be insulated for thermal purposes unless noted otherwise on the contract drawings. (Ductliner for acoustical concerns shall still be provided as noted on the plans and within these specifications.)
8. HVAC ductwork that is internally insulated with fiber glass duct liner insulation does not need to be externally insulated.

B. Refrigerant Piping

1. Unless Noted Otherwise, all refrigerant piping shall be insulated with 1/2" thick flexible unicellular elastomeric pipe insulation. Insulation on refrigerant piping installed exterior to the building shall be coated with a weather resistant UV protective finish compatible with the insulation.
 - a. Any refrigerant suction piping interior to the building may be insulated with 1" thick fiber glass pipe insulation with an all service jacket in lieu of flexible unicellular elastomeric pipe insulation.
Fiberglass insulation shall not be used on the building exterior.

C. A/C Condensate Piping

1. All A/C condensate piping shall be insulated with 1" thick fiber glass pipe insulation with an all service jacket.
2. All A/C condensate piping shall be insulated with 1/2" thick flexible unicellular elastomeric pipe insulation.

PART 3 - EXECUTION

3.1 GENERAL

- A. Insulation materials shall be of the type indicated for each application. Where more than one type is indicated the installing contractor shall select from the indicated options according to his preference. (Unless noted otherwise on the contract drawings.) If a type is not indicated, the installer shall provide proper selection for architect / engineer's review in accordance with industry standards and government regulations.
- B. Installation personnel shall take all safety precautions to properly protect themselves during installation of insulation systems. Protection shall include the use of respirators, gloves and eye protection.
- C. Insulation materials shall be installed in complete accordance with the manufacturer's recommendations and in conformance with building codes and industry standards.
- D. Insulation systems shall only be installed over clean dry surfaces. Insulation materials must also be dry and in good condition. Insulation shall not be installed until completion of any required pressure testing.
- E. All insulation systems shall be continuous through wall openings, ceiling openings, floor openings, and pipe hangers. A continuous vapor barrier is required.
- F. Flexible fiber glass duct wrap insulation shall be wrapped tightly onto the ductwork with all circumferential joints butted together and all longitudinal joints overlapped by a minimum of two inches. Insulation shall be secured to all types of designated ductwork with 4" wide strips of fireproof adhesive 8" on center and additionally with mechanical fasteners 18" on center on the bottom side of all rectangular ductwork more than 24" wide. All circumferential and longitudinal joints shall have their facing secured with staples 6" on center and then taped with 4" wide foil reinforced kraft tape to insure both the means of fastening and the integrity of vapor seal. All penetrations of the vapor barrier from mechanical fasteners shall also be taped.
- G. Fiber glass duct liner insulation shall be installed as part of the ductwork fabrication as specified in Specification Section 23 31 00 "Ductwork". Duct liner shall be laminated to the internal surfaces of the ductwork and attached with galvanized steel pins, welded or mechanically fastened in complete accordance with the latest edition of SMACNA HVAC Duct Construction Standards.
- H. Fiber glass pipe insulation shall be installed with all joints butted firmly together. Longitudinal joints shall be sealed with jacket laps with factory applied adhesive. All butt joints to be sealed with butt strips having factory applied adhesive.

Valves and fittings shall be insulated with mitered sections of pipe insulation equal in density and thickness to the adjoining section, or with insulation cement, or premolded insulation fittings. Valve and fitting insulation shall be covered with an all service jacket or with PVC covers with a flame-spread and smoke-development index as previously indicated. Insulation shall not restrict valve operation.

1. All pipe insulation on the exterior of the building shall be protected with a continuous PVC jacket with all joints and seams sealed with a waterproof sealant. PVC jacket for pipe and fittings shall be 20 mils thick high impact ultra-violet resistant.
- I. Flexible unicellular elastomeric pipe and equipment insulation shall be installed with an adhesive selected for the anticipated service temperature of the item being insulated. All ends and joints shall be firmly butted together and sealed with a vapor barrier adhesive. Valves and fittings shall be insulated with mitered sections of pipe insulation equal in thickness to the adjoining section. All insulation exposed to the weather shall be painted with two coats of a vinyl lacquer type finish as recommended by the manufacturer.
 - J. Insulation materials shall be installed with smooth and even surfaces, with full length units of insulation materials, and with a single cut piece to complete a run. Cut scrap pieces abutting each other shall not be acceptable.
 - K. Insulation may be omitted as indicated below:
 1. Omit insulation of factory insulated plenums, terminal boxes and filter boxes and sections.
 2. Omit insulation for vibration control devices, testing laboratory labels and stamps, nameplates and data plates, access panels and doors in air distribution systems.
 3. Omit insulation for mducts with duct liner and factory-insulated flexible ducts.
 - L. All pipe insulation ends shall be tapered and sealed.
 - M. Contractor shall protect installed insulation throughout the construction project. Damaged insulation shall be replaced prior to acceptance by the owner.
 - N. Provide proper support at piping hanger systems.

- O. All insulation shall be applied so that there is no fiberglass exposed to the air stream without filters downstream. All fiberglass insulation, including all exposed edges, shall be coated, or mylar or other suitable material shall be provided between the fiberglass and the air stream.

END OF SECTION

SECTION 23 09 00

HVAC CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 23 Specification Sections 23 05 01 "Basic HVAC Requirements" and 23 05 02 "Basic HVAC Materials and Methods".
- C. **Installation of the control system devices shall be the responsibility of the HVAC contractor. The control system devices shall be unitary to the HVAC equipment and be provided by the unit manufacturer.**
- D. Quality Assurance: All products, components, and devices must be tested, listed, and labeled by UL and be in compliance with and be installed in accordance with the following codes and standards
 - 1. Enclosures shall comply with NEMA 250
 - 2. Installation shall comply with NFPA 90A
 - 3. Damper components shall comply with AMCA 500
 - 4. Electrical components shall meet NFPA 70
- E. Electrical contractor shall provide 120 VAC power to control devices as indicated in the sequence of operations and/or on the temperature control diagrams on the contract drawings.
- F. Submittals shall include wiring diagrams and a written description of the operational sequences.

PART 2 - PRODUCTS

2.1 DESCRIPTION:

- A. Control products shall be of type, size and capacity and possess performance characteristics as required for the indicated "Sequence of Operations". Products,

components, and devices may include but not be limited to electronic controllers, programmable thermostats, space temperature and humidity sensors, duct temperature sensors, space thermostats, freezestats, low leakage control dampers, damper operators, time clocks, hazardous gas monitoring, etc....

2.2 BASIC MATERIALS

- A. Control Wiring shall be in accordance with Electrical Specifications. Exposed wiring in ceiling plenums shall be open wired UL rated plenum cable or it should be installed in conduit.
 - 1. Wire for control circuits over 25 volt shall utilize color coded No. 12 wire in electric metallic tubing.
 - 2. Wire for control circuits under 25 volt shall utilize color coded No. 18 wire with 0.031 high temperature (41°C) plastic insulation on each conductor and a plastic sheath over all.
 - 3. Wire for electronic circuits shall utilize color coded No. 22 wire with 0.023 polyethylene insulation on each conductor and a plastic-jacketed copper shield over all.
 - 4. Open wiring shall be secured with plastic tie wraps to a permanent building structure.
- B. Control Panels shall be fabricated of 0.06" thick furniture-quality painted steel or extruded aluminum. Panel shall be fully enclosed type with a key lockable hinged access door. All control panels shall be keyed alike with a minimum of two keys provided to the owner. Panels shall be labeled with nameplates.
- C. Time Clocks shall be (7 day / 365 day) programmable of the quartz or digital type with a minimum of 24 hours of battery back-up. Clocks shall be suitable for surface or panel mounting and include a manual override.

2.3 THERMOSTATS

A. General Requirements

- 1. Type and function of thermostats shall be coordinated with the "Sequence of Operations". Thermostats for heating shall have a minimum set point of 55°F or lower. Thermostats for cooling shall have a maximum set point of

85°F or higher. Heating and cooling thermostats shall have automatic changeover with a deadband of 5°F between heating and cooling.

2. Unless noted otherwise, all thermostats shall have a spiral bi-metal thermometer and be installed with a locking transparent plastic guard.
3. Thermostats located on exterior walls shall be mounted on an insulated base.

B. Low Voltage On-Off Thermostats

1. Thermostats shall be 24 volt AC bi-metal operated switch type with an anticipator.

C. Line Voltage On-Off Thermostats

1. Thermostats shall be snap switch or solid state type with an anticipator and an integral ON-OFF-AUTO selector switch. The OFF position of the selector switch shall be wired to break all ungrounded conductors.

D. Electric Low Limit Thermostats

1. Thermostat shall be of the single pole, single throw, snap acting type with a remote sensing element and a manual or automatic reset.

E. Electric High Limit Thermostats

1. Thermostat shall be of the single pole, single throw, snap acting type with a remote sensing element and a manual or automatic reset.

F. Programmable Electronic Thermostats

1. Thermostat shall be solid state type with independent 7-day programming capabilities for occupied and unoccupied settings. Thermostat shall have automatic changeover from heating to cooling and include a fan switch (On-Off), a system switch (Heat-Auto-Cool-Off) and the ability to automatically control the fan for continuous operation in the occupied mode. Thermostat shall have an LED display indicating the current time, temperature and operating status. In addition the thermostat shall have a program override and battery backup capabilities of at least 24 hours.

2.4 ELECTRONIC SENSORS

A. Temperature Sensors

1. Sensors shall be vibration and corrosion resistant with platinum resistance temperature detectors for an accuracy of plus or minus 0.2% at the point of calibration.
2. Duct sensors shall be of the insertion type for ducts smaller than 6 square feet in cross sectional area and of the averaging element type for ducts 6 square feet in cross sectional area and larger.
3. Room sensors shall have an integral temperature indicator.

B. Humidity Sensors

1. Sensors shall be vibration and corrosion resistant with a bulk polymer sensor element for an accuracy of 5% across the full range.

C. Sensor Guards

2.5 CONTROL DAMPERS:

- A. Unless noted otherwise, dampers shall be opposed blade AMCA Class 1 low leakage type with maximum rated leakage of 4 CFM / Sq. Ft. at a differential pressure of 1" WC.
- B. Damper seals shall consist of flexible metal compression type jamb seals and synthetic elastomeric blade edge seals mechanically locked onto the blade edge. Seals shall be suitable for temperature applications between -25 and 180.

2.6 DAMPER ACTUATORS

- A. Electronic, low voltage motor actuators shall be of sufficient size and quantity with torque characteristics and capacity to provide smooth two position or modulating operation of the control device between the minimum and maximum positions. Actuators for unit mixing dampers shall have a spring return.

2.7 ELECTRONIC CONTROLLERS

- A. Electronic controllers shall be application specific solid state type from manufacturer's standard product line. Controller shall include operator input capability to set all adjustable parameters. Controller shall be integrated with additional control devices as required to satisfy the specified "Sequence of Operations."

2.8 HAZARDOUS GAS MONITORING

- A. The hazardous gas monitor shall be complete with a CSA approved steel enclosure, up to 16 relay contacts (120 VAC resistive), operating temperature range of -20 to 50C, operating humidity range of 0-90%RH, support up to 980 sensors, up to 4 analog outputs, audible alarm, colored display graphics, up to 5 minute activation delay, up to 60 minute run-time, integral power supply and USB flash drive.
- B. The combination CO/NO2 hazardous gas transmitter with 3-button interface and a minimum 50ft coverage area shall be complete with a Modbus interface.
- C. Hazardous Gas Monitors shall be as manufactured by one of the following:
 - 1. Armstrong
 - 2. Sensor Electronics
 - 3.

PART 3 - EXECUTION

3.1 DESCRIPTION:

- A. Contractor shall handle and store the Control System Devices in accordance with the manufacturer's recommendations. The contractor shall be responsible for protecting the Control System Devices from weather, construction dirt and debris, and from physical damage until final acceptance by the owner.
- B. Contractor shall install control systems and components in accordance with the manufacturer's installation instructions. All devices shall be mounted in accessible locations. Manufacturer's recommended operating and service clearances shall be maintained. All control wiring and tubing shall be concealed in the building wherever possible. Exposed control wiring and tubing is acceptable only in equipment and storage rooms. Exposed control wiring and

tubing must be concealed in either wire mold or conduit. All conductor wires shall be coded and labeled for future reference.

1. Install thermostats at same height above finished floor as lighting switches.

3.2 COMMISSIONING AND TRAINING

- A. The contractor shall be responsible for coordinating start-up with all associated trades and with the control system manufacturer's authorized representative. The control system manufacturer or his authorized representative shall provide start up services upon completion of installation. Such service shall include verification of proper system installation and performance.

END OF SECTION

SECTION 23 23 00

REFRIGERANT PIPING SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 23 Specification Sections 23 05 01 "Basic HVAC Requirements" and 23 05 02 "Basic HVAC Materials and Methods".

1.2 QUALITY ASSURANCE

- A. The complete refrigerant piping system and associated equipment shall be installed in complete accordance with the applicable requirements of the following codes and standards:
 - 1. Ohio Mechanical Code Chapter 11 (OAC 4101:2-46) "Mechanical Refrigeration"
 - 2. Ohio Pressure Piping Systems Rules (OAC 4101:8)
 - 3. All pipe brazing shall be done in accordance with ASME Boiler and Pressure Vessel Code, Section IX, for brazing work done in a shop environment and at the project site
 - 4. ASHRAE Standard 15 "Safety Code for Mechanical Refrigeration"
 - 5. ASME B31.5 Refrigeration Piping, latest edition
 - 6. UL 207 Refrigerant containing components and accessories

PART 2 - PRODUCTS

2.1 Material Standards

- A. Pipe shall be ASTM B280 refrigerant grade ACR type hard-drawn copper tube.
- B. Pipe fittings shall be wrought copper and bronze for brazed joints in accordance with ANSI B16.22. Elbows shall be of the long radius type.

- C. When indicated on the contract drawings, pre-charged refrigerant grade ACR soft annealed copper tube may be installed. Maximum length shall be forty feet.
- D. Refrigeration Valves and Specialties shall be as manufactured by one of the following:
 - 1. AC&R Components
 - 2. Alco
 - 3. Henry Valve
 - 4. Mueller Brass
 - 5. Parker Hannifin
 - 6. Sporlan Valve
 - 7. Vilter

PART 3 - EXECUTION

3.1 GENERAL

- A. Refrigerant piping layout and arrangement shall be per the HVAC equipment manufacturer's recommendations to assure proper oil and refrigerant flow through the system. Installer shall coordinate requirements for pipe sizes, pipe slopes, locations of traps, inverted traps, double suction risers etc. with the equipment manufacturer.
 - 1. Any pipe sizes indicated on the contract drawings are nominal sizes for reference only. Final determination of pipe sizes shall be per the equipment manufacturer's recommendations.
 - 2. The refrigerant piping system and associated specialties shall be sized and selected to prevent excessive pressure drops so as the compressor and evaporator perform with balance points at or above the specified capacity.
- B. Unless noted otherwise, refrigerant liquid lines shall be installed with a filter drier, a sight glass, a solenoid valve and a thermal expansion valve.
 - 1. A refrigerant filter-drier shall be installed in the liquid refrigerant line with a three valve by-pass immediately ahead of the moisture indicating sight glass. The filter-drier shall consist of a corrosion resistant steel shell with a molded porous core to remove moisture and foreign matter and to neutralize acids within the refrigerant. The filter-drier may be of the in-line type for up to 15 ton systems and shall be of the replaceable core angle type for systems 15 tons and larger.

2. A sight glass shall be installed immediately downstream of the filter-drier. The sight glass shall contain an indicator set in a recess in the glass to indicate when moisture is present in the refrigerant. A dark green color shall indicate dry refrigerant and a bright yellow color shall indicate wet refrigerant. The sight glass shall also provide a clear view of the refrigerant to examine for the presence of bubbles (flash gas) indicating a shortage of refrigerant or a restriction in the liquid line. A removable cap shall cover the sight glass to protect the glass from dust and dirt.
 3. Unless noted otherwise, an electric solenoid valve shall be installed in the liquid line of each evaporator circuit directly ahead of the thermal expansion valve to enable staging of circuits and to allow the compressor to pump the refrigerant out of the evaporator. The solenoid valve shall be normally closed direct acting type of non-corrosive construction with a tight closing synthetic seat. The valve shall include a molded interchangeable coil with voltage compatible with the control circuit of the refrigerant equipment.
 4. Each evaporator circuit shall have a thermostatic expansion valve installed in the liquid line as close to the evaporator inlet as possible. The valve shall have a stainless steel diaphragm with accessible internal parts and replaceable elements. The amount of superheat shall be externally adjustable. The expansion valve shall include a remote copper bulb connected to the diaphragm with a capillary tube. The bulb shall be fastened with two straps to a clean straight horizontal section of suction line. An external equalizer shall be utilized with the expansion valve whenever the evaporator has a refrigerant pressure drop of 2 psi or greater or whenever a refrigerant distributor is applied at the evaporator inlet. The external equalizer shall connect to the suction line downstream of the remote bulb. (The distributor shall have an auxiliary side connection for hot gas by pass applications.)
- C. Shut-off valves shall be provided in the refrigerant piping system to isolate all major components and as indicated on the contract drawings and as recommended by the HVAC equipment manufacturer for maintenance. Valves shall be refrigerant grade full port ball valves.
- D. Hot gas by-pass valves when specified on the contract drawings shall be provided and installed with sufficient capacity to by-pass the minimum stage of the lead compressor's capacity.
- E. Copper to copper pipe joints shall be brazed without flux using a phosphorus bearing alloy such as "Sil-Phos." Copper to brass or steel pipe joints shall be brazed with flux using a 45% silver alloy such as "Easy-Flo." Inert nitrogen shall be passed through the piping during brazing to prevent oxidation.

1. Care shall be taken during installation to insure maximum cleanliness of all refrigerant piping.
- F. Refrigerant piping shall be properly isolated from equipment with refrigerant grade flexible pipe connectors to prevent the transmission of equipment vibration into the building structure.
 - G. Refrigerant piping shall be properly supported in accordance with Specification Section 23 05 29 "HVAC Hangers and Supports."
 - H. Upon completion of the refrigerant piping system installation, the entire system shall be leak tested at 300 psi for high side and 150 psi for low side to the maximum operating pressure of the system. The system shall be charged with dry nitrogen and pressurized to the test pressure. Test shall be maintained for a period of twenty-four hours without any appreciable loss of pressure. Leak test piping and joints with an electronic or halide leak detector. Piping insulation shall not be installed until the system satisfactorily passes the leak test.
 - I. Upon satisfactory completion of the leak testing, the entire piping system shall be evacuated with a triple evacuation method or other means when specifically recommended by the equipment manufacturer. Vacuum shall be drawn to 1500 microns, 1500 microns, and 500 microns successively and broken each time with dry nitrogen.
 - J. Upon completion of the system evacuation, the entire system shall be charged with the proper amount and type of refrigerant for system operation.

END OF SECTION

SECTION 23 31 00

DUCTWORK

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 23 Specification Sections 23 05 01 "Basic HVAC Requirements" and 23 05 02 "Basic HVAC Materials and Methods".
- C. Regulatory Agencies: The work described in this section shall be in compliance with all codes and standards listed below:
 - 1. Ohio Building Code
 - 2. NFPA 90A & 90B
 - 3. NFPA 96 (grease hood exhaust)
 - 4. NFPA 211 (gas vents and chimneys)
 - 5. SMACNA
 - 6. ASHRAE
- D. Shop Drawings: Coordination drawings (to scale) shall be submitted showing duct layout and dimensions, duct elevations, and hanger and accessory locations. Coordination drawings shall include building structure and existing conditions, as well as work of other trades and disciplines so that potential space interference of items is avoided and proper clearance requirements are maintained.

PART 2 - PRODUCTS

2.1 MATERIAL AND CONSTRUCTION STANDARDS

- A. Ductwork shall be fabricated of prime grade materials free from any imperfections.
- B. Ductwork shall be fabricated of minimum 26 gauge sheet metal.

- C. Galvanized sheet steel shall be G90 zinc coated and mill phosphatized for painted applications on exposed ductwork in conditioned spaces.
- D. Aluminum sheetmetal shall be 3003 alloy temper H14.
- E. Stainless Steel shall be of the type specified for the application or as indicated on the contract drawings. Finish shall be No 4 where exposed to view in occupied spaces and No. 1 elsewhere. The finish shall be protected with mill-applied adhesive paper until installation is ready for owner acceptance.
- F. Manufacturer's stamp indicating the metal gauge shall be clear and visible on the outside surface of the duct.
- G. All ductwork shall be constructed in accordance with the SMACNA standards for the designated pressure classification.
- H. Elbows or turns in the ductwork shall be fabricated with a center line radius of not less than 1.5 times the duct width or with elbows with integral turning vanes.
- I. Transitions and offsets shall be fabricated in accordance with SMACNA standards. In general limit the angular taper to 30 degrees maximum unless space conditions prohibit.
- J. All duct sizes on drawings indicate free internal dimensions. Actual sheetmetal sizes shall include an allowance for internal ductliner. See Specification Section 23 07 00 "HVAC Insulation" for ductliner application requirements.

2.2 SPECIFIC APPLICATIONS

- A. General supply air, return air, exhaust air and outside air ductwork within the building shall be 2" SMACNA pressure classification galvanized steel unless noted otherwise on the contract drawings.
- B. Unless Noted Otherwise, supply air and return air ductwork exterior to the building shall be rectangular ductwork of 4" SMACNA pressure classification fabricated of paintable galvanized steel with 2" thick internal ductliner insulation.
- C. Shower & Locker Room exhaust ductwork shall be 2" SMACNA pressure classification aluminum unless noted otherwise on the contract drawings.
- D. Flexible ductwork shall have a flame proof vinyl sheath with spiral wound spring steel and 1" thick fiber glass insulation with a vinyl vapor barrier exterior jacket. Flexible ductwork shall be listed and tested in accordance with UL 181. Flexible

ductwork shall be rated for the SMACNA pressure classification in which it will be applied and be as manufactured by Wiremold, Genflex, Clevaflex, or Thermaflex.

- E. Gas Vents shall be compatible with the equipment for which they serve.
 - 1. Gas Vents shall be double wall UL listed metal type B with an aluminum inner pipe, a 1/2" air space, and a galvanized steel outer pipe. Total vent system shall include UL labeled draft hood connectors, increasers, elbows, tees, thimbles, adjustable roof flashing, storm collar, metal cap with bird barrier, fire stop spacers, support assemblies and fasteners as well as straight pipe sections. Gas vents shall be as manufactured by AMPCO, Metal-Fab, Heat-Fab, or Selkirk Metalbestos.

2.3 DUCTWORK ACCESSORIES

- A. Sheetmetal Accessories: Furnish and install deflectors, turning vanes, elbows, Y-branch fittings, tee fittings, tap in fittings, transitions and plenums as indicated on the contract drawings and of the same material as the ductwork system in which they are installed. All accessories shall be fabricated in accordance with the latest revision of SMACNA "HVAC Duct Construction Standards".
- B. Balancing Devices: Furnish and install manual balancing dampers and splitter dampers as indicated on the contract drawings and of the same material as the ductwork system in which they are installed. All balancing devices shall be supplied with an indicating locking quadrant. Balancing dampers in ducts of one square foot of cross sectional area or less shall be of a single blade. Balancing dampers in ducts one square foot of cross sectional area and larger shall be the multiple opposed blade type. Balancing dampers shall be as manufactured by American Warming, Reliable or Young Regulator.
- C. Fire Dampers: Furnish and install UL labeled fire dampers for ductwork penetrations or air openings through all fire rated building assemblies. Dampers shall comply with the requirements of UL555. Dampers shall be frame style "B" for rectangular ductwork and openings and frame style "C" for round and flat oval ductwork. Dampers shall be curtain type with interlocking blades outside of the airstream and a 165 degree F fusible link. Damper rating shall be 1-1/2 hour for 1 or 2 hour rated assemblies and 3 hour for 3 hour rated assemblies. Dampers shall be as manufactured by Air Balance Inc., Greenheck, Prefco, or Ruskin.
- D. Access Doors: Furnish and install duct access doors for fusible link repair for each fire damper and for maintenance access and inspection of each smoke damper as indicated on the contract drawings. Access doors shall have extended frames for externally insulated ductwork. Access doors shall be factory

insulated for all insulated ductwork applications. Access doors shall be of the cam lock type fitted for air tight closure and shall be rated for the SMACNA pressure classification in which it will be applied. Access doors shall be permanently identified on the exterior by a label with letters not less than ½" high reading "FIRE DAMPER" or "SMOKE DAMPER". Access doors shall be as manufactured by Cesco, Ruskin, Semco, or United McGill.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Ductwork systems shall be fabricated, assembled, and installed in accordance with recognized industry standards and SMACNA HVAC Duct Construction Standards. Systems shall be installed with a minimum number of joints and be air-tight (2% maximum allowable air leakage). Ductwork shall be rigidly supported to prevent buckling with braces, ties, and hangers of the same material as the ductwork itself.
- B. All supply, return, outside and exhaust air ductwork shall have its transverse joints and longitudinal seams sealed with UL listed duct sealant as manufactured by Duro-Dyne, Hardcast, 3M, or United Sheetmetal.
- C. Ductwork shall be routed in the most direct path providing the greatest headroom possible which does not interfere with clearance requirements and be vertically, horizontally and parallel to the building confines whenever possible unless noted otherwise.
- D. Ductwork branches off of mains shall generally be arranged as follows:
 - 1. Rectangular branches off of rectangular mains shall be with 45 degree shoe entry type tap in fittings.
 - 2. Round branches off of rectangular mains shall be made with conical type tap in fittings if the main is 4" or more greater in depth than the branch diameter. Otherwise, a 45 degree shoe entry type tap in fitting with rectangular dimensions of equivalent cross sectional area to the round branch diameter shall be used immediately followed by a rectangular to round transition.
 - 3. Round branches off of round mains shall be made with Y-branch, conical tap, 45 degree shoe entry tap, or tee fittings as indicated on the contract drawings.

- E. This contractor shall be responsible for installation of control dampers which are provided by the Temperature Control Contractor. All ductwork accessories shall be installed according to the manufacturer's instructions. Turning vanes shall be installed in all rectangular elbows.
- F. Open ends of ductwork shall be protected with a temporary closure to prevent the entrance of dust and debris prior to ductwork connections.
- G. Flexible ductwork shall be installed in accordance with Section III of SMACNA's "HVAC Duct Construction Standards, Metal and Flexible". Flexible ductwork installation shall be a maximum of five feet in length. The insulating ends of all flexible ductwork shall be sealed with duct tape.
- H. Gas vents shall be installed in accordance with the manufacturer's instructions. Installation shall maintain minimum clearances from combustible materials in accordance with the UL listing and the OBC.
- I. Ductwork systems designated with a SMACNA pressure classification of 4" or greater shall be leak tested in accordance with the latest revision of SMACNA's "HVAC Duct Leakage Test Manual".

3.2 POST CONSTRUCTION AIR DISTRIBUTION SYSTEM CLEANING

- A. Prior to turning the systems over to the owner, the HVAC Units & Supply and Return Air Ductwork Systems shall be cleaned in accordance with NADCA (National Air Duct Cleaners Association) standards. Cleaning shall be after completion of temporary system use of systems during construction.
- B. Small Ductwork systems shall be cleaned with forced air at high velocity to remove accumulated dust.

END OF SECTION

SECTION 23 34 00

HVAC FANS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 23 Specification Sections 23 05 01 "Basic HVAC Requirements" and 23 05 02 "Basic HVAC Materials and Methods".
- C. Type, quantity, performance and operating characteristics of Fans shall be as indicated on the Contract Drawings.
- D. All Fans shall be supplied by the same manufacturer.
- E. Fans shall be tested and rated in accordance with the following AMCA standards and shall bear the AMCA seal.
 - 1. AMCA Standard 210 - Laboratory Methods of Testing Fans for Rating.
 - 2. AMCA Standard 301 - Sound Power Level Rating.
- F. Related Work Specified Elsewhere:
 - 1. HVAC Hangers and Supports: 23 05 29
 - 2. HVAC Controls: 23 09 00
 - 3. Ductwork: 23 31 00
 - 4. Electrical Divisions

PART 2 - PRODUCTS

2.1 GENERAL

- A. Fans shall be of size and capacity as indicated on the contract drawings; Refer to equipment schedule for additional fan accessories.
- B. Fans shall be factory fabricated, assembled, and tested.

- C. Fans shall be designed for continuous operation at the maximum rated fan speed and motor horsepower. The assembly shall be statically and dynamically balanced.
- D. Motors shall be NEMA type MG 1, general purpose, continuous duty, design "B" with built in thermal overload protection and be of the electrical characteristics as indicated on the contract drawings. Enclosures shall be open drip proof unless noted otherwise. Temperature rating shall be for 40 degree C ambient with a 50 degree C temperature rise (class A insulation). Service factor shall be 1.15 minimum. Motors shall be sized large enough so as not to operate in the service factor range for design capacity. All three phase motors shall be protected with phase loss protection. Protection shall be provided by the electrical system, by built-in protection, or by protection built into a variable frequency drive.
 - 1. Motors shall be Premium Efficiency – Variable Frequency Drive (VFD) compatible with a minimum efficiency in accordance with IEEE Standard 112, Test Method B and the latest requirements of the Federally mandated Energy Policy Act (EPACT).
- E. Belt drive shall be sized for a 1.5 service factor. Adjustable pitch pulleys shall be provided for motors up to 5 HP. Fixed pitch pulleys shall be provided for motors 5HP and above. OSHA approved belt guards shall be provided for exposed drives.
- F. Shaft shall be turned, ground, and polished steel designed to operate at no more than 70 percent of its first critical speed. Bearings shall be of the type indicated and have a median life of 200,000 hours (AFBMA L50).
- G. Fans to be as manufactured by one of the following:
 - 1. Greenheck
 - 2. Loren Cook
 - 3. Jenn Fan

2.2 CENTRIFUGAL ROOF MOUNTED VENTILATORS

- A. Fan assembly shall consist of centrifugal wheel, shaft, bearings, drive, motor, housing, disconnect switch, curb and other accessories as scheduled.
- B. Housing shall be of spun aluminum with aluminum dome top, outlet baffle, square base and venturi inlet cone. Upblast units shall have rain and snow drains.

- C. Fan wheel shall be all aluminum with backward inclined blades.
- D. The motor / drive assembly shall be resiliently mounted to the housing with the motor out of the air stream and with permanently lubricated shaft bearings.
- E. A removable bird screen of 1/2" 16 gauge aluminum wire mesh shall be provided in the discharge.
- F. A non fusible disconnect switch shall be provided factory wired to the motor through an internal aluminum conduit.

2.3 CABINET EXHAUST FAN

- A. Fan shall be direct drive forward curved type housed in an acoustically insulated galvanized steel enclosure and include accessories as scheduled or specified.
- B. The blower / motor assembly shall have permanently lubricated bearings and be removable from the cabinet.
- C. The fan assembly shall include a white painted inlet grille, an integral discharge backdraft damper and duct connection flanges as well as other accessories as indicated on the Contract Drawings.
- D. The fan discharge position shall be changeable by relocating plates on the exterior fan cabinet.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Contractor shall handle and store the Fans in accordance with the manufacturer's recommendations. The contractor shall be responsible for protecting fans from weather, construction dirt and debris, and from physical damage until final acceptance by the owner.
- B. Contractor shall install Fans plumb and level in accordance with the manufacturer's installation instructions. Manufacturer's recommended operating and service clearances shall be maintained.
 - 1. Installation of the roof curb shall also be in accordance with the roofing system manufacturer's requirements. This contractor shall coordinate all

requirements with the general contractor. See Specification Section 23 05 29 "HVAC Hangers and Supports" for curb requirements.

2. Roof mounted fans shall be secured to the roof curbs with cadmium plated screws.
3. Unless specifically noted otherwise, all rooftop equipment shall be located so as to maintain at least ten feet of clearance from any roof edge with a drop of 24" or more.
4. Suspended fans shall be supported by threaded steel rods anchored to the overhead structure. See Specification Section 23 05 48 "HVAC Vibration and Seismic Control" for isolation requirements.
5. Make ductwork connections so as to maintain required clearance adjacent to the equipment for service and maintenance.

3.2 COMMISSIONING

- A. The contractor shall be responsible for coordinating start-up with all associated trades.

1. Contractor to verify Fan installation is complete prior to start-up.
 - a. Contractor shall verify that all ductwork connections are complete.
 - b. Contractor shall lubricate all bearings and moving parts prior to start-up.
 - c. Contractor shall adjust V-belt drives for proper alignment and tension.
 - d. Contractor shall check and verify that all vibration isolation components are properly adjusted with adequate freedom of movement.
 - e. Contractor shall check and verify that all control dampers function smoothly from full closed to full open position without binding.
 - f. Contractor shall make sheave changes as required to achieve design operating conditions.
2. Temperature control contractor shall verify that the field controls are functional prior to start-up.

END OF SECTION

SECTION 23 37 00

AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 23 Specification Sections 23 05 01 "Basic HVAC Requirements" and 23 05 02 "Basic HVAC Materials and Methods".
- C. Type, quantity, and performance characteristics of Air Distribution and Ventilation Devices shall be as indicated on the Contract Drawings.
- D. All similar types of Air Distribution and Ventilation Devices shall be supplied by the same manufacturer.
- E. Performance Characteristics of Air Distribution and Ventilation Devices shall be rated in accordance with the following applicable standards:
 - 1. ARI 650 "Standard for Air Outlets and Inlets"
 - 2. ANSI/ASHRAE 70-1991 "Method of Testing for Rating the Air Flow Performance of Outlets and Inlets"
 - 3. AMCA 511 "Test Method for Louvers, Dampers and Shutters. (Louvers shall bear the AMCA Certified Rating Seal)
 - 4. NFPA 90A for installation
- F. Related Work Specified Elsewhere:
 - 1. HVAC Hangers and Supports: 23 05 29
 - 2. Testing, Adjusting and Balancing: 23 05 93
 - 3. Ductwork: 23 31 00

PART 2 - PRODUCTS

2.1 GRILLES, REGISTERS AND DIFFUSERS

- A. Grilles, Registers and Diffusers for Supply Air, Return Air, Exhaust Air and Relief Air shall be provided with accessories and finishes as indicated by Air Distribution Schedules and Annotation on the Contract Drawings.
 - 1. Where balance dampers are to be provided as part of the air distribution device, damper shall be operable from the face of the air distribution device.
- B. Unless noted otherwise, Grilles, Registers and Diffusers shall be the manufacturer's standard product line with frames and border styles compatible with the ceiling and wall construction in which they are being installed and factory baked white enamel or powder paint finish.
 - 1. Refer to Architectural Contract Documents for types of ceiling and wall construction.
- C. Grilles, Registers and Diffusers shall be as manufactured by one of the following:
 - 1. Anemostat
 - 2. Krueger
 - 3. Price
 - 4. Titus
- D. Return and exhaust air grilles/registers: Steel or aluminum construction as scheduled; 1/2" or 3/4" blade spacing; and fixed deflection with louvers parallel to the long dimension.
- E. Supply Air Registers: Steel or aluminum construction as scheduled; and double deflection louvers with individually adjustable blades.
- F. Supply Air Diffusers: All steel diffuser with equalizing grid.
- G. Eggcrate Return and Exhaust Air Grilles: 1/2" x 1/2" x 1/2" aluminum grid with aluminum border.
- H. Heavy Duty Return Air Grilles: Heavy gauge steel construction with angled louvers at 1/2 " blade spacing.

2.2 GRAVITY ROOF VENTILATORS

- A. Gravity Ventilators for Outdoor Air shall be provided with accessories and finishes as indicated by Gravity Ventilator Schedules and / or Annotation on the Contract Drawings.
- B. Unless noted otherwise, Gravity Ventilators shall be the manufacturer's standard product line with ½" galvanized steel birdscreen, throat damper, 12" high insulated roof curb compatible with the roof construction in which they are being installed and exterior, factory baked enamel finish.
 - 1. Refer to Architectural Contract Documents for types of roof construction.
 - 2. Tapered roof curbs shall be utilized on sloped roof applications to allow for plumb and level installation of the ventilator.
 - 3. Refer to "HVAC Hangers and Supports" Specification Section 23 05 29 for additional roof curb requirements.
 - 4. Refer to "Sequence of Operations" for coordination of throat damper requirements.
 - 5. All hoods shall be removable from base or hinged and insulated on the underside to prevent condensation.
- C. Spun aluminum ventilators shall be manufactured of heavy gage aluminum. The hood shall be easily removed for access to the components beneath the ventilator. The base shall be fully welded at the corners to ensure a weather-tight installation.
- D. Gravity Ventilators shall be as manufactured by one of the following:
 - 1. Cook
 - 2. Greenheck
 - 3. Jenn Fan

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Contractor shall handle and store the Air Distribution and Ventilation Devices in accordance with the manufacturer's recommendations. The contractor shall be responsible for protecting the Air Distribution and Ventilation Devices from weather, construction dirt and debris, and from physical damage until final acceptance by the owner.

- B. Contractor shall install Air Distribution and Ventilation Devices flush with the finish ceiling and wall surfaces in which they are applied in accordance with the manufacturer's installation instructions.
- C. Exact locations of Air Distribution Devices shall be coordinated with the Architectural Reflected Ceiling plans.
- D. All fasteners exposed to the weather shall be stainless steel.

END OF SECTION

SECTION 23 55 00

FUEL-FIRED HEATERS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including; General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 23 Specification Sections 23 05 01 "Basic HVAC Requirements" and 23 05 02 "Basic HVAC Materials and Methods".
- C. Type, quantity, performance and operating characteristics of Fuel Fired Heaters shall be as indicated on the Contract Drawings.
- D. All Fuel Fired Heaters shall be supplied by the same manufacturer.
- E. Performance Characteristics of Fuel Fired Heaters shall be rated in accordance with DOE testing procedures.
- F. Fuel Fired Heaters shall have operating efficiencies in excess of the minimum requirements of ASHRAE Standard 90.1 "Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings."
- G. Fuel Fired Heaters shall be UL listed and have an ETL Label.
- H. Fuel Fired Heaters shall carry a complete parts and labor warranty for one year from date of final acceptance unless noted otherwise.
- I. Related work specified elsewhere:
 - 1. Plumbing Pipe and Pipe Fittings (gas piping): 22 05 03
 - 2. Hangers and Supports: 23 05 29
 - 3. Ductwork- Gas Vents: 23 31 00
 - 4. Electrical Divisions

PART 2 - PRODUCTS

2.1 TUBULAR INFRARED HEATERS

- A. Single stage, tubular infrared gas heaters shall be CSA design certified low intensity positive pressure, non-condensing type.
- B. The burner shall be fully assembled and tested at the factory. The burner shall be complete with an air inlet air collar for sealed combustion, a combustion air orifice for proper gas/air ratio mixture and a 120 VAC combustion air blower with a permanently lubricated and thermally protected motor. The burner shall include a thirty-six (36) inch long three prong plug with power cord. An inspection window shall be provided for burner observation.
- C. Gas burner safety controls, with self-diagnostic LED display, shall be totally enclosed within a corrosion resistant housing and isolated from the combustion air. Features shall include a direct spark ignition system with (3) trials for ignition, pre-and post- purge controls, flame sensing rod with safety shut-off and an air pressure switch with safety shut-off to sense air inlet or vent blockage. Gas valve shut-off shall be of the redundant type.
- D. Temperature control shall be by a factory supplied 24 volt space thermostat, field installed remote from the burner, with power supply provided at heater terminal board. Factory controls shall include a control transformer.
- E. The heat exchanger shall consist of 4" OD heavy duty, 12 gauge black steel tubes. The combustion chamber and radiant tubes shall be constructed of 4" OD, 14 gauge aluminized steel. Heat exchanger sections shall be joined to the burner and to other heat exchanger sections with factory supplied couplings/clamps. Turbulator baffles shall be factory installed.
- F. The reflectors shall be fabricated of #3003H25 brite finish aluminum with a geometric shape for a reflectional efficiency of 90% or greater. The reflectors shall be supported by an aluminized steel wire hanger which shall have the ability to rotate up to 45 degrees from horizontal in either direction around the heat exchanger. Each reflector section shall rotate independently from other sections. Additional side reflectors shall be included when noted.
- G. The tubular infrared gas heater shall be installed with manufacturer's hanging kit designed to permit expansion while minimizing operation noise and rattles.
- H. The tubular infrared gas heater shall carry a warranty covering the burner for ten years and the heat exchanger and combustion chamber for a minimum of five years.

- I. Venting shall be directly outdoors with single wall stainless pipe or minimum 24 gauge galvanized sheet metal pipe. See Specification 15891 "Ductwork" and Drawings for additional requirements.
- J. Combustion air intake piping shall be Schedule 40 PVC that is sealed and pressure tight. Pipe must be at least the same size as the connection on the unit.
- K. The burners shall be capable of satisfactorily operating at a minimum 7" WC and maximum 14" WC inlet gas pressure
- L. The tubular infrared gas heaters shall be as manufactured by one of the following. All units shall be supplied by the same manufacturer.
 - 1. AmbiRad
 - 2. Solaronics
 - 3. Re-Verber-Ray
 - 4. Roberts Gordon
 - 5. Superior Radiant Products

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Contractor shall handle and store the Fuel Fired Heaters in accordance with the manufacturer's recommendations. The contractor shall be responsible for protecting the Fuel Fired Heaters from weather, construction dirt and debris, and from physical damage until final acceptance by the owner.
- B. Contractor shall install Fuel Fired Heaters plumb and level in accordance with the manufacturer's installation instructions. Manufacturer's recommended operating and service clearances shall be maintained.
- C. Contractor shall maintain clearance to combustibles in accordance with the manufacturer's recommendations and applicable code requirements.
- D. Install vent and combustion air piping in accordance with the manufacturer's instructions, material types and listed codes and standards. Do not exceed manufacturer's specified maximum lengths.

3.2 COMMISSIONING

- A. The contractor shall be responsible for coordinating start-up with all associated trades and with the Fuel Fired Heater manufacturer.

1. Contractor to verify Fuel Fired Heater installation is complete prior to start-up.
 - a. Contractor shall verify that all piping and vent connections are complete.
2. Temperature control contractor shall verify that the field controls are functional prior to start-up.

END OF SECTION

SECTION 23 55 05

ROOFTOP HEATING UNITS & MAKE-UP AIR UNITS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 1 - General Requirements.
- B. The scope of work described in this section is subject to the Division 23 Specification Sections 23 05 01 "Basic HVAC Requirements" and 23 05 02 "Basic HVAC Materials and Methods".
- C. Type, quantity, performance and operating characteristics of Rooftop Heating & Make-Up Air Units shall be as indicated on the Contract Drawings.
- D. All Rooftop Heating & Make-Up Air Units shall be supplied by the same manufacturer.
- E. Performance Characteristics of Rooftop Heating & Make-Up Air Units shall be rated in accordance with DOE and/or ARI testing procedures.
- F. Rooftop Heating & Make-up Air Units shall have operating efficiencies in excess of the minimum requirements of ASHRAE Standard 90.1 "Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings."
- G. All Rooftop Heating & Make-Up Air Units shall be UL listed and have an ETL label.
- H. All Rooftop Heating & Make-Up Air Units shall ship in one piece on a common frame and be suitable for outdoor rooftop or ground level installation. Units shall consist of the following applicable weatherproof sections:
 - 1. Ventilation / Damper section
 - 2. Filter section
 - 3. DX Cooling section (where applicable)
 - 4. Blower section
 - 5. Gas-fired heating section
 - 6. Condensing section (where applicable)
 - 7. Roof curb

- I. All Rooftop Heating & Make-Up Air Units shall be completely factory assembled, tested, piped, and internally wired for a single point of power connection. Unless noted otherwise, units shall be fully charged with R407C or R410A refrigerant and filled with compressor oil.
- J. Rooftop Heating & Make-Up Units shall carry a complete parts and labor warranty for a minimum one year from date of final acceptance; Compressors shall carry a minimum 18 months warranty; and furnace heat exchanger a minimum 25 year warranty.
- K. Refer to equipment schedules for individual requirements and additional accessories.
- L. Related Work Specified Elsewhere:
 - 1. Plumbing Piping and Accessories: 22 05 03
 - 2. HVAC Hangers and Supports: 23 05 29
 - 3. HVAC Controls: 23 09 00
 - 4. Ductwork: 23 31 00
 - 5. Electrical Divisions

PART 2 - PRODUCTS

2.1 UNIT FRAME AND CASING

- A. The frame and unit base shall be made of heavy gauge galvanized steel with adequate strength to support the entire unit.
- B. Roof curb shall be provided loose for field installation. The unit base shall be sealed to the curb to provide a positive water tight seal without trapping water. See Specification Section 23 05 29 "HVAC Hangers and Supports" for additional curb requirements.
- C. Exterior panels shall be galvanized sheet steel with manufacturers standard enamel finish. Interior panel shall be insulated with minimum 1" thick fire resistant mat faced fiber glass insulation.
- D. Access panels or doors shall be provided to service all component sections and control components.

2.2 VENTILATION / DAMPER SECTION

- A. Ventilation section to include an outdoor air intake opening with a rain hood and wire mesh bird screen.
- B. Ventilation section to include low leakage outdoor air damper with spring return for normally closed outdoor air.
- C. Provide a recirculation damper when scheduled to allow 80% return air / 20% outdoor air capacity (for direct gas-fired units) and 100% return air (for indirect gas-fired units); Refer to Sequences of Operation for additional information.

2.3 FILTER SECTION

- A. The filter section shall be complete with galvanized steel filter racks / frames as an integral part of the unit.
- B. Media: Pleated, 2" nominal thickness with a MERV-8 minimum rating.

2.4 DX COOLING COIL SECTION

- A. Coil section shall include an evaporator coil of non-ferrous construction with aluminum fins mechanically bonded to seamless copper tubes. Coils shall be factory pressure and leak tested. Coils shall be installed in a condensate drain pan piped to the exterior of the unit casing.
- B. The cooling coil section shall be complete with modulating hot gas reheat.

2.5 BLOWER SECTION

- A. Blower section shall include a plenum direct-drive type fan.
- B. The blower assembly shall be isolated from the unit structure with rubber in shear type isolators.
- C. Variable Frequency Drives shall be installed as an integral part of the unit. VFD's shall be used to set or regulate fan speed and airflow. VFD's shall be installed with integral brake resistor, overload protection, and adjustable pulse-width modulation.

2.6 GAS FIRED HEATING SECTION

- A. Heating section shall include AGA design certified indirect fired heat exchanger, natural gas burner combination gas valve, and gravity flue vent as applicable.
- B. **Direct Gas-Fired Units** shall have a 92% efficient burner with direct spark ignition. Burner shall have a cast aluminum manifold and stainless steel mixing plates. Temperature control shall be provided by an electronic 30:1 turndown-ratio modulating discharge air sensor. Safety Controls to include a Safety Shutoff Valve, Manual Reset and a High Limit Switch. The Main gas valve shall close if high-limit temperature is exceeded.
- C. **Indirect Gas-Fired Units** shall have a 80% efficient burner with direct spark ignition. Burner shall have a cast aluminum manifold and stainless steel mixing plates. Temperature control shall be provided by an electronic 12:1 minimum turndown-ratio modulating and discharge air sensor. Safety Controls to include a Safety Shutoff Valve, Manual Reset and a High Limit Switch. The Main gas valve shall close if high-limit temperature is exceeded.

2.7 CONDENSING SECTION

- A. The condensing section shall include resiliently mounted compressors of the inverter scroll type with overload protection and crankcase heaters.
- B. The condensing section shall include condensing coils of non-ferrous construction with aluminum fins mechanically bonded to seamless copper tubes. Coils shall be factory pressure and leak tested.
- C. The condensing section shall include direct drive propeller type condenser fans arranged for vertical air discharge. Fan blades shall be enclosed behind a steel wire safety guard.
- D. The condensing section shall include a complete refrigeration system including suction and liquid line service gauge ports.

2.8 ELECTRICAL

- A. Units shall be completely wired and tested at the factory before shipment. Wiring shall be in accordance with NEC requirements. All wiring shall be coded per the electrical wiring diagrams. All electrical components shall be labeled per the electrical wiring diagrams and be UL listed.

- B. Electrical system shall include an integral control package. Requirements of this control package shall be coordinated with the "Sequence of Operations." Unless noted otherwise, this control package shall include the following:
1. Rooftop Heating & Make-Up Air Unit packaged controls will include O/A damper positioner, recirc damper positioner, DX cooling system with reheat, modulating gas burner controls, temperature high limit and temperature low limit safeties, and gas burner safeties. Spring return on the damper operators shall close the O/A damper whenever the unit is shut down.
 2. Temperature Control by space thermostat and/or discharge air sensor to be provided by the unit manufacturer.
- C. Electrical system shall include a unit mounted disconnect switch, a 115 VAC convenience outlet, contactors / starters and thermal overload protection for all motors, and individual branch circuit protection for the supply air blower, the compressors and the condenser fans.
- D. Unit control panel shall be accessible from the unit exterior and be of weatherproof construction. A terminal block shall be provided for the main power wiring connection. A terminal board shall be provided for the low voltage control wiring. Knockouts shall be provided in the bottom of the main control panel for field wiring entrance.

2.9 MANUFACTURER

- A. Rooftop Heating & Make-Up Air Units shall be standard line as indicated in published literature as manufactured by one of the following:
1. Greenheck
 2. Valent
 3. Daikin Rebel
 4. Engineered Air
 5. AAON

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Contractor shall handle and store the Rooftop Heating & Make-Up Air Units in accordance with the manufacturer's recommendations. The contractor shall be responsible for protecting the Rooftop Heating & Make-Up Air Units from weather, construction dirt and debris, and from physical damage until final acceptance by the owner.
- B. Contractor shall install Rooftop Heating & Make-Up Air Units plumb and level in accordance with the manufacturer's installation instructions. Manufacturer's recommended operating and service clearances shall be maintained.
 - 1. Installation of the roof curb shall also be in accordance with the roofing system manufacturer's requirements. This contractor shall coordinate all requirements with the general contractor.
 - 2. Unless specifically noted otherwise, all Rooftop Heating & Make-Up Air Units shall be located so as to maintain at least ten feet of clearance from any roof edge with a drop of 24" or more.
 - 3. Make piping and ductwork connections so as to maintain required clearance adjacent to the equipment for service and maintenance.
 - 4. Install condensate drain trap for discharge directly onto the roof.

3.2 COMMISSIONING

- A. The contractor shall be responsible for coordinating start-up with all associated trades and with the Rooftop Heating & Make-Up Air Units manufacturer. The unit manufacturer or his authorized representative shall provide start up services upon completion of installation. Such service shall include verification of proper installation and performance, verification of operating sequences, and owner training in operating and maintenance procedures.
 - 1. Contractor to verify Rooftop Heating & Make-Up Units installation is complete prior to start-up.
 - a. Contractor shall verify that all piping and ductwork connections are complete.
 - b. Contractor shall lubricate all bearings and moving parts prior to start-up.
 - c. Contractor shall adjust V-belt drives for proper alignment and tension.

- d. Contractor shall check and verify that all vibration isolation components are properly adjusted with adequate freedom of movement.
 - e. Contractor shall check and verify that all control dampers function smoothly from full closed to full open position without binding.
 - f. Contractor shall install clean air filters.
 - g. Contractor shall make sheave changes as required to achieve design operating conditions.
2. Temperature control contractor shall verify that the field controls are functional prior to start-up.
3. Manufacturer's start-up representative shall verify that the installation arrangement and controls (both factory and field) are satisfactory to assure proper function of Rooftop Heating & Make-Up Air Units and safety devices.

END OF SECTION

SECTION 23 63 23

AIR-COOLED HEAT PUMPS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 23 Specification Sections 23 05 01 "Basic HVAC Requirements" and 23 05 02 "Basic HVAC Materials and Methods".
- C. Type, quantity, performance and operating characteristics of Air Cooled Heat Pumps shall be as indicated on the Contract Drawings.
- D. All Air Cooled Heat Pumps shall be supplied by the same manufacturer. Air Cooled Heat Pump shall be of the same manufacturer as the matching unitary equipment it serves.
- E. Performance Characteristics of Air Cooled Heat Pumps shall be rated in accordance with the applicable ARI Standard 240/270.
- F. Air Cooled Heat Pump construction shall be in compliance with ASHRAE Standard 15 "Safety Code for Mechanical Refrigeration."
- G. Air Cooled Heat Pumps shall have operating efficiencies in excess of the minimum requirements of ASHRAE Standard 90.1 "Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings."
- H. Air Cooled Heat Pumps shall be UL listed and labeled.
- I. Air Cooled Heat Pumps shall carry a complete parts and labor warranty for one year from date of final acceptance. Compressors shall carry an extended 5-year warranty from date of final acceptance.
- J. Related Work Specified Elsewhere:
 - 1. HVAC Hangers and Supports: 23 05 29
 - 2. HVAC Controls: 23 09 00

3. Refrigerant Piping Systems: 23 23 00
4. Electrical Divisions

PART 2 - PRODUCTS

2.1 GENERAL

- A. Air Cooled Heat Pumps shall be completely factory assembled, tested, piped, and internally wired for a single point of power connection. Unless noted otherwise, units shall be fully charged with R407C or R410A refrigerant and filled with compressor oil. Units shall be supplied with accessories as indicated on the contract drawings.
- B. Air Cooled Heat Pumps shall be capable of continuous operation at outdoor ambient temperatures of 40°F to 115°F.
 1. When indicated, the unit shall be supplied with a low-ambient kit for refrigeration system head pressure control via fan speed or discharge dampers to allow condensing unit to operate down to 0°F.

2.2 CASING

- A. Air Cooled Heat Pumps shall be assembled on a heavy gauge integral steel base with a weatherproofed sheetmetal enclosure. Casing shall have removable panels for required access to internal components and controls. Casing shall be painted with the manufacturer's standard finish.

2.3 REFRIGERATION SYSTEM

- A. Air Cooled Heat Pumps shall include resiliently mounted "inverter" compressors of the scroll or reciprocating type with overload and integral motor winding thermostat protection and crankcase heaters.
 1. Quantity of compressors, refrigeration circuits, and steps of unloading shall be as indicated on the contract drawings or greater.
- B. The unit shall include a complete refrigeration system including suction and liquid line service valves and gauge ports, a filter drier and a pressure relief device.

2.4 CONDENSER COIL

- A. The condensing coil shall be of non-ferrous construction with aluminum fins mechanically bonded to seamless copper tubes. Coils shall be factory pressure and leak tested and then vacuum dehydrated and filled with a holding charge of refrigerant. An exterior coil guard shall be provided to minimize coil damage after installation.

2.5 CONDENSER FANS

- A. The condenser fans shall be direct drive propeller type arranged for vertical discharge of air. Fan blades shall be statically and dynamically balanced.
- B. Fan blades shall be enclosed behind a steel wire safety guard or a louvered metal grille.

2.6 CONTROLS

- A. Controls shall be housed in an integral control panel with a hinged cover. Controls shall include step down transformer, fuses, magnetic contactors for each compressor and condenser fan motor, compressor overload protection, high and low pressure cutout switches and a anti-short-cycle time switch to prevent compressor short cycling. A time delay relay shall also be provided for units with multiple compressors to prevent multiple compressor simultaneous start-up.

2.7 MANUFACTURERS

- A. Air Cooled Heat Pumps shall be as manufactured by one of the following:
 - 1. Carrier
 - 2. Lennox
 - 3. Daikin
 - 4. Trane

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Contractor shall handle and store the Air Cooled Heat Pumps in accordance with the manufacturer's recommendations. The contractor shall be responsible for protecting the Air Cooled Heat Pumps from weather, construction dirt and debris, and from physical damage until final acceptance by the owner.
- B. Contractor shall install Air Cooled Heat Pumps plumb and level in accordance with the manufacturer's installation instructions. Manufacturer's recommended operating and service clearances shall be maintained.
- C. Air Cooled Heat Pumps for rooftop applications shall be installed on either structural steel or prefabricated equipment support rails.

3.2 COMMISSIONING

- A. The contractor shall be responsible for coordinating start-up with all associated trades and with the Air Cooled Heat Pump manufacturer. The Air Cooled Heat Pump manufacturer or his authorized representative shall provide start up services upon completion of installation. Such service shall include verification of proper installation and performance, verification of operating sequences, and owner training in operating and maintenance procedures.
 - 1. Contractor to verify Air Cooled Heat Pump installation is complete prior to start-up.
 - 2. Temperature control contractor shall verify that the field controls are functional prior to start-up.
 - 3. Manufacturer's start-up representative shall verify that the installation arrangement and controls (both factory and field) are satisfactory to assure proper function of the Air Cooled Heat Pump and safety devices.

END OF SECTION

SECTION 23 82 13

ELECTRIC HEAT DEVICES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Reference: The contents of this section are subject to the conditions indicated on the drawings and in the project manual including, General Conditions, Supplementary Conditions and the Specification Sections of Division 01 - General Requirements.
- B. The scope of work described in this section is subject to the Division 23 Specification Sections 23 05 01 "Basic HVAC Requirements" and 23 05 02 "Basic HVAC Materials and Methods".
- C. Type, quantity, performance and operating characteristics of Electric Heat Devices shall be as indicated on the Contract Drawings.
- D. All Electric Heat Devices shall be supplied by the same manufacturer.
- E. All Electric Heat Devices shall be UL listed.
- F. Related Work Specified Elsewhere:
 - 1. HVAC Controls: 23 09 00
 - 2. Electrical Divisions

PART 2 - PRODUCTS

2.1 WALL HEATERS

- A. Electric wall heaters shall be heavy duty wall-mounted forced air type for recessed (max. 1-1/2" protrusion from wall) semi-recessed (max. 3-1/2" protrusion from wall) or surface mounted (max. 5-3/4" protrusion from wall) installation with heating capacities and electrical characteristics as noted on the contract drawings.
- B. The enclosure shall be 16 gauge steel zinc coated on both sides with a baked enamel finish. The front assembly shall include a combination supply and return grille and be attached to the chassis by hidden tamper-resistant machine screws.

- C. The fan motor shall be permanently lubricated, totally enclosed, shaded pole type with impedance protection for operation on the same voltage as the heater.
- D. The heater shall be of corrosion resistant steel sheathed type elements mechanically bonded to common corrosion resistant steel fins.
- E. Wall heater shall include a manually reset thermal overload and an integral thermostat which shall act as a power disconnect by breaking all ungrounded conductors in the "off" position. Thermostat control knob shall be made tamper-proof to prevent unauthorized adjustments.

2.2 RADIANT COVE HEATER

- A. Electric radiant heater surface shall be concave in contour and saw-tooth in profile with heating capacities and electrical characteristics as indicated on the contract drawings.
- B. The heating element shall be of nichrome wire embedded in magnesium oxide powder, enclosed and sealed in aluminum metal tubing.
- C. Unless noted otherwise, radiant heaters shall be supplied with a remote line voltage thermostat.

2.3 MANUFACTURERS

- A. Electric Heat Devices shall be as manufactured by one of the following:
 - 1. Berko
 - 2. Brasch
 - 3. Indeeco
 - 4. Markel
 - 5. Q-Mark
 - 6. Raywall

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Contractor shall handle and store the Electric Heat Devices in accordance with the manufacturer's recommendations. The contractor shall be responsible for

protecting the Electric Heat Devices from weather, construction dirt and debris, and from physical damage until final acceptance by the owner.

- B. Contractor shall install Electric Heat Devices plumb and level in accordance with the manufacturer's installation instructions. Manufacturer's recommended operating and service clearances shall be maintained.
- C. Electric heat devices shall be provided and installed by the mechanical contractor for power wiring by the electrical contractor. Installation shall be in compliance with the National Electric Code.

END OF SECTION

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Copper building wire.
 - 2. Metal-clad cable, Type MC.
 - 3. Fire-alarm wire and cable.
 - 4. Connectors and splices.

- B. Related Requirements:

- 1. Section 260523 "Control-Voltage Electrical Power Cables" for control systems communications cables and Classes 1, 2, and 3 control cables.
 - 2. Section 271313 "Communications Copper Backbone Cabling" for twisted pair cabling used for data circuits.
 - 3. Section 271513 "Communications Copper Horizontal Cabling" for twisted pair cabling used for data circuits.

1.3 DEFINITIONS

- A. PV: Photovoltaic.
- B. RoHS: Restriction of Hazardous Substances.
- C. VFC: Variable-frequency controller.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.

1.6 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Belden Inc.
 - 2. Encore Wire Corporation.
 - 3. General Cable Technologies Corporation.
 - 4. Okonite Company (The).
 - 5. Service Wire Co.
 - 6. Southwire Company.
 - 7. WESCO.
- C. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. RoHS compliant.
 - 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 ASTM B496 for stranded conductors.
- E. Conductor Insulation:
 - 1. Type NM is NOT acceptable on this project.
 - 2. Comply with UL 44.
 - 3. Comply with UL 854.
 - 4. Type TC-ER: Comply with NEMA WC 70/ICEA S-95-658 and UL 1277.
 - 5. Type THHN : Comply with UL 83.
 - 6. Type THW-2: Comply with NEMA WC-70/ICEA S-95-658 and UL 83.
 - 7. Type XHHW-2: Comply with UL 44.

2.2 METAL-CLAD CABLE, TYPE MC

- A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Belden Inc.
 - 2. Encore Wire Corporation.

3. General Cable Technologies Corporation.
4. Okonite Company (The).
5. Service Wire Co.
6. Southwire Company.
7. WESCO.

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with UL 1569.
3. RoHS compliant.
4. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
5. Installation of MC cable shall be permitted as indicated on plans General note #2.
6. MC cable must include a redundant ground and be hospital grade type where used in patient care areas.

D. Circuits:

1. Multi-circuit with color-coded conductors.
2. Power-Limited Fire-Alarm Circuits: Comply with UL 1424.

E. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors .

F. Ground Conductor: Bare .

G. Conductor Insulation:

1. Type TFN/THHN/THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

H. Armor: , interlocked.

I. Jacket: PVC applied over armor.

2.3 FIRE-ALARM WIRE AND CABLE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Allied Wire & Cable Inc.
2. CommScope, Inc.
3. Genesis Cable Products; Honeywell International, Inc.
4. West Penn Wire.

B. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.

C. Signaling Line Circuits: Twisted, shielded pair, not less than No. 18 size as recommended by system manufacturer.

1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire-alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a two-hour rating.
- D. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for a two-hour rating.
 1. Low-Voltage Circuits: No. 16 AWG, minimum, in pathway.
 2. Line-Voltage Circuits: No. 12 AWG, minimum, in pathway.
 3. Multiconductor Armored Cable: NFPA 70, Type MC, copper conductors, Type TFN/THHN conductor insulation, copper drain wire, copper armor with outer jacket with red identifier stripe, NTRL listed for fire-alarm and cable tray installation, plenum rated.

2.4 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Manufacturers: Subject to compliance with requirements, undefined:
 1. 3M Electrical Products.
 2. AFC Cable Systems; a part of Atkore International.
 3. Hubbell Power Systems, Inc.
 4. ILSCO.
 5. O-Z/Gedney; a brand of Emerson Industrial Automation.
 6. Service Wire Co.
 7. Thomas & Betts Corporation; A Member of the ABB Group.
- C. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
 1. Material: Copper .
 2. Type: Two hole with standard barrels.
 3. Termination: Crimp.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders:
 1. Copper; solid or stranded for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
 2. Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger. Conductors shall be solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits:

1. Copper. Solid or stranded for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

C. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Exposed Feeders: Type XHHW-2, single conductors in raceway .

B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway, EMT conduit.

C. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway .

D. Exposed Branch Circuits, spaces: Type THHN/THWN-2, single conductors in raceway, Wiremold where approved by owner and Architect.

E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway Metal-clad cable, Type MC .

F. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway .

G. Branch Circuits in Cable Tray: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors larger than No. 1/0 AWG .

H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION, GENERAL

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

- F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 INSTALLATION OF FIRE-ALARM WIRE AND CABLE

- A. Comply with NECA 1 and NFPA 72.
- B. Wiring Method: Install wiring in metal pathway according to Section 270528.29 "Hangers and Supports for Communications Systems."
 - 1. Install plenum cable in environmental airspaces, including plenum ceilings.
 - 2. Fire-alarm circuits and equipment control wiring associated with fire-alarm system shall be installed in a dedicated pathway system.
 - a. Cables and pathways used for fire-alarm circuits, and equipment control wiring associated with fire-alarm system, may not contain any other wire or cable.
 - 3. Fire-Rated Cables: Use of two-hour, fire-rated fire-alarm cables, NFPA 70, Types MI and CI, is not permitted.
 - 4. Signaling Line Circuits: Power-limited fire-alarm cables may be installed in the same cable or pathway as signaling line circuits.
- C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with fire-alarm system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
- D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes; cabinets; or equipment enclosures where circuit connections are made.
- E. Color-Coding: Color-code fire-alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire-alarm system junction boxes and covers red.
- F. Risers: Install at least two vertical cable risers to serve the fire-alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent receipt or transmission of signals from other floors or zones.
- G. Wiring to Remote Alarm Transmitting Device: 1-inch conduit between the fire-alarm control panel and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.5 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

1. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.
- D. Comply with requirements in Section 284621.11 "Addressable Fire-Alarm Systems" for connecting, terminating, and identifying wires and cables.

3.6 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.7 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.8 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

END OF SECTION 260519

SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Backboards.
 - 2. Category 6 balanced twisted pair cable.
 - 3. Low-voltage control cabling.
 - 4. Control-circuit conductors.
 - 5. Identification products.

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.
- C. Plenum: A space forming part of the air distribution system to which one or more air ducts are connected. An air duct is a passageway, other than a plenum, for transporting air to or from heating, ventilating, or air-conditioning equipment.
- D. RCDD: Registered Communications Distribution Designer.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency, RCDD, layout technician, installation supervisor, and field inspector.
- B. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Accredited by NETA.

1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Flame Travel and Smoke Density in Plenums: As determined by testing identical products according to NFPA 262, by a qualified testing agency. Identify products for installation in plenums with appropriate markings of applicable testing agency.
 1. Flame Travel Distance: 60 inches or less.
 2. Peak Optical Smoke Density: 0.5 or less.
 3. Average Optical Smoke Density: 0.15 or less.
- C. Flame Travel and Smoke Density for Riser Cables in Non-Plenum Building Spaces: As determined by testing identical products according to UL 1666.
- D. Flame Travel and Smoke Density for Cables in Non-Riser Applications and Non-Plenum Building Spaces: As determined by testing identical products according to UL 1685.
- E. RoHS compliant.

2.2 BACKBOARDS

- A. Description: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches . Comply with requirements for plywood backing panels in Section 061000 "Rough Carpentry."
- B. Painting: Paint plywood on all sides and edges with flat Gray latex paint. Comply with requirements in Section 099123 "Interior Painting."

2.3 CATEGORY 6 BALANCED TWISTED PAIR CABLE

- A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 6 cable at frequencies up to 250MHz.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. 3M.
 2. AMP NETCONNECT; a TE Connectivity Ltd. company.
 3. Belden CDT Networking Division/NORDX.
 4. CommScope, Inc.

5. General Cable; General Cable Corporation.
6. Genesis Cable Products; Honeywell International, Inc.
7. Mohawk; a division of Belden Networking, Inc.

C. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.

D. Conductors: 100-ohm, 23 AWG solid copper.

E. Shielding/Screening: Unshielded twisted pairs (UTP) .

F. Cable Rating: Riser .

G. Jacket: Blue thermoplastic.

2.4 TWIN-AXIAL DATA HIGHWAY CABLE

A. Standard Cable: NFPA 70, Type CM.

1. Paired, 50 pairs, No. 24 AWG, stranded (7x32) tinned-copper conductors.
2. Polypropylene insulation.
3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
4. PVC jacket.
5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned-copper drain wire.
6. Flame Resistance: Comply with UL 1685.

B. Plenum-Rated Cable: NFPA 70, Type CMP.

1. Paired, 50 pairs, No. 24 AWG, stranded (7x32) tinned-copper conductors.
2. Plastic insulation.
3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
4. Plastic jacket.
5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned-copper drain wire.
6. Flame Resistance: Comply with NFPA 262.

2.5 LOW-VOLTAGE CONTROL CABLE

A. Paired Cable: NFPA 70, Type CMG.

1. pair, twisted, or No. 18 AWG, stranded (19x30)tinned-copper conductors as indicated on plans.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1685.

B. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.

1. pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.
2. PVC insulation.
3. Unshielded.

4. PVC jacket.
5. Flame Resistance: Comply with NFPA 262.

2.6 FIRE-ALARM WIRE AND CABLE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Allied Wire & Cable Inc.
 2. CommScope, Inc.
 3. Genesis Cable Products; Honeywell International, Inc.
 4. West Penn Wire.
- B. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
- C. Signaling Line Circuits: Twisted, shielded pair, not less than No. 18 AWG or size as recommended by system manufacturer.
 1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire-alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a two-hour rating.
- D. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for a two-hour rating.
 1. Low-Voltage Circuits: No. 16 AWG, minimum, in pathway.
 2. Line-Voltage Circuits: No. 12 AWG, minimum, in pathway.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Test cables on receipt at Project site.
 1. Test each pair of twisted pair cable for open and short circuits.

3.2 INSTALLATION OF RACEWAYS AND BOXES

- A. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems" for raceway selection and installation requirements for boxes, conduits, and wireways as supplemented or modified in this Section.
 1. Outlet boxes shall be as indicated on plans .
 - a. Outlet boxes for cables shall be no smaller than 4 inches square by 2-1/8 inches deep with extension ring sized to bring edge of ring to within 1/8 inch of the finished wall surface. See plan details for exact details of data boxes.
 - b. Flexible metal conduit shall not be used.

- B. Comply with TIA-569-D for pull-box sizing and length of conduit and number of bends between pull points.
- C. Install manufactured conduit sweeps and long-radius elbows if possible.
- D. Raceway Installation in Equipment Rooms:
 - 1. Position conduit ends adjacent to a corner on backboard if a single piece of plywood is installed, or in the corner of the room if multiple sheets of plywood are installed around perimeter walls of the room.
 - 2. Install cable trays to route cables if conduits cannot be located in these positions.
 - 3. Secure conduits to backboard if entering the room from overhead.
 - 4. Extend conduits to equipment rack a minimum of 12" above finished floor.
 - 5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.
- E. Backboards: Install backboards with 96-inch dimension vertical. Butt adjacent sheets tightly and form smooth gap-free corners and joints.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Comply with NECA 1.
- B. General Requirements for Cabling:
 - 1. Comply with TIA-568-C Series of standards.
 - 2. Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems."
 - 3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
 - 4. Cables may not be spliced and shall be continuous from terminal to terminal. Do not splice cable between termination, tap, or junction points.
 - 5. Cables serving a common system may be grouped in a common raceway. Install network cabling and control wiring and cable in separate raceway from power wiring. Do not group conductors from different systems or different voltages.
 - 6. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 - 7. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Install lacing bars and distribution spools.
 - 8. Do not install bruised, kinked, scored, deformed, or abraded cable. Remove and discard cable if damaged during installation and replace it with new cable.
 - 9. Cold-Weather Installation: Bring cable to room temperature before dereeling. Do not use heat lamps for heating.
 - 10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Monitor cable pull tensions.
 - 11. Support: Do not allow cables to lie on removable ceiling tiles.
 - 12. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.
 - 13. Provide strain relief.

14. Keep runs short. Allow extra length for connecting to terminals. Do not bend cables in a radius less than 10 times the cable OD. Use sleeves or grommets to protect cables from vibration at points where they pass around sharp corners and through penetrations.
15. Ground wire shall be copper, and grounding methods shall comply with IEEE C2. Demonstrate ground resistance.

C. Balanced Twisted Pair Cable Installation:

1. Comply with TIA-568-C.2.
2. Install termination hardware as specified in Section 271513 "Communications Copper Horizontal Cabling" unless otherwise indicated.
3. Do not untwist balanced twisted pair cables more than 1/2 inch at the point of termination to maintain cable geometry.

D. Installation of Control-Circuit Conductors:

1. Install wiring in raceways.
2. Use insulated spade lugs for wire and cable connection to screw terminals.
3. Comply with requirements specified in Section 260533 "Raceways and Boxes for Electrical Systems."

E. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend copper cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 30 inches apart.
3. Cable shall not be run through or on structural members or in contact with pipes, ducts, or other potentially damaging items. Do not run cables between structural members and corrugated panels.

F. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA-569-D recommendations for separating unshielded copper voice and data communications cable from potential EMI sources including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 5 inches .
 - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 12 inches .
 - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 24 inches .
3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 2-1/2 inches .
 - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 6 inches .
 - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 12 inches .
4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

- a. Electrical Equipment or Circuit Rating Less Than 2 kVA: No requirement.
 - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 3 inches .
 - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 6 inches .
- 5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or 5 HP and Larger: A minimum of 48 inches .
 - 6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches .

3.4 REMOVAL OF CONDUCTORS AND CABLES

- A. Remove abandoned conductors and cables. Abandoned conductors and cables are those installed that are not terminated at equipment and are not identified with a tag for future use.

3.5 CONTROL-CIRCUIT CONDUCTORS

- A. Minimum Conductor Sizes:
 - 1. Class 1 remote-control and signal circuits; No 14 AWG.
 - 2. Class 2 low-energy, remote-control, and signal circuits; No. 16 AWG.
 - 3. Class 3 low-energy, remote-control, alarm, and signal circuits; No 12 AWG.

3.6 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569-D, Annex A, "Firestopping."
- C. Comply with BICSI TDMM, "Firestopping" Chapter.

3.7 GROUNDING

- A. For data communication wiring, comply with TIA-607-B and with BICSI TDMM, "Bonding and Grounding (Earthing)" Chapter.
- B. For low-voltage control wiring and cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.8 IDENTIFICATION

- A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Identify data and communications system components, wiring, and cabling according to TIA-606-B; label printers shall use label stocks, laminating adhesives, and inks complying with UL 969.
- C. Identify each wire on each end and at each terminal with a number-coded identification tag. Each wire shall have a unique tag.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
 - 1. Visually inspect cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA-568-C.1.
 - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - 3. Test cabling for direct-current loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination, but not after cross-connection.
 - a. Test instruments shall meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in its "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in its "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
- C. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.
- D. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

END OF SECTION 260523

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes grounding and bonding systems and equipment, plus the following special applications:
 - 1. Underground distribution grounding.
 - 2. Foundation steel electrodes.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Plans showing as-built, dimensioned locations of system described in "Field Quality Control" Article, including the following:
 - 1) Test wells.
 - 2) Ground rods.
 - 3) Grounding arrangements and connections for separately derived systems.
 - 4) .
 - b. Instructions for periodic testing and inspection of grounding features at test wells grounding connections for separately derived systems based on NFPA 70B .
 - 1) Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
 - 2) System ground resistance shall not exceed 5 ohms. Individual ground rod resistance to earth shall not exceed 25ohms.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Certified by NETA.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ERICO; a brand of nVent.
 - 2. Hubbell Incorporated (Construction and Energy Group).
 - 3. ILSCO.
 - 4. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - 5. Thomas & Betts Corporation; A Member of the ABB Group.

2.3 CONDUCTORS

- A. Insulated Conductors: Copper [or] wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
- C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression exothermic-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

- D. Bus-Bar Connectors: Compression type, copper or copper alloy, with two wire terminals.
- E. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.
- F. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- G. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.
- H. Conduit Hubs: Mechanical type, terminal with threaded hub.
- I. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt .
- J. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.
- K. Lay-in Lug Connector: Mechanical type, copper rated for direct burial terminal with set screw.
- L. Service Post Connectors: Mechanical type, bronze alloy terminal, in short- and long-stud lengths, capable of single and double conductor connections.
- M. Signal Reference Grid Clamp: Mechanical type, stamped-steel terminal with hex head screw.
- N. Straps: Solid copper, copper lugs. Rated for 600 A.
- O. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.
- P. Water Pipe Clamps:
 - 1. Mechanical type, two pieces with stainless-steel bolts.
 - a. Material: Die-cast zinc alloy.
 - b. Listed for direct burial.
 - 2. U-bolt type with malleable-iron clamp and copper ground connector rated for direct burial.

2.5 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel ; 3/4 inch by 10 feet .

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for grounding electrodes as indicated on grounding details and per NFPA grounding tables 250.122 and 250.66.
- B. If electrical service is existing, this section is provided for the purpose to bring the existing system up to current codes. If existing grounding system is found to be inadequate, this engineer should be notified for further direction in determining a course of action to comply with NEC article 250. See system online and grounding details on plan view for additional/specific grounding requirements.
- C. Grounding Conductors: Green-colored insulation with continuous yellow stripe.

- D. Isolated Grounding Conductors: Green-colored insulation with more than one continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- E. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.
- B. Electrical service is existing to remain. E.C. shall inspect existing grounding and improve per details on drawings.

3.3 GROUNDING SEPARATELY DERIVED SYSTEMS

- A. Generator: Install grounding electrode(s) at the generator location. The electrode shall be connected to the equipment grounding conductor and to the frame of the generator.

3.4 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.

3.5 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

- C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- D. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.
- E. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

3.6 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
- C. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
 - 2. Use exothermic welds for all below-grade connections.
 - 3. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Section 260543 "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches deep, with cover.
 - 1. Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.

2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- F. Grounding and Bonding for Piping:
1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.
- H. Grounding for Steel Building Structure: Existing to remain. During construction, E.C. shall verify existing structure is bonded to earth via ground rods at not more than 100' apart. Consult this engineer for further direction if building does not have ground rods installed as further testing may be required to assure earth potential.
- I. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; use a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG.
- J. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; using electrically conductive coated steel reinforcing bars or rods, at least 20 feet long. If reinforcing is in multiple pieces, connect together by the usual steel tie wires or exothermic welding to create the required length.
- K. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 2. Make connections with clean, bare metal at points of contact.
 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.7 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Grounding system is existing. Contractor shall de-energize during construction, disconnect bonds and test system as indicated below.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.

B. Grounding system will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

D. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
5. Substations and Pad-Mounted Equipment: 5 ohms.

E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Steel slotted support systems.
2. Aluminum slotted support systems.
3. Conduit and cable support devices.
4. Structural steel for fabricated supports and restraints.
5. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
6. Fabricated metal equipment support assemblies.

1.3 ACTION SUBMITTALS

1.4 INFORMATIONAL SUBMITTALS

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M .

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit; a part of Atkore International.
 - b. B-line, an Eaton business.

- c. CADDY; a brand of nVent.
 - d. Flex-Strut Inc.
 - e. Gripple Inc.
 - f. Thomas & Betts Corporation; A Member of the ABB Group.
 - g. Unistrut; Part of Atkore International.
 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 3. Material for Channel, Fittings, and Accessories: Galvanized steel .
 4. Channel Width: Selected for applicable load criteria 1-5/8 inches or larger if required for loading .
 5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 6. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 7. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.
- D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated stainless steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) B-line, an Eaton business.
 - 2) Hilti, Inc.
 - 3) MKT Fastening, LLC.
 2. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
 3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
 4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F 3125/F 3125M, Grade A325 .
 5. Toggle Bolts: Stainless-steel springhead type.
 6. Hanger Rods: Threaded steel.

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 - 1. NECA 1.
 - 2. NECA 101
 - 3. NECA 105.
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by scheduled in NECA 1, where its Table 1 lists maximum spacings that are less than those stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps single-bolt conduit clamps using spring friction action for retention in support channel.
- F. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT IMC and RMC may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb .
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To New Concrete: Bolt to concrete inserts.

2. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 3. To Existing Concrete: Expansion anchor fasteners.
 4. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 5. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69 Spring-tension clamps.
 6. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that comply with seismic-restraint strength and anchorage requirements.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000 psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete."
- C. Anchor equipment to concrete base as follows:
 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

- A. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Metal conduits and fittings.
 - 2. Nonmetallic conduits and fittings.
 - 3. Metal wireways and auxiliary gutters.
 - 4. Surface raceways.
 - 5. Boxes, enclosures, and cabinets.
 - 6. Handholes and boxes for exterior underground cabling.

- B. Related Requirements:

- 1. Section 078413 "Penetration Firestopping" for firestopping at conduit and box entrances.
 - 2. Section 260543 "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.
 - 3. Section 270528 "Pathways for Communications Systems" for conduits, wireways, surface pathways, innerduct, boxes, faceplate adapters, enclosures, cabinets, and handholes serving communications systems.

1.3 DEFINITIONS

- A. ARC: Aluminum rigid conduit.
- B. GRC: Galvanized rigid steel conduit.
- C. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

1.5 INFORMATIONAL SUBMITTALS

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

1. Manufacturers: Subject to compliance with requirements, undefined:
 - a. AFC Cable Systems; a part of Atkore International.
 - b. Allied Tube & Conduit; a part of Atkore International.
 - c. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - d. Southwire Company.
 - e. Thomas & Betts Corporation; A Member of the ABB Group.
 - f. Wheatland Tube Company.
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. GRC: Comply with ANSI C80.1 and UL 6.
4. IMC: Comply with ANSI C80.6 and UL 1242.
5. PVC-Coated Steel Conduit: PVC-coated .
 - a. Comply with NEMA RN 1.
 - b. Coating Thickness: 0.040 inch, minimum.
6. EMT: Comply with ANSI C80.3 and UL 797.
7. FMC: Comply with UL 1; zinc-coated steel .
8. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

B. Metal Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AFC Cable Systems; a part of Atkore International.
 - b. Allied Tube & Conduit; a part of Atkore International.
 - c. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - d. Southwire Company.
 - e. Thomas & Betts Corporation; A Member of the ABB Group.
 - f. Wheatland Tube Company.
2. Comply with NEMA FB 1 and UL 514B.
3. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
4. Fittings, General: Listed and labeled for type of conduit, location, and use.
5. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
6. Fittings for EMT:
 - a. Material: Steel .
 - b. Type: Setscrew or compression.
7. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.

8. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
- C. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS AND FITTINGS

A. Nonmetallic Conduit:

1. Manufacturers: Subject to compliance with requirements, undefined:
 - a. AFC Cable Systems; a part of Atkore International.
 - b. Hubbell Incorporated (Commercial and Industrial Group - RACO).
 - c. Kraloy Fittings.
 - d. Thomas & Betts Corporation; A Member of the ABB Group.
2. Listing and Labeling: Nonmetallic conduit shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Fiberglass:
 - a. Comply with NEMA TC 14.
 - b. Comply with UL 2515 for aboveground raceways.
 - c. Comply with UL 2420 for belowground raceways.
4. ENT: Comply with NEMA TC 13 and UL 1653.
5. RNC: Type EPC-40-PVC , complying with NEMA TC 2 and UL 651 unless otherwise indicated.
6. LFNC: Comply with UL 1660.

B. Nonmetallic Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AFC Cable Systems; a part of Atkore International.
 - b. Hubbell Incorporated (Commercial and Industrial Group - RACO).
 - c. Kraloy Fittings.
 - d. Thomas & Betts Corporation; A Member of the ABB Group.
2. Fittings, General: Listed and labeled for type of conduit, location, and use.
3. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
 - a. Fittings for LFNC: Comply with UL 514B.
4. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. B-line, an Eaton business.
2. Hoffman; a brand of nVent.
3. MonoSystems, Inc.
4. Square D.

- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 Type 3R Type 4 Type 12 as indicated on drawings, and sized according to NFPA 70.
 - 1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Hinged type unless otherwise indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.4 SURFACE RACEWAYS

- A. Listing and Labeling: Surface raceways and tele-power poles shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color selected by Architect .
 - 1. Manufacturers: Subject to compliance with requirements, undefined:
 - a. Hubbell Incorporated (Commercial and Industrial Group - Wiring Device-Kellems).
 - b. Panduit Corp.
 - c. Wiremold / Legrand.
- C. Tele-Power Poles:
 - 1. Manufacturers: Subject to compliance with requirements, undefined:
 - a. MonoSystems, Inc.
 - b. Panduit Corp.
 - c. Wiremold / Legrand.
 - 2. Material: Aluminum with clear anodized finish. Finish to be approved by Architect and owner prior to purchasing.
 - 3. Fittings and Accessories: Dividers, end caps, covers, cutouts, wiring harnesses, devices, mounting materials, and other fittings shall match and mate with tele-power pole as required for complete system.

2.5 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Hoffman; a brand of nVent.
 - 2. Hubbell Incorporated (Commercial and Industrial Group - RACO).
 - 3. Kraloy Fittings.
 - 4. MonoSystems, Inc.
 - 5. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - 6. Thomas & Betts Corporation; A Member of the ABB Group.

7. Wiremold / Legrand.

- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy aluminum, Type FD, with gasketed cover.
- E. Metal Floor Boxes:
 - 1. Material: Cast metal or sheet metal.
 - 2. Type: Fully adjustable .
 - 3. Shape: Rectangular.
 - 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- F. Nonmetallic Floor Boxes: Nonadjustable, round rectangular.
 - 1. Listing and Labeling: Nonmetallic floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. See floorbox schedule on plans where applicable
- G. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- H. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- I. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- J. Device Box Dimensions: 4 inches square by 2-1/8 inches deep .
- K. Gangable boxes are allowed .
- L. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 Type 3R Type 4 Type 12 with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

2.6 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

- A. General Requirements for Handholes and Boxes:
 - 1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.

2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.
1. Manufacturers: Subject to compliance with requirements, undefined:
 - a. Armorcast Products Company.
 - b. Hubbell Incorporated (Power Systems Group - Quazite).
 - c. NewBasis.
 - d. Oldcastle Enclosure Solutions.
 - e. Oldcastle Precast, Inc.
 2. Standard: Comply with SCTE 77.
 3. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
 4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
 5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 6. Cover Legend: Molded lettering, "ELECTRIC." .
 7. See description of in grade box on plans for exact size and requirements.
- C. Fiberglass Handholes and Boxes: Molded of fiberglass-reinforced polyester resin, with frame and covers of polymer concrete reinforced concrete fiberglass.
1. Manufacturers: Subject to compliance with requirements, undefined:
 - a. Armorcast Products Company.
 - b. Hubbell Incorporated (Power Systems Group - Quazite).
 - c. Oldcastle Enclosure Solutions.
 - d. Oldcastle Enclosure Solutions.
 - e. Oldcastle Precast, Inc.
 2. Standard: Comply with SCTE 77.
 3. Color of Frame and Cover: Gray .
 4. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
 5. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
 6. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 7. Cover Legend: Molded lettering, "ELECTRIC." .

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed Conduit: GRC RNC, Type EPC-80-PVC.
 2. Concealed Conduit, Aboveground: GRC RNC, Type EPC-40-PVC.
 3. Underground Conduit: RNC, Type EPC-40-PVC Type EPC-80-PVC , .
 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFNC.

5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R Type 4.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT .
2. Concealed in Ceilings and Interior Walls and Partitions: EMT .
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
4. Damp or Wet Locations: GRC .
5. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
3. EMT: Use setscrew or compression , fittings. Comply with NEMA FB 2.10.
4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

F. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

G. Install surface raceways only where indicated on Drawings.

H. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F .

3.2 INSTALLATION

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

C. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.

D. Do not fasten conduits onto the bottom side of a metal deck roof.

- E. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- F. Complete raceway installation before starting conductor installation.
- G. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- H. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- I. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- J. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- K. Support conduit within 12 inches of enclosures to which attached.
- L. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 2 inches of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
 - 5. Change from ENT to GRC before rising above floor.
- M. Stub-Ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- N. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- O. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- P. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- Q. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

- R. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- S. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- T. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- U. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- V. Surface Raceways:
 - 1. Install surface raceway with a minimum 2-inch radius control at bend points.
 - 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- W. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- X. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Conduit extending from interior to exterior of building.
 - 4. Conduit extending into pressurized duct and equipment.
 - 5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 - 6. Where otherwise required by NFPA 70.
- Y. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- Z. Expansion-Joint Fittings:
 - 1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
 - 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.

- c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
 - d. Attics: 135 deg F temperature change.
 - e. .
 - 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
 - 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 - 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- AA. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 36 inches of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
- 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- BB. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- CC. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- DD. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- EE. Locate boxes so that cover or plate will not span different building finishes.
- FF. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- GG. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- HH. Set metal floor boxes level and flush with finished floor surface.
- II. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.
- D. Install handholes with bottom below frost line, 24" below grade.
- E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables but short enough to preserve adequate working clearances in enclosure.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.6 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.7 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal conduits and fittings, including GRC and PVC-coated steel conduit.
 - 2. Rigid nonmetallic duct.
 - 3. Flexible nonmetallic duct.
 - 4. Duct accessories.
 - 5. Utility structure accessories.

1.3 DEFINITIONS

- A. Direct Buried: Duct or a duct bank that is buried in the ground, without any additional casing materials such as concrete.
- B. Duct: A single duct or multiple ducts. Duct may be either installed singly or as component of a duct bank.
- C. Duct Bank:
 - 1. Two or more ducts installed in parallel, with or without additional casing materials.
 - 2. Multiple duct banks.
- D. GRC: Galvanized rigid (steel) conduit.
- E. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include duct-bank materials, including spacers and miscellaneous components.
 - 2. Include duct, conduits, and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
 - 3. Include accessories for manholes, handholes, boxes.
 - 4. Include underground-line warning tape.
 - 5. Include warning planks.

1.5 INFORMATIONAL SUBMITTALS

1.6 QUALITY ASSURANCE

1.7 FIELD CONDITIONS

- A. Ground Water: Assume ground-water level is at grade level unless a lower water table is noted on Drawings.
- B. Ground Water: Assume ground-water level is 36 inches below ground surface unless a higher water table is noted on Drawings.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND FITTINGS

- A. GRC: Comply with ANSI C80.1 and UL 6.
- B. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.

2.2 DUCT ACCESSORIES

- A. Duct Spacers: Factory-fabricated, rigid, PVC interlocking spacers; sized for type and size of duct with which used, and selected to provide minimum duct spacing indicated while supporting duct during concreting or backfilling.
 - 1. Manufacturers: Subject to compliance with requirements, undefined:
 - a. Allied Tube & Conduit; a part of Atkore International.
 - b. Cantex Inc.
 - c. Carlon; a brand of Thomas & Betts Corporation.
 - d. IPEX USA LLC.
 - e. PenCell Plastics.
 - f. Underground Devices, Inc.
- B. Underground-Line Warning Tape: Comply with requirements for underground-line warning tape specified in Section 260553 "Identification for Electrical Systems."

2.3 UTILITY STRUCTURE ACCESSORIES

- A. Accessories for Utility Structures: Utility equipment and accessory items used for utility structure access and utility support, listed and labeled for intended use and application.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate layout and installation of duct, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field. Notify Architect if there is a conflict between areas of excavation and existing structures or archaeological sites to remain.
- B. Coordinate elevations of duct and duct-bank entrances into manholes, handholes, and boxes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to manholes and handholes, and as approved by Architect.
- C. Clear and grub vegetation to be removed, and protect vegetation to remain according to Section 311000 "Site Clearing." Remove and stockpile topsoil for reapplication according to Section 311000 "Site Clearing."

3.2 UNDERGROUND DUCT APPLICATION

- A. Duct for Electrical Feeders 600 V and Less: Type EPC-40-PVC RNC, direct-buried unless otherwise indicated.

3.3 UNDERGROUND ENCLOSURE APPLICATION

3.4 EARTHWORK

- A. Excavation and Backfill: Comply with Section 312000 "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.
- B. Restoration: Replace area immediately after backfilling is completed or after construction vehicle traffic in immediate area is complete.
- C. Restore surface features at areas disturbed by excavation, and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.
- D. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Section 329200 "Turf and Grasses" and Section 329300 "Plants."
- E. Cut and patch existing pavement in the path of underground duct, duct bank, and underground structures according to "Cutting and Patching" Article in Section 017300 "Execution."

3.5 DUCT AND DUCT-BANK INSTALLATION

- A. Where indicated on Drawings, install duct, spacers, and accessories into the duct-bank configuration shown. Duct installation requirements in this Section also apply to duct bank.
- B. Install duct according to NEMA TCB 2.
- C. Slope: Pitch duct a minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment. Slope duct from a high point between two manholes, to drain in both directions.
- D. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches , both horizontally and vertically, at other locations unless otherwise indicated.
 - 1. Duct shall have maximum of two 90 degree bends or the total of all bends shall be no more 180 degrees between pull points.
- E. Joints: Use solvent-cemented joints in duct and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent duct do not lie in same plane.
- F. Installation Adjacent to High-Temperature Steam Lines: Where duct is installed parallel to underground steam lines, perform calculations showing the duct will not be subject to environmental temperatures above 40 deg C. Where environmental temperatures are calculated to rise above 40 deg C, and anywhere the duct crosses above an underground steam line, install insulation blankets listed for direct burial to isolate the duct bank from the steam line.
- G. End Bell Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use end bells, spaced approximately 10 inches o.c. for 5-inch duct, and vary proportionately for other duct sizes.
 - 1. Begin change from regular spacing to end-bell spacing 10 feet from the end bell, without reducing duct slope and without forming a trap in the line.
 - 2. Expansion and Deflection Fittings: Install an expansion and deflection fitting in each duct in the area of disturbed earth adjacent to manhole or handhole. Install an expansion fitting near the center of all straight line direct-buried duct with calculated expansion of more than 3/4 inch.
 - 3. Grout end bells into structure walls from both sides to provide watertight entrances.
- H. Terminator Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use manufactured, cast-in-place duct terminators, with entrances into structure spaced approximately 6 inches o.c. for 4-inch duct, and vary proportionately for other duct sizes.
 - 1. Begin change from regular spacing to terminator spacing 10 feet from the terminator, without reducing duct line slope and without forming a trap in the line.
 - 2. Expansion and Deflection Fittings: Install an expansion and deflection fitting in each duct in the area of disturbed earth adjacent to manhole or handhole. Install an expansion fitting near the center of all straight line duct with calculated expansion of more than 3/4 inch.
- I. Building Wall Penetrations: Make a transition from underground duct to GRC at least 10 feet outside the building wall, without reducing duct line slope away from the building and without forming a

trap in the line. Use fittings manufactured for RNC-to-GRC transition. Install GRC penetrations of building walls as specified in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

- J. Sealing: Provide temporary closure at terminations of duct with pulled cables. Seal spare duct at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.
- K. Pulling Cord: Install 200-lbf- test nylon cord in empty ducts.
- L. Direct-Buried Duct and Duct Bank:
 - 1. Excavate trench bottom to provide firm and uniform support for duct. Comply with requirements in Section 312000 "Earth Moving" for preparation of trench bottoms for pipes less than 6 inches in nominal diameter.
 - 2. Width: Excavate trench 12 inches wider than duct on each side.
 - 3. Width: Excavate trench 3 inches wider than duct on each side.
 - 4. Depth: Install top of duct at least 36 inches below finished grade unless otherwise indicated.
 - 5. Set elevation of bottom of duct bank below frost line.
 - 6. Support ducts on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
 - 7. Spacer Installation: Place spacers close enough to prevent sagging and deforming of duct, with not less than four spacers per 20 feet of duct. Place spacers within 24 inches of duct ends. Stagger spacers approximately 6 inches between tiers. Secure spacers to earth and to ducts to prevent floating during concreting. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
 - 8. Install duct with a minimum of 3 inches between ducts for like services and 6 inches between power and communications duct.
 - 9. Elbows: Install manufactured duct elbows for stub-ups, at building entrances, and at changes of direction in duct direction unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
 - 10. Install manufactured GRC elbows for stub-ups, at building entrances, and at changes of direction in duct.
 - a. Couple RNC duct to GRC with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
 - b. Stub-ups to Outdoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches from edge of base. Install insulated grounding bushings on terminations at equipment.
 - 1) Stub-ups shall be minimum 4 inches above finished floor and minimum 3 inches from conduit side to edge of slab.
 - c. Stub-ups to Indoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches from edge of wall. Install insulated grounding bushings on terminations at equipment.
 - 1) Stub-ups shall be minimum 4 inches above finished floor and no less than 3 inches from conduit side to edge of slab.
 - 11. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inches over duct and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete

backfilling with normal compaction. Comply with requirements in Section 312000 "Earth Moving" for installation of backfill materials.

- a. Place minimum 3 inches of sand as a bed for duct. Place sand to a minimum of 6 inches above top level of duct.
- M. Warning Planks: Bury warning planks approximately 12 inches above direct-buried duct, placing them 24 inches o.c. Align planks along the width and along the centerline of duct or duct bank. Provide an additional plank for each 12-inch increment of duct-bank width over a nominal 18 inches. Space additional planks 12 inches apart, horizontally.
- N. Underground-Line Warning Tape: Bury conducting underground line specified in Section 260553 "Identification for Electrical Systems" no less than 12 inches above all concrete-encased duct and duct banks and approximately 12 inches below grade. Align tape parallel to and within 3 inches of centerline of duct bank. Provide an additional warning tape for each 12-inch increment of duct-bank width over a nominal 18 inches. Space additional tapes 12 inches apart, horizontally.

3.6 INSTALLATION OF CONCRETE MANHOLES, HANDHOLES, AND BOXES

- A. Precast Concrete Handhole and Manhole Installation:
 1. Comply with ASTM C 891 unless otherwise indicated.
 2. Install units level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances.
 3. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- B. Elevations:
 1. Manhole Roof: Install with rooftop at least 15 inches below finished grade.
 2. Manhole Frame: In paved areas and trafficways, set frames flush with finished grade. Set other manhole frames 1 inch above finished grade.
 3. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch above finished grade.
 4. Where indicated, cast handhole cover frame integrally with handhole structure.
- C. Drainage: Install drains in bottom of manholes where indicated. Coordinate with drainage provisions indicated.
- D. Manhole Access: Circular opening in manhole roof; sized to match cover size.
 1. Manholes with Fixed Ladders: Offset access opening from manhole centerlines to align with ladder.
 2. Install chimney, constructed of precast concrete collars and rings, to support cast-iron frame to connect cover with manhole roof opening. Provide moisture-tight masonry joints and waterproof grouting for frame to chimney.

END OF SECTION 260543

SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Round sleeves.
 - 2. Grout.
 - 3. Foam sealants.

- B. Related Requirements:

- 1. Section 078413 "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.3 ACTION SUBMITTALS

PART 2 - PRODUCTS

2.1 ROUND SLEEVES

- A. Wall Sleeves, Steel:

- 1. Description: ASTM A53/A53M, Type E, Grade B, Schedule 40, zinc coated, plain ends and integral waterstop.

2.2 SLEEVE SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable or between raceway and cable.

- 1. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 2. Pressure Plates: Carbon steel .
 - 3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.3 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
 - 1. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

2.4 FOAM SEALANTS

- A. Description: Multicomponent, liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam. Foam expansion must not damage cables or crack penetrated structure.

PART 3 - EXECUTION

3.1 INSTALLATION OF SLEEVES FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Sleeves for Conduits Penetrating Above-Grade, Non-Fire-Rated, Concrete and Masonry-Unit Floors and Walls:
 - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall or floor so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - b. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."
 - 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 3. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
- C. Sleeves for Conduits Penetrating Non-Fire-Rated Wall Assemblies:
 - 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 2. Seal space outside of sleeves with approved joint compound for wall assemblies.
- D. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work. Provide a EPDM roof boot as directed by roof manufacturer to assure roof warranty is not voided due to conduit installation. Coordinate entire installation of all roof penetrations with roofing contractor and roof system manufacturer.

- E. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seal systems. Size sleeves to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

END OF SECTION 260544

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Labels.
 - 2. Signs.
 - 3. Cable ties.
 - 4. Miscellaneous identification products.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Comply with NFPA 70E and Section 260573.19 "Arc-Flash Hazard Analysis" requirements for arc-flash warning labels.
- F. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F , ambient; 180 deg F , material surfaces .

2.2 COLOR AND LEGEND REQUIREMENTS

A. Raceways and Cables Carrying Circuits at 600 V or Less:

1. Black letters on an orange field .
2. Legend: Indicate voltage and system or service type.

B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.

1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
3. Colors for 240-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
4. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
5. Color for Neutral: White .
6. Color for Equipment Grounds: Bare copper Green Green with a yellow stripe.
7. Colors for Isolated Grounds: Green with two or more yellow stripes.

C. Raceways and Cables Carrying Circuits at More Than 600 V:

1. Black letters on an orange field.
2. Legend: "DANGER - CONCEALED HIGH VOLTAGE WIRING."

D. Warning Label Colors:

1. Identify system voltage with black letters on an orange background.

E. Warning labels and signs shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES" This warning label should be placed on the main distribution panels as it is fed from the normal utility source as well as from the generator.
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

F. Equipment Identification Labels:

1. Black letters on a white field.

2.3 LABELS

- A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. LEM Products Inc.
 - c. Marking Services, Inc.
 - d. Panduit Corp.
- B. Self-Adhesive Wraparound Labels: Preprinted , 3-mil- thick, vinyl flexible label with acrylic pressure-sensitive adhesive.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. LEM Products Inc.
 - c. Marking Services, Inc.
 - d. Panduit Corp.
 2. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
 3. Marker for Labels:
 - a. Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.

2.4 SIGNS

- A. Baked-Enamel Signs:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlton Industries, LP.
 - b. Champion America.
 - c. emedco.
 - d. Marking Services, Inc.
 2. Preprinted aluminum signs, high-intensity reflective, punched or drilled for fasteners, with colors, legend, and size required for application.
 3. 1/4-inch grommets in corners for mounting.
 4. Nominal Size: 7 by 10 inches.

2.5 CABLE TIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. HellermannTyton.
 2. Ideal Industries, Inc.

3. Marking Services, Inc.
 4. Panduit Corp.
- B. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
1. Minimum Width: 3/16 inch.
 2. Tensile Strength at 73 Deg F according to ASTM D638: 12,000 psi.
 3. Temperature Range: Minus 40 to plus 185 deg F.
 4. Color: Black, except where used for color-coding.
- C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.
1. Minimum Width: 3/16 inch.
 2. Tensile Strength at 73 Deg F according to ASTM D638: 7000 psi.
 3. UL 94 Flame Rating: 94V-0.
 4. Temperature Range: Minus 50 to plus 284 deg F.
 5. Color: Black.

2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.

- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- G. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- H. System Identification for Raceways and Cables over 600 V: Identification shall completely encircle cable or conduit. Place adjacent identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- I. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- J. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer .
- K. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- L. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:
 - 1. "EMERGENCY POWER."
 - 2. "POWER."
 - 3. "UPS."
- M. Vinyl Wraparound Labels:
 - 1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
 - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- N. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.
- O. Baked-Enamel Signs:
 - 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on minimum 1-1/2-inch- high sign; where two lines of text are required, use signs minimum 2 inches high.
- P. Cable Ties: General purpose, for attaching tags, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.
 - 2. In Spaces Handling Environmental Air: Plenum rated.

3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels .
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- D. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use vinyl wraparound labels self-adhesive wraparound labels to identify the phase.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- E. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use with the conductor or cable designation, origin, and destination.
- F. Control-Circuit Conductor Termination Identification: For identification at terminations, provide with the conductor designation.
- G. Conductors to Be Extended in the Future: Attach to conductors and list source.
- H. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
- I. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.
- J. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Baked-enamel warning signs .
 - 1. Apply to exterior of door, cover, or other access.
 - 2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:
 - a. Power-transfer switches.
 - b. Controls with external control power connections.
- K. Operating Instruction Signs: Baked-enamel warning signs .
- L. Equipment Identification Labels:
 - 1. Indoor Equipment: .
 - 2. Equipment to Be Labeled:

- a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a self-adhesive, engraved, laminated acrylic or melamine label.
- b. Enclosures and electrical cabinets.
- c. Switchgear.
- d. Transformers: Label that includes tag designation indicated on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
- e. Enclosed switches.
- f. Enclosed circuit breakers.
- g. Enclosed controllers.
- h. Variable-speed controllers.
- i. Power-transfer equipment.
- j. Contactors.
- k. Remote-controlled switches, dimmer modules, and control devices.
- l. Power-generating units.
- m. Monitoring and control equipment.
- n. .

END OF SECTION 260553

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Indoor occupancy and vacancy sensors.
 - 2. Switchbox-mounted occupancy sensors.
 - 3. High-bay occupancy sensors.
 - 4. Extreme-temperature occupancy sensors.
 - 5. Lighting contactors.
 - 6. Conductors and cables.

- B. Related Requirements:

- 1. Section 262726 "Wiring Devices" for wall-box dimmers, non-networkable wall-switch occupancy sensors, and manual light switches.

1.3 ACTION SUBMITTALS

- A. Shop Drawings:

- 1. Show installation details for the following:
 - a. Occupancy sensors.
 - b. Vacancy sensors.
 - 2. Interconnection diagrams showing field-installed wiring.
 - 3. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of lighting control device to include in operation and maintenance manuals.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail(s) in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Faulty operation of lighting control software.
 - b. Faulty operation of lighting control devices.
 2. Warranty Period: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 INDOOR OCCUPANCY AND VACANCY SENSORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cooper Industries, Inc.
 2. Hubbell Building Automation, Inc.
 3. Intermatic, Inc.
 4. Leviton Manufacturing Co., Inc.
 5. Lithonia Lighting; Acuity Brands Lighting, Inc.
 6. Lutron Electronics Co., Inc.
 7. Sensor Switch, Inc.
 8. WattStopper; a Legrand® Group brand.
- B. General Requirements for Sensors:
1. Wall Ceiling-mounted, solid-state indoor occupancy sensors.
 2. Dual technology.
 3. Integrated power pack.
 4. Hardwired connection to switch .
 5. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 6. Operation:
 - a. Occupancy Sensor: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 - b. Vacancy Sensor: Unless otherwise indicated, lights are manually turned on and sensor turns lights off when the room is unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 - c. Combination Sensor: Unless otherwise indicated, sensor shall be programmed to turn lights on when coverage area is occupied and turn them off when unoccupied, or to turn off lights that have been manually turned on; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 7. Sensor Output: Sensor is powered from the power pack .
 8. Power: Line voltage .
 9. Power Pack: Dry contacts rated for 20-A LED load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.

10. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outlet box.
 - b. Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
 11. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
 12. Bypass Switch: Override the "on" function in case of sensor failure.
 13. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc; turn lights off when selected lighting level is present.
- C. Dual-Technology Type: Wall Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.
1. Sensitivity Adjustment: Separate for each sensing technology.
 2. Detector Sensitivity: Detect occurrences of 6-inch- minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch- high ceiling.
 4. Detection Coverage (Room, Wall Mounted): Detect occupancy anywhere within a 180-degree pattern centered on the sensor over the entire space when mounted 48 inches above finished floor. Size sensor coverage area based on the space designated.

2.2 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 16 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.
- B. Examine walls and ceilings for suitable conditions where lighting control devices will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF SENSORS

- A. Comply with NECA 1.
- B. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.
- C. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.3 INSTALLATION OF CONTACTORS

- A. Comply with NECA 1.
- B. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.4 INSTALLATION OF WIRING

- A. Comply with NECA 1.
- B. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch.
- C. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors in accordance with conductor manufacturer's written instructions.
- D. Size conductors in accordance with lighting control device manufacturer's written instructions unless otherwise indicated.
- E. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.5 IDENTIFICATION

- A. Identify components and power and control wiring in accordance with Section 260553 "Identification for Electrical Systems."
 - 1. Identify controlled circuits in lighting contactors.
 - 2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
 - 1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
 - 2. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.

3.7 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION 260923

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Distribution panelboards.
 - 2. Lighting and appliance branch-circuit panelboards.

1.3 DEFINITIONS

- A. ATS: Acceptance testing specification.
- B. GFCI: Ground-fault circuit interrupter.
- C. GFEP: Ground-fault equipment protection.
- D. HID: High-intensity discharge.
- E. MCCB: Molded-case circuit breaker.
- F. SPD: Surge protective device.
- G. VPR: Voltage protection rating.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard.
 - 1. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
 - 2. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details.
 - 2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.

3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
4. Detail bus configuration, current, and voltage ratings.
5. Short-circuit current rating of panelboards and overcurrent protective devices.
6. Include evidence of NRTL listing for series rating of installed devices.
7. Include evidence of NRTL listing for SPD as installed in panelboard.
8. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
9. Include wiring diagrams for power, signal, and control wiring.
10. Key interlock scheme drawing and sequence of operations.
11. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graph paper; include selectable ranges for each type of overcurrent protective device. Include an Internet link for electronic access to downloadable PDF of the coordination curves.

1.5 INFORMATIONAL SUBMITTALS

- A. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

1.6 CLOSEOUT SUBMITTALS

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: ISO 9001 or ISO 9002 certified.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.
- B. Handle and prepare panelboards for installation according to NECA 407 .

1.9 FIELD CONDITIONS

- A. Environmental Limitations:
 1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Architect Construction Manager Owner no fewer than 4 days in advance of proposed interruption of electric service.
2. Do not proceed with interruption of electric service without Architect's Construction Manager's Owner's written permission.
3. Comply with NFPA 70E.

1.10 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.
 1. Panelboard Warranty Period: 18 months from date of Substantial Completion.
- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace SPD that fails in materials or workmanship within specified warranty period.
 1. SPD Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANELBOARDS AND LOAD CENTERS COMMON REQUIREMENTS

- A. Product Selection for Restricted Space: Drawings indicate general location of new panelboards. E.C. must comply with NEC #110.26 and maintain proper working clearances.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA PB 1.
- D. Comply with NFPA 70.
- E. Enclosures: Surface-mounted, dead-front cabinets.
 1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1 .
 2. Height: 84 inches maximum.
 3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.
 4. Finishes:
 - a. Panels and Trim: Steel , factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
 - b. Back Boxes: Galvanized steel .
- F. Incoming Mains:
 1. Location: Convertible between top and bottom.

2. Main Breaker: Main lug interiors up to 400 amperes shall be field convertible to main breaker.

G. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity. Neutral and ground bar may be tin plated aluminum.
 - a. Plating shall run entire length of bus.
 - b. Bus shall be fully rated the entire length.
2. Interiors shall be factory assembled into a unit. Replacing switching and protective devices shall not disturb adjacent units or require removing the main bus connectors.
3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
4. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications or separately derived systems. Mount electrically isolated from enclosure. Do not mount neutral bus in gutter.

H. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Terminations shall allow use of 75 deg C rated conductors without derating.
2. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
3. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

I. Future Devices: Panelboards or load centers shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

1. Spare capacity and spare breakers are indicated on panel schedules. See Drawing for details.

J. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include label or manual with size and type of allowable upstream and branch devices listed and labeled by an NRTL for series-connected short-circuit rating.

1. Panelboards rated at 240 V shall have short-circuit ratings as shown on Drawings, but not less than 10,000 A rms symmetrical.
2. Panelboards rated at 600 V shall have short-circuit ratings as shown on Drawings, but not less than 14,000 A rms symmetrical.

2.2 PERFORMANCE REQUIREMENTS

- A. Surge Suppression: Factory installed as an integral part of indicated panelboards, complying with UL 1449 SPD Type 1 . See power distribution drawing for manufacturer and model number.

2.3 POWER PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton.

2. Siemens Industry, Inc., Energy Management Division.
3. Square D; by Schneider Electric.
4. General Electric

B. Panelboards: NEMA PB 1, distribution type.

C. Mains: Circuit breaker .

D. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers .

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB (Electrification Products Division).
2. Eaton.
3. Siemens Industry, Inc., Energy Management Division.
4. Square D; by Schneider Electric.
5. General Electric

B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Mains: Circuit breaker or lugs only.

D. Branch Overcurrent Protective Devices: Plug-in circuit breakers, replaceable without disturbing adjacent units.

E. Doors: Door-in-door construction with concealed hinges; secured with multipoint latch with tumbler lock; keyed alike. Outer door shall permit full access to the panel interior. Inner door shall permit access to breaker operating handles and labeling, but current carrying terminals and bus shall remain concealed.

2.5 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB (Electrification Products Division).
2. Eaton.
3. Siemens Industry, Inc., Energy Management Division.
4. Square D; by Schneider Electric.
5. General Electric.

B. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers:
 - a. Inverse time-current element for low-level overloads.
 - b. Instantaneous magnetic trip element for short circuits.
 - c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

2. Subfeed Circuit Breakers: Vertically mounted.
3. MCCB Features and Accessories:
 - a. Breaker handle indicates tripped status.
 - b. UL listed for reverse connection without restrictive line or load ratings.
 - c. Lugs: style, suitable for number, size, trip ratings, and conductor materials.
 - d. Rating Plugs: Three-pole breakers with ampere ratings greater than 150 amperes shall have interchangeable rating plugs or electronic adjustable trip units.

2.6 IDENTIFICATION

- A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.
- B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.
- C. Circuit Directory: Directory card inside panelboard door, mounted in metal frame with transparent protective cover.
 1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.
- D. Circuit Directory: Computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.
 1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

2.7 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.
- B. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.
- B. Receive, inspect, handle, and store panelboards according to NECA 407 .

- C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.
- D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Comply with NECA 1.
- C. Install panelboards and accessories according to NECA 407 .
- D. Equipment Mounting:
 - 1. Install panelboards on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete." See drawings for locations of house keeping pads.
 - 2. Attach panelboard to the vertical finished or structural surface behind the panelboard.
- E. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
- F. Mount top of trim 90 inches above finished floor unless otherwise indicated.
- G. Mount panelboard cabinet plumb and rigid without distortion of box.
- H. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- I. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.
- J. Install filler plates in unused spaces.
- K. Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.
- L. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.
- M. Mount spare fuse cabinet in accessible location.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- D. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- E. Install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems" identifying source of remote circuit.

3.4 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. If provided, set field-adjustable circuit-breaker trip ranges as directed by Engineer.

3.5 PROTECTION

- A. Temporary Heating: Prior to energizing panelboards, apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION 262416

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Standard Spec-grade receptacles, 125 V, 20 A.
 - 2. USB receptacles.
 - 3. GFCI receptacles, 125 V, 20 A.
 - 4. Toggle switches, 120/277 V, 20 A.
 - 5. Decorator-style devices, 20 A.
 - 6. Occupancy sensors.
 - 7. Wall-box dimmers.
 - 8. Wall plates.

1.3 DEFINITIONS

- A. AFCI: Arc-fault circuit interrupter.
- B. BAS: Building automation system.
- C. EMI: Electromagnetic interference.
- D. GFCI: Ground-fault circuit interrupter.
- E. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- F. RFI: Radio-frequency interference.
- G. SPD: Surge protective device.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

1.5 INFORMATIONAL SUBMITTALS

1.6 CLOSEOUT SUBMITTALS

PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Comply with NFPA 70.
- C. RoHS compliant.
- D. Comply with NEMA WD 1.
- E. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
 - 1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
 - 2. Devices shall comply with requirements in this Section.
- F. Devices for Owner-Furnished Equipment:
 - 1. Receptacles: Match plug configurations.
 - 2. Cord and Plug Sets: Match equipment requirements.
- G. Device Color:
 - 1. Wiring Devices Connected to Normal Power System: As selected by Architect unless otherwise indicated or required by NFPA 70 or device listing.
 - 2. Wiring Devices Connected to Essential Electrical System: Red .
- H. Wall Plate Color: For plastic covers, match device color.
- I. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 STANDARD-GRADE RECEPTACLES, 125 V, 20 A

- A. Duplex Receptacles, 125 V, 20 A :
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated (Commercial and Industrial Group - Wiring Device-Kellems).
 - c. Leviton Manufacturing Co., Inc.

- d. Pass & Seymour/Legrand (Pass & Seymour).
2. Description: Two pole, three wire, and self-grounding.
3. Configuration: NEMA WD 6, Configuration 5-20R.
4. Standards: Comply with UL 498 and FS W-C-596.

B. Tamper-Resistant Duplex Receptacles, 125 V, 20 A :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated (Commercial and Industrial Group - Wiring Device-Kellems).
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle.
3. Configuration: NEMA WD 6, Configuration 5-20R.
4. Standards: Comply with UL 498 and FS W-C-596.
5. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" Article.

C. Tamper- and Weather-Resistant Duplex Receptacles, 125 V, 20 A :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated (Commercial and Industrial Group - Wiring Device-Kellems).
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
3. Configuration: NEMA WD 6, Configuration 5-20R.
4. Standards: Comply with UL 498.
5. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" and "Receptacles in Damp or Wet Locations" articles.

2.3 USB RECEPTACLES

A. USB Charging Receptacles:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated (Commercial and Industrial Group - Wiring Device-Kellems).
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Description: Single-piece, rivetless, nickel-plated, all-brass grounding system. Nickel-plated, brass mounting strap.
3. USB Receptacles: Dual , USB Type A, 5 V dc, and 2.1 A per receptacle (minimum).
4. Standards: Comply with UL 1310 and USB 3.0 devices.

2.4 GFCI RECEPTACLES, 125 V, 20 A

A. Tamper- and Weather-Resistant, GFCI Duplex Receptacles, 125 V, 20 A:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated (Commercial and Industrial Group - Wiring Device-Kellems).
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
3. Configuration: NEMA WD 6, Configuration 5-15R.
4. Type: Feed through.
5. Standards: Comply with UL 498 and UL 943 Class A.
6. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" and "Receptacles in Damp or Wet Locations" articles.

2.5 TOGGLE SWITCHES, 120/277 V, 20 A

A. Single-Pole Switches, 120/277 V, 20 A:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated (Commercial and Industrial Group - Wiring Device-Kellems).
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Standards: Comply with UL 20 and FS W-S-896.

B. Three-Way Switches, 120/277 V, 20 A:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated (Commercial and Industrial Group - Wiring Device-Kellems).
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Comply with UL 20 and FS W-S-896.

C. Four-Way Switches, 120/277 V, 20 A:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated (Commercial and Industrial Group - Wiring Device-Kellems).
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Standards: Comply with UL 20 and FS W-S-896.

2.6 DECORATOR-STYLE DEVICES, 20 A

A. Decorator Single-Pole Switches, 120/277 V, 20 A:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated (Commercial and Industrial Group - Wiring Device-Kellems).
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Comply with UL 20.

2.7 OCCUPANCY SENSORS

A. Wall Switch Sensor Light Switch, Dual Technology:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated (Commercial and Industrial Group - Wiring Device-Kellems).
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Description: Switchbox-mounted, combination lighting-control sensor and conventional switch lighting-control unit using dual (ultrasonic and passive infrared) technology.
3. Standards: Comply with UL 20.
4. Adjustable time delay of 20 minutes.
5. Able to be locked to Manual-On mode.
6. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc.
7. Connections: Provisions for connection to BAS.
8. Connections: RJ-45 communications outlet.
9. Connections: Integral wireless networking.

2.8 DIMMERS

A. Wall-Box Dimmers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated (Commercial and Industrial Group - Wiring Device-Kellems).
 - c. Leviton Manufacturing Co., Inc.
 - d. Lutron Electronics Co., Inc.
 - e. Pass & Seymour/Legrand (Pass & Seymour).
2. Description: Modular, full-wave, solid-state dimmer switch with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
3. Control: Continuously adjustable slider toggle switch ; with single-pole or three-way switching.
4. Standards: Comply with UL 1472.

5. LED Lamp Dimmer Switches: Modular; compatible with LED lamps; trim potentiometer to adjust low-end dimming; capable of consistent dimming with low end not greater than 20 percent of full brightness.

2.9 WALL PLATES

- A. Single Source: Obtain wall plates from same manufacturer of wiring devices.
- B. Single and combination types shall match corresponding wiring devices.
 1. Plate-Securing Screws: Metal with head color to match plate finish.
 2. Material for all Spaces: 0.035-inch- thick, satin-finished, Type 302 stainless steel .
 3. Material for Damp Locations: Thermoplastic [**Cast aluminum**] with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
 1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
 1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 3. The length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtails.
 4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtail existing conductors is permitted, provided the outlet box is large enough.
- D. Device Installation:
 1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.

2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Dimmers:

1. Install dimmers within terms of their listing.
2. Verify that dimmers used for fan-speed control are listed for that application.
3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device, listing conditions in the written instructions.

F. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

G. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 GFCI RECEPTACLES

- A. Install non-feed-through GFCI receptacles where protection of downstream receptacles is not required.

3.3 IDENTIFICATION

- A. Comply with Section 260553 "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black -filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.
- C. Essential Electrical System: Mark receptacles supplied from the essential electrical system to allow easy identification using a self-adhesive label. See NEC 517.30(e) for labeling requirements.

3.4 FIELD QUALITY CONTROL

- A. Tests for Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
 3. Ground Impedance: Values of up to 2 ohms are acceptable.
 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 5. Using the test plug, verify that the device and its outlet box are securely mounted.
 6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault-current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- B. Wiring device will be considered defective if it does not pass tests and inspections.
- C. Contractor shall prepare test and inspection reports.

END OF SECTION 262726

SECTION 262813 - FUSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Cartridge fuses rated 600 V ac and less for use in the following:
 - a. Enclosed switches.
 - 2. Spare-fuse cabinets.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:
 - 1. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.

1.4 CLOSEOUT SUBMITTALS

1.5 FIELD CONDITIONS

- A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F or more than 100 deg F , apply manufacturer's ambient temperature adjustment factors to fuse ratings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Bussmann, an Eaton business.
 - 2. Edison; a brand of Bussmann by Eaton.
 - 3. Littelfuse, Inc.
 - 4. Mersen USA.

- B. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.
 - 1. Type RK-1: 250 600-V, zero- to 600-A rating, 200 kAIC , time delay.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NFPA 70.
- D. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

2.3 SPARE-FUSE CABINET

- A. Characteristics: Wall-mounted steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.
 - 1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.
 - 2. Finish: Gray, baked enamel.
 - 3. Identification: "SPARE FUSES" in 1-1/2-inch- high letters on exterior of door.
 - 4. Fuse Pullers: For each size of fuse, where applicable and available, from fuse manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
- B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
- C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

- A. Cartridge Fuses:

1. Motor Branch Circuits: Class RK1 , time delay.
2. Other Branch Circuits: Class RK1, time delay .
3. Provide open-fuse indicator fuses or fuse covers with open fuse indication.

3.3 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.
- B. Install spare-fuse cabinet(s) in location shown on the Drawings or as indicated in the field by Construction Manager or Owner.

3.4 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Fusible switches.
 - 2. Nonfusible switches.

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current ratings (interrupting and withstand, as indicated on drawings).
 - 4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
- B. Shop Drawings: For enclosed switches and circuit breakers.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Include wiring diagrams for power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

1.6 CLOSEOUT SUBMITTALS

1.7 QUALITY ASSURANCE

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
2. Altitude: Not exceeding 6600 feet.

1.9 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One 3 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 GENERAL REQUIREMENTS

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with NFPA 70.
- E. All fusing shall be class RK1 to limit arc flash hazards. See disconnect schedule on plans for further details

2.3 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB (Electrification Products Division).

2. Eaton.
3. Siemens Industry, Inc., Energy Management Division.
4. Square D; by Schneider Electric.

B. Type HD, Heavy Duty:

1. Single throw.
2. pole.
3. -V ac.
4. 200 A and smaller.
5. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses.
6. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
3. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.4 NONFUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB (Electrification Products Division).
2. Eaton.
3. Siemens Industry, Inc., Energy Management Division.
4. Square D; by Schneider Electric.

B. Type HD, Heavy Duty, Six Pole, Single Throw, 240 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
3. Lugs: Mechanical type, suitable for number, size, and conductor material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

3.2 PREPARATION

- A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 1. Notify Architect Construction Manager Owner no fewer than seven days in advance of proposed interruption of electric service.
 2. Indicate method of providing temporary electric service.
 3. Do not proceed with interruption of electric service without Architect's Construction Manager's Owner's written permission.
 4. Comply with NFPA 70E.

3.3 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- C. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- D. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- E. Install fuses in fusible devices.
- F. Comply with NFPA 70 and NECA 1.

3.4 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 262816

SECTION 264313 - SURGE PROTECTIVE DEVICES FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
 - 1. Type 2 surge protective devices.
 - 2. Enclosures.
 - 3. Conductors and cables.
- B. Related Requirements:
 - 1. Section 262413 "Switchboards" for integral SPDs installed by E.C. Main switchboard is existing to remain. E.C. shall provide new SPD as indicated on power distribution diagram.
 - 2. Section 262416 "Panelboards" for integral SPDs installed by panelboard manufacturer.

1.3 DEFINITIONS

- A. Inominal: Nominal discharge current.
- B. MCOV: Maximum continuous operating voltage.
- C. Mode(s), also Modes of Protection: air of electrical connections where the VPR applies.
- D. MOV: Metal-oxide varistor; an electronic component with a significant non-ohmic current-voltage characteristic.
- E. NRTL: Nationally recognized testing laboratory.
- F. OCPD: Overcurrent protective device.
- G. SCCR: Short-circuit current rating.
- H. SPD: Surge protective device.
- I. Type 1 SPDs: Permanently connected SPDs intended for installation between the secondary of the service transformer and the line side of the service disconnect overcurrent device.

- J. Type 2 SPDs: Permanently connected SPDs intended for installation on the load side of the service disconnect overcurrent device, including SPDs located at the branch panel.
- K. Type 3 SPDs: Point of utilization SPDs.
- L. VPR: Voltage protection rating.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include electrical characteristics, specialties, and accessories for SPDs.
 - 2. NRTL certification of compliance with UL 1449.
 - a. Tested values for VPRs.
 - b. Inominal ratings.
 - c. MCOV, type designations.
 - d. OCPD requirements.
 - e. Manufacturer's model number.
 - f. System voltage.
 - g. Modes of protection.

1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace SPDs that fail in materials or workmanship within five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 TYPE 2 SURGE PROTECTIVE DEVICES (SPDs)

- A. Manufacturers: Subject to compliance with requirements as shown on drawings. Provide equipment as indicated on power distribution diagram on drawings or equal products by one of the following:
 - 1. Advanced Protection Technologies Inc. (APT).
 - 2. Eaton.
 - 3. Leviton Manufacturing Co., Inc.
 - 4. Liebert; a brand of Vertiv.
 - 5. Schneider Electric USA, Inc.
 - 6. Siemens Industry, Inc., Energy Management Division.

- B. Source Limitations: Obtain devices from single source from single manufacturer.
- C. Standards:
 - 1. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1449, Type 2.
- D. Product Options:
 - 1. Include LED indicator lights for power and protection status.
 - 2. Include internal thermal protection that disconnects the SPD before damaging internal suppressor components.
 - 3. Include surge counter.
- E. Performance Criteria:
 - 1. MCOV: Not less than 125 percent of nominal system voltage for 208Y/120 V and 120/240 V power systems, and not less than 115 percent of nominal system voltage for 480Y/277 V power systems.
 - 2. Protection modes and UL 1449 VPR for grounded wye circuits with 480Y/277 V 208Y/120 V, three-phase, four-wire circuits must not exceed the following:
 - a. Line to Neutral: 1200 V for 480Y/277 V 700 V for 208Y/120 V.
 - b. Line to Ground: 1200 V for 480Y/277 V 700 V for 208Y/120 V.
 - c. Neutral to Ground: 1200 V for 480Y/277 V .
 - d. Line to Line: 2000 V for 480Y/277 V 1200 V for 208Y/120 V.
 - 3. SCCR: Equal or exceed 100 kA.
 - 4. Inominal Rating: 20 kA.

2.2 ENCLOSURES

- A. Indoor Enclosures: NEMA 250, Type 1.
- B. Outdoor Enclosures: NEMA 250, .

2.3 CONDUCTORS AND CABLES

- A. Power Wiring: Same size as SPD leads, complying with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.
- B. Provide OCPD and disconnect for installation of SPD in accordance with UL 1449 and manufacturer's written instructions.

- C. Install leads between disconnects and SPDs short, straight, twisted, and in accordance with manufacturer's written instructions. Comply with wiring methods in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
 - 1. Do not splice and extend SPD leads unless specifically permitted by manufacturer.
 - 2. Do not exceed manufacturer's recommended lead length.
 - 3. Do not bond neutral and ground.
- D. Use crimped connectors and splices only. Wire nuts are unacceptable.

END OF SECTION 264313

SECTION 265119 - LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Lighting Fixtures.
 - 2. Materials.
 - 3. Luminaire support.

- B. Related Requirements:

- 1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, and occupancy sensors.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Arrange in order of luminaire designation.
 - 2. Include data on features, accessories, and finishes.
 - 3. Include physical description and dimensions of luminaires.
 - 4. Include emergency lighting units, including batteries and chargers.
 - 5. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.

B. Shop Drawings: For nonstandard or custom luminaires.

1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.

1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.6 QUALITY ASSURANCE

- A. Provide luminaires from a single manufacturer for each luminaire type.
- B. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
- C. Color temperature of luminaires shall be as shown on drawings.
- D. Thermal protection shall be provided on all recessed fixtures where exposed to attic space. (IC Rated).
- E. Each luminaire shall have an integral disconnecting means per NFPA70.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.8 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: 3 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- B. Recessed luminaires shall be IC rated where exposed to attic space or insulation.
- C. All luminaires shall be provided as directed on the plans and per the luminaire schedule. Include all mounting equipment and parts for a complete and operable system.
- D. Provide hurricane clips where required and per Ohio Building Code.

2.2 DOWNLIGHT .

- A. Manufacturers: Subject to compliance with requirements with the luminaire schedule shown on drawings. Contractor may provide equal or base bid by one of the following:
 - 1. Cooper Lighting, an Eaton business.
 - 2. Lithonia Lighting; Acuity Brands Lighting, Inc.
 - 3. Hubbell Lighting Systems Inc.
- B. Nominal Operating Voltage: 120 V ac 277 V ac .
- C. Standards:
 - 1. ENERGY STAR certified.
 - 2. RoHS compliant.
 - 3. UL Listing: Listed for damp location where applicable and per luminaire schedule
 - 4. Recessed luminaires shall comply with NEMA LE 4 and shall be IC rated where exposed to attic/insulation.

2.3 MATERIALS

- A. Metal Parts:
 - 1. Free of burrs and sharp corners and edges.
 - 2. Sheet metal components shall be steel unless otherwise indicated.
 - 3. Form and support to prevent warping and sagging.
- B. Steel:
 - 1. ASTM A36/A36M for carbon structural steel.
 - 2. ASTM A568/A568M for sheet steel.
- C. Stainless Steel:
 - 1. Manufacturer's standard grade.
 - 2. Manufacturer's standard type, ASTM A240/240M.
- D. Galvanized Steel: ASTM A653/A653M.
- E. Aluminum: ASTM B209.

2.4 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.5 LUMINAIRE SUPPORT

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A641/A641M, Class 3, soft temper, zinc-coated steel, 12 gage .
- D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

- A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.3 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:

1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping.
3. Provide support for luminaire without causing deflection of ceiling or wall.
4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

E. Flush-Mounted Luminaires:

1. Secured to outlet box.
2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
3. Trim ring flush with finished surface.

F. Wall-Mounted Luminaires:

1. Attached to structural members in walls .
2. Do not attach luminaires directly to gypsum board.

G. Suspended Luminaires:

1. Ceiling Mount:
 - a. Two diameter aircraft cable supports adjustable to 5 .
2. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
3. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
4. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and wire support for suspension for each unit length of luminaire chassis, including one at each end.
5. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

H. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.
2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

I. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
 2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 3. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION 265119

SECTION 265213 - EMERGENCY AND EXIT LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Emergency lighting.
 - 2. Exit signs.
 - 3. Materials.
 - 4. Luminaire support components.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Emergency Lighting Unit: A lighting unit with internal or external emergency battery powered supply and the means for controlling and charging the battery and unit operation.
- D. Fixture: See "Luminaire" Paragraph.
- E. Lumen: Measured output of lamp and luminaire, or both.
- F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of emergency lighting unit, exit sign, and emergency lighting support.
 - 1. Include data on features, accessories, and finishes.
 - 2. Include physical description of the unit and dimensions.
 - 3. Battery and charger for light units.
 - 4. Include life, output of luminaire (lumens, CCT, and CRI), and energy-efficiency data.
 - 5. Include photometric data and adjustment factors based on laboratory tests, complying with IES LM-45, for each luminaire type.

1.5 INFORMATIONAL SUBMITTALS

- A. Provide submittals for approval as part of the overall lighting submittals.
- B. See luminaire schedule for manufacturer catalog numbers and additional information.

1.6 CLOSEOUT SUBMITTALS

1.7 QUALITY ASSURANCE

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.9 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 3 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 GENERAL REQUIREMENTS FOR EMERGENCY LIGHTING

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. NRTL Compliance: Fabricate and label emergency lighting units, exit signs, and batteries to comply with UL 924.
- C. Comply with NFPA 70 and NFPA 101.
- D. Comply with NEMA LE 4 for recessed luminaires.
- E. Comply with UL 1598 for fluorescent luminaires.
- F. Internal Type Emergency Power Unit: Self-contained, modular, battery-inverter unit, factory mounted within luminaire body.
 - 1. Emergency Connection: Operate LED lamp(s) continuously for a minimum of 90minutes. lumen output as indicated on luminaire schedule.

2. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
3. Test Push-Button and Indicator Light: Visible and accessible without opening luminaire or entering ceiling space.
 - a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
4. Battery: Sealed, maintenance-free, nickel-cadmium type.
5. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.

2.3 EMERGENCY LIGHTING

- A. General Requirements for Emergency Lighting Units: Self-contained units.
- B. Emergency Luminaires:
 1. Manufacturers: Subject to compliance with requirements shown in the luminaires schedule, provide equal or specified products by one of the following:
 - a. Cooper Lighting, an Eaton business.
 - b. Dual-Lite.
 - c. Lightolier; a Philips group brand.
 - d. Lithonia Lighting; Acuity Brands Lighting, Inc.

2.4 EXIT SIGNS

- A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
- B. Internally Lighted Signs:
 1. Manufacturers: Subject to compliance with requirements indicated in the luminaire schedule, provide specified or equal products by one of the following:
 - a. Cooper Lighting, an Eaton business.
 - b. Hubbell Incorporated (Lighting Group).
 - c. Lithonia Lighting; Acuity Brands Lighting, Inc.
 2. Operating at nominal voltage of 120 V ac 277 V ac .
 3. Lamps for AC Operation:
 - a. LEDs; 50,000 hours minimum rated lamp life.
 4. Self-Powered Exit Signs (Battery Type): Internal emergency power unit.
 - a. Nicad Battery
 - b. Capable of operation for a minimum of 90minutes upon power failure

2.5 MATERIALS

- A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging.

B. Doors, Frames, and Other Internal Access:

1. Smooth operating, free of light leakage under operating conditions.
2. Designed to permit relamping without use of tools.
3. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Diffusers and Globes:

1. Acrylic: 100 percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

D. Conduit: Electrical metallic tubing Flexible metallic conduit, minimum 3/4 inch in diameter.

2.6 LUMINAIRE SUPPORT COMPONENTS

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for conditions affecting performance of luminaires.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
- C. Examine walls, floors, roofs, and ceilings for suitable conditions where emergency lighting luminaires will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Supports:
1. Sized and rated for luminaire and emergency power unit weight.
 2. Able to maintain luminaire position when testing emergency power unit.

3. Provide support for luminaire and emergency power unit without causing deflection of ceiling or wall.
4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire and emergency power unit weight and vertical force of 400 percent of luminaire weight.

D. Wall-Mounted Luminaire Support:

1. Attached to structural members in walls .
2. Do not attach luminaires directly to gypsum board.

E. Suspended Luminaire Support:

1. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
2. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

F. Ceiling Grid Mounted Luminaires:

1. Secure to any required outlet box.
2. Secure emergency power unit using approved fasteners in a minimum of four locations, spaced near corners of emergency power unit.

3.3 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

END OF SECTION 265213

SECTION 270526 - GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Grounding conductors.
 - 2. Grounding busbars.
 - 3. Grounding labeling.

1.3 DEFINITIONS

- A. BCT: Bonding conductor for telecommunications.
- B. TGB: Telecommunications grounding busbar.
- C. TMGB: Telecommunications main grounding busbar.
- D. Service Provider: The operator of a service that provides telecommunications transmission delivered over access provider facilities.

1.4 ACTION SUBMITTALS

1.5 INFORMATIONAL SUBMITTALS

1.6 CLOSEOUT SUBMITTALS

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 - 1. Installation Supervision: Installation shall be under the direct supervision of ITS Technician , who shall be informed at all times when Work of this Section is performed at Project site.
 - 2. Field Inspector: Currently registered by BICSI as a designer RCDD to perform the on-site inspection.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.
- C. Comply with TIA-607-B.

2.2 CONDUCTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Harger Lightning & Grounding.
 - 2. Panduit Corp.
 - 3. TE Connectivity Ltd.
- B. Comply with UL 486A-486B.
- C. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Bonding Jumper: Tinned-copper tape, braided conductors terminated with two-hole copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.3 GROUNDING BUSBARS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Chatsworth Products, Inc.
 - 2. Harger Lightning & Grounding.
 - 3. Panduit Corp.
- B. TMGB: Predrilled, wall-mounted, rectangular bars of hard-drawn solid copper, 1/4 by 4 inches in cross section, length as indicated on Drawings. The busbar shall be NRTL listed for use as TMGB and shall comply with TIA-607-B.
 - 1. Predrilling shall be with holes for use with lugs specified in this Section.
 - 2. Mounting Hardware: Stand-off brackets that provide a 4-inch clearance to access the rear of the busbar. Brackets and bolts shall be stainless steel.
 - 3. Stand-off insulators for mounting shall be Lexan or PVC. Comply with UL 891 for use in 600-V switchboards, impulse tested at 5000 V.

- C. TGB: Predrilled rectangular bars of hard-drawn solid copper, 1/4 by 2 inches in cross section, length as indicated on Drawings. The busbar shall be for wall mounting, shall be NRTL listed as complying with UL 467, and shall comply with TIA-607-B.
 - 1. Predrilling shall be with holes for use with lugs specified in this Section.
 - 2. Mounting Hardware: Stand-off brackets that provide at least a 2-inch clearance to access the rear of the busbar. Brackets and bolts shall be stainless steel.
 - 3. Stand-off insulators for mounting shall be Lexan or PVC. Comply with UL 891 for use in 600-V switchboards, impulse tested at 5000 V.
- D. Rack and Cabinet Grounding Busbars: Rectangular bars of hard-drawn solid copper, accepting conductors ranging from No. 14 to No. 2/0 AWG, NRTL listed as complying with UL 467, and complying with TIA-607-B. Predrilling shall be with holes for use with lugs specified in this Section.
 - 1. Rack-Mounted Horizontal Busbar: Designed for mounting in 19- or 23-inch equipment racks. Include a copper splice bar for transitioning to an adjoining rack, and stainless-steel or copper-plated hardware for attachment to the rack.

2.4 IDENTIFICATION

- A. Comply with requirements for identification products in Section 270553 "Identification for Communications Systems."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the ac grounding electrode system and equipment grounding for compliance with requirements for maximum ground-resistance level and other conditions affecting performance of grounding and bonding of the electrical system.
- B. Inspect the test results of the ac grounding system measured at the point of BCT connection.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with connection of the BCT only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Bonding shall include the ac utility power service entrance, the communications cable entrance, and the grounding electrode system. The bonding of these elements shall form a loop so that each element is connected to at least two others.
- B. Comply with NECA 1.
- C. Comply with TIA-607-B.

3.3 APPLICATION

- A. Conductors: Install solid conductor for #8 AWG and smaller and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
 - 1. The bonding conductors between the TGB and structural steel of steel-frame buildings shall not be smaller than 4 AWG.
 - 2. The bonding conductors between the TMGB and structural steel of steel-frame buildings shall not be smaller than 4 AWG.
- B. Conductor Support:
 - 1. Secure grounding and bonding conductors at intervals of not less than 36 inches.
- C. Grounding and Bonding Conductors:
 - 1. Install in the straightest and shortest route between the origination and termination point, and no longer than required. The bend radius shall not be smaller than eight times the diameter of the conductor. No one bend may exceed 90 degrees.
 - 2. Install without splices.
 - 3. Support at not more than 36-inch intervals.
 - 4. Install grounding and bonding conductors in 3/4-inch PVC conduit until conduit enters a telecommunications room. The grounding and bonding conductor pathway through a plenum shall be in EMT. Conductors shall not be installed in EMT unless otherwise indicated.
 - a. If a grounding and bonding conductor is installed in ferrous metallic conduit, bond the conductor to the conduit using a grounding bushing that complies with requirements in Section 270528 "Pathways for Communications Systems," and bond both ends of the conduit to a TGB.

3.4 GROUNDING ELECTRODE SYSTEM

3.5 GROUNDING BUSBARS

- A. Indicate locations of grounding busbars on Drawings. Install busbars horizontally, on insulated spacers 2 inches minimum from wall, 12 inches above finished floor unless otherwise indicated.
- B. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.

3.6 CONNECTIONS

- A. Bond metallic equipment in a telecommunications equipment room to the grounding busbar in that room, using equipment grounding conductors not smaller than 4 AWG.
- B. Stacking of conductors under a single bolt is not permitted when connecting to busbars.

- C. Assemble the wire connector to the conductor, complying with manufacturer's written instructions and as follows:
 - 1. Use crimping tool and the die specific to the connector.
 - 2. Pretwist the conductor.
 - 3. Apply an antioxidant compound to all bolted and compression connections.
- D. Primary Protector: Bond to the TMGB with insulated bonding conductor.
- E. Interconnections: Interconnect all TGBs with the TMGB with the telecommunications backbone conductor. If more than one TMGB is installed, interconnect TMGBs using the grounding equalizer conductor. The telecommunications backbone conductor and grounding equalizer conductor size shall not be less than 2 kmils/linear foot of conductor length, up to a maximum size of No. 3/0 AWG unless otherwise indicated.
- F. Telecommunications Enclosures and Equipment Racks: Bond metallic components of enclosures to the telecommunications bonding and grounding system. Install vertically mounted rack grounding busbar unless the enclosure and rack are manufactured with the busbar. Bond the equipment grounding busbar to the TGB No. 2 AWG bonding conductors.
- G. Shielded Cable: Bond the shield of shielded cable to the TGB in communications rooms and spaces. Comply with TIA-568-C.1 and TIA-568-C.2 when grounding shielded balanced twisted-pair cables.

3.7 IDENTIFICATION

- A. Labels shall be preprinted or computer-printed type.
 - 1. Label TMGB(s) with "fs-TMGB," where "fs" is the telecommunications space identifier for the space containing the TMGB.
 - 2. Label TGB(s) with "fs-TGB," where "fs" is the telecommunications space identifier for the space containing the TGB.
 - 3. Label the BCT and each telecommunications backbone conductor at its attachment point: "WARNING! TELECOMMUNICATIONS BONDING CONDUCTOR. DO NOT REMOVE OR DISCONNECT!"

END OF SECTION 270526

SECTION 270528 - PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal conduits and fittings.
 - 2. Nonmetallic conduits and fittings.
 - 3. Optical-fiber-cable pathways and fittings.
 - 4. Hooks.

1.3 DEFINITIONS

- A. ARC: Aluminum rigid conduit.
- B. GRC: Galvanized rigid conduit.
- C. IMC: Intermediate metal conduit.
- D. RTRC: Reinforced thermosetting resin conduit.

1.4 ACTION SUBMITTALS

- A. Product data for the following:
 - 1. Surface pathways
 - 2. Wireways and fittings.
 - 3. Tele-power poles.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.5 INFORMATIONAL SUBMITTALS

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

- A. Description: Metal raceway of circular cross section with manufacturer-fabricated fittings.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Allied Tube & Conduit; a part of Atkore International.
 - 2. Alpha Wire.
 - 3. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - 4. Southwire Company.
 - 5. Thomas & Betts Corporation; A Member of the ABB Group.
- C. General Requirements for Metal Conduits and Fittings:
 - 1. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.
 - 2. Comply with TIA-569-D.
- D. GRC: Comply with ANSI C80.1 and UL 6.
- E. EMT: Comply with ANSI C80.3 and UL 797.
- F. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 - 1. Fittings for EMT:
 - a. Material: Steel .
 - b. Type: Set screw or compression.
 - 2. Expansion Fittings: PVC or steel to match conduit type, complying with UL-467, rated for environmental conditions where installed, and including flexible external bonding jumper.

2.2 OPTICAL-FIBER-CABLE PATHWAYS AND FITTINGS

- A. Description: Comply with UL 2024; flexible-type pathway with a circular cross section, approved for plenum riser or general-use installation unless otherwise indicated.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Alpha Wire.
 - 2. Carlon; a brand of Thomas & Betts Corporation.
 - 3. Dura-Line.
- C. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with TIA-569-D.

2.3 HOOKS

- A. Description: Prefabricated sheet metal cable supports for telecommunications cable.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. MonoSystems, Inc.
 - 2. Panduit Corp.
 - 3. Wiremold / Legrand.
- C. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with TIA-569-D.
- E. Galvanized steel.
- F. J shape.

PART 3 - EXECUTION

3.1 PATHWAY APPLICATION

- A. Indoors: Apply pathway products as specified below unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT .
 - 2. Concealed in Ceilings and Interior Walls and Partitions: EMT .
 - 3. Pathways for Concealed General-Purpose Distribution of Optical-Fiber or Communications Cable: General-use, optical-fiber-cable pathway .
- B. Minimum Pathway Size: 3/4-inch trade size for copper and aluminum cables, and 1 inch for optical-fiber cables.
- C. Pathway Fittings: Compatible with pathways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 - 3. EMT: Use set-screw or compression , fittings. Comply with NEMA FB 2.10.
- D. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

3.2 INSTALLATION

- A. Comply with the following standards for installation requirements except where requirements on Drawings or in this Section are stricter:

1. NECA 1.
 2. NECA/BICSI 568.
 3. TIA-569-D.
 4. NECA 101
- B. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.
- C. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- D. Comply with requirements in Section 270529 "Hangers and Supports for Communications Systems" for hangers and supports.
- E. Comply with requirements in Section 270544 "Sleeves and Sleeve Seals for Communications Pathways and Cabling" for sleeves and sleeve seals for communications.
- F. Keep pathways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal pathway runs above water and steam piping.
- G. Keep data cables a minimum of 12" from feeder conduits or branch circuits. Cross electrical feeds at 90degrees.
- H. Complete pathway installation before starting conductor installation.
- I. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- J. Install no more than the equivalent of two 90-degree bends in any pathway run. Support within 12 inches of changes in direction. Utilize long radius ells for all optical-fiber cables.
- K. Conceal rigid conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- L. Support conduit within 12 inches of enclosures to which attached.
- M. Stub-ups to Above Recessed Ceilings:
1. Use EMT, IMC, or RMC for pathways.
 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- N. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install insulated bushings on conduits terminated with locknuts.
- O. Install pathways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus one additional quarter-turn.
- P. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure, to assure a continuous ground path.
- Q. Cut conduit perpendicular to the length. For conduits of 2-inch trade size and larger, use roll cutter or a guide to ensure cut is straight and perpendicular to the length.

- R. Install pull wires in empty pathways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Secure pull wire, so it cannot fall into conduit. Cap pathways designated as spare alongside pathways in use.
- S. Pathways for Optical-Fiber and Communications Cable: Install pathways, metal and nonmetallic, rigid and flexible, as follows:
 - 1. 3/4-Inch Trade Size and Smaller: Install pathways in maximum lengths of 50 feet.
 - 2. 1-Inch Trade Size and Larger: Install pathways in maximum lengths of 75 feet.
 - 3. Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- T. Install pathway-sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed pathways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install pathway-sealing fittings according to NFPA 70.
- U. Install devices to seal pathway interiors at accessible locations. Locate seals, so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:
 - 1. Where an underground service pathway enters a building or structure.
 - 2. Where otherwise required by NFPA 70.
- V. Comply with manufacturer's written instructions for solvent welding PVC conduit and fittings.
- W. Expansion-Joint Fittings:
 - 1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT that is located where environmental temperature change may exceed 100 deg F, and that has straight-run length that exceeds 100 feet.
 - 2. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
- X. Hooks:
 - 1. Size to allow a minimum of 25 percent future capacity without exceeding design capacity limits.
 - 2. Shall be supported by dedicated support wires. Do not use ceiling grid support wire or support rods.
 - 3. Hook spacing shall allow no more than 6 inches of slack. The lowest point of the cables shall be no less than 6 inches adjacent to ceilings, mechanical ductwork and fittings, luminaires, power conduits, power and telecommunications outlets, and other electrical and communications equipment.
 - 4. Space hooks no more than 5 feet o.c.
 - 5. Provide a hook at each change in direction.

- Y. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
 - Z. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surface to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
 - AA. Horizontally separate boxes mounted on opposite sides of walls, so they are not in the same vertical channel.
 - BB. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
 - CC. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
 - DD. Set metal floor boxes level and flush with finished floor surface.
 - EE. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.
- 3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR COMMUNICATIONS PENETRATIONS
- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 270544 "Sleeves and Sleeve Seals for Communications Pathways and Cabling."
- 3.4 FIRESTOPPING
- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."
- 3.5 PROTECTION
- A. Protect coatings, finishes, and cabinets from damage or deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 270528

SECTION 270529 - HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Conduit and cable support devices.
 - 2. Support for conductors in vertical conduit.
 - 3. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
 - 4. Fabricated metal equipment support assemblies.

- B. Related Requirements:

- 1. Section 270548 "Seismic Controls for Communications Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.
 - g. Anchors.
 - h. Saddles.
 - i. Brackets.
 - 2. Include rated capacities and furnished specialties and accessories.

- B. Shop Drawings: For fabrication and installation details for communications hangers and support systems.

- 1. Trapeze hangers. Include product data for components.

2. Steel slotted-channel systems.
3. Aluminum slotted-channel systems.
4. Nonmetallic slotted-channel systems.
5. Equipment supports.
6. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

1.4 INFORMATIONAL SUBMITTALS

1.5 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame Rating: Class 1.
 2. Self-extinguishing according to ASTM D635.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with minimum 13/32-inch- diameter holes at a maximum of 8 inches o.c., in at least one surface.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit; a part of Atkore International.
 - b. B-line, an Eaton business.
 - c. Fabco Plastics Wholesale Limited.
 - d. G-Strut.
 - e. Haydon Corporation.
 - f. Seasafe, Inc.; AMICO, a Gibraltar Industries Company.
 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 3. Channel Width: Selected for applicable load criteria 1-5/8 inches .
 4. Fittings and Accessories: Products provided by channel and angle manufacturer and designed for use with those items.
 5. Fitting and Accessory Materials: Same as those for channels and angles , except metal items may be stainless steel.
 6. Rated Strength: Selected to suit applicable load criteria.
 7. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- B. Conduit and Cable Support Devices: Steel clamps, hangers, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored communications conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.
- D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti, Inc.
 - 2) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) B-line, an Eaton business.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti, Inc.
 - 4) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
 - 5. Hanger Rods: Threaded steel.

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 - 1. NECA 1.
 - 2. NECA/BICSI 568.
 - 3. TIA-569-D.
 - 4. NECA 101.
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for pathways specified in Section 270528 "Pathways for Communications Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMTs, IMCs, and RMCs as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps single-bolt conduit clamps, using spring friction action for retention in support channel.
- F. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Raceway Support Methods: In addition to methods described in NECA 1, EMT IMC and RMC may be supported by openings through structure members, according to NFPA 70.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb .
- C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten communications items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To New Concrete: Bolt to concrete inserts.
 - 2. To Masonry: Use approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 3. To Existing Concrete: Use expansion anchor fasteners.

4. Instead of expansion anchors, powder-actuated-driven threaded studs, provided with lock washers and nuts, may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 5. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69 Spring-tension clamps.
 6. To Light Steel: Sheet metal screws.
 7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor communications materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

- A. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION 270529

SECTION 270553 - IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Color and legend requirements for labels and signs.
 - 2. Labels.
 - 3. Bands and tubes.
 - 4. Tapes.
 - 5. Cable ties.

1.3 ACTION SUBMITTALS

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with NFPA 70 and TIA 606-B.
- B. Comply with ANSI Z535.4 for safety signs and labels.
- C. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F , ambient; 180 deg F , material surfaces .

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Equipment Identification Labels:
 - 1. Black letters on a white field.
 - 2. Label MDF and IDF equipment racks and all associated patch panels, .

2.3 LABELS

- A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Marking Services, Inc.
 - c. Panduit Corp.
- B. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameters of raceway or cable they identify, that stay in place by gripping action.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Marking Services, Inc.
 - c. Panduit Corp.
- C. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil- thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Ideal Industries, Inc.
 - c. LEM Products Inc.
 - d. Marking Services, Inc.
 - e. Panduit Corp.
 - 2. Minimum Nominal Size:
 - a. 1-1/2 by 6 inches for raceway and conductors.
 - b. 3-1/2 by 5 inches for equipment.
 - c. As required by authorities having jurisdiction.

2.4 BANDS AND TUBES

- A. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches long, with diameters sized to suit diameters of raceway or cable they identify, that stay in place by gripping action.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Marking Services, Inc.
 - c. Panduit Corp.

2.5 UNDERGROUND-LINE WARNING TAPE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Brady Corporation.
 2. Ideal Industries, Inc.
 3. LEM Products Inc.
 4. Marking Services, Inc.
- B. Tape:
1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground communications utility lines.
 2. Printing on tape shall be permanent and shall not be damaged by burial operations.
 3. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
- C. Color and Printing:
1. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, and ANSI Z535.4.
 2. Inscriptions for Orange-Colored Tapes: "TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL-FIBER CABLE" .
- D. Tag: Type ID :
1. Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core; bright colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
 2. Width: 3 inches.
 3. Overall Thickness: 5 mils.
 4. Foil Core Thickness: 0.35 mil.
 5. Weight: 28 lb/1000 sq. ft..
 6. Tensile according to ASTM D 882: 70 lbf and 4600 psi.

2.6 CABLE TIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ideal Industries, Inc.
 2. Marking Services, Inc.
 3. Panduit Corp.
- B. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
1. Minimum Width: 3/16 inch.
 2. Tensile Strength at 73 deg F according to ASTM D 638: 12,000 psi.
 3. Temperature Range: Minus 40 to plus 185 deg F.
 4. Color: Black, except where used for color-coding.

C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F according to ASTM D 638: 7000 psi.
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F.
5. Color: Black.

2.7 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).

PART 3 - EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying communications identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of communications systems and connected items.
- G. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- H. Vinyl Wraparound Labels:
1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.

2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
3. Provide label 6 inches from cable end.

I. Snap-Around Labels:

1. Secure tight to surface at a location with high visibility and accessibility.
2. Provide label 6 inches from cable end.

J. Self-Adhesive Labels:

1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.

K. Snap-Around, Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.

L. Underground-Line Warning Tape:

1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.
2. Install underground-line warning tape for direct-buried cables and cables in raceways.

M. Cable Ties: General purpose, except as listed below:

1. In Spaces Handling Environmental Air: Plenum rated.

3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations with high visibility. Identify by system and circuit designation.
- C. Faceplates: Label individual faceplates with self-adhesive labels. Place label at top of faceplate. Each faceplate shall be labeled with its individual, sequential designation, composed of the following, in the order listed:
 1. Wiring closet designation.
 2. Colon.
 3. Faceplate number.
- D. Equipment Room Labeling:

1. Racks, Frames, and Enclosures: Identify front and rear of each with self-adhesive labels containing equipment designation.
 2. Patch Panels: Label individual rows in each rack, starting at top and working down, with self-adhesive labels.
 3. Data Outlets: Label each outlet with a self-adhesive label indicating the following, in the order listed:
 - a. Room number being served.
 - b. Colon.
 - c. Faceplate number.
- E. Backbone Cables: Label each cable with a vinyl-wraparound label indicating the location of the far or other end of the backbone cable. Patch panel or punch down block where cable is terminated should be labeled identically.
- F. Horizontal Cables: Label each cable with a vinyl-wraparound label indicating the following, in the order listed:
1. Room number.
 2. Colon.
 3. Faceplate number.
- G. Equipment Identification Labels:
1. Indoor Equipment: Self-adhesive label .
 2. Equipment to Be Labeled:
 - a. Communications cabinets.

END OF SECTION 270553

SECTION 271116 - COMMUNICATIONS RACKS, FRAMES, AND ENCLOSURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. 19-inch equipment racks.
 - 2. 19-inch freestanding and wall-mounted equipment cabinets.
 - 3. Power strips.
 - 4. Grounding.
 - 5. Labeling.

- B. Related Requirements:

- 1. Section 271110 "Communications Equipment Room Fittings" for backboards and accessories.
 - 2. Section 270526 "Grounding and Bonding for Telecommunications Equipment" for TMGBs and TGBs.
 - 3. Section 270536 "Cable Trays for Communications Systems" for cable trays and cable tray accessories.
 - 4. Section 271313 "Communications Copper Backbone Cabling" for copper data cabling associated with system panels and devices.
 - 5. Section 271323 "Communications Optical Fiber Backbone Cabling" for optical-fiber data cabling associated with system panels and devices.
 - 6. Section 271333 "Communications Coaxial Backbone Cabling" for coaxial data cabling associated with system panels and devices.
 - 7. Section 271513 "Communications Copper Horizontal Cabling" for copper data cabling associated with system panels and devices.
 - 8. Section 271523 "Communications Optical Fiber Horizontal Cabling" for optical-fiber data cabling associated with system panels and devices.
 - 9. Section 271533 "Communications Coaxial Horizontal Cabling" for coaxial data cabling associated with system panels and devices.
 - 10. Section 271611 "Communications Hybrid Cabling" for combined copper and optical fiber data cables associated with system panels and devices.

1.3 DEFINITIONS

- A. Access Provider: An operator that provides a circuit path or facility between the service provider and user. An access provider can also be a service provider.
- B. BICSI: Building Industry Consulting Service International.

- C. LAN: Local area network.
- D. RCDD: Registered communications distribution designer.
- E. Service Provider: The operator of a telecommunications transmission service delivered through access provider facilities.
- F. TGB: Telecommunications grounding bus bar.
- G. TMGB: Telecommunications main grounding bus bar.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for equipment racks and cabinets.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, certifications, standards compliance, and furnished specialties and accessories.
- B. Shop Drawings: For communications racks, frames, and enclosures. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Equipment Racks and Cabinets: Include workspace requirements and access for cable connections.
 - 3. Grounding: Indicate location of TGB and its mounting detail showing standoff insulators and wall-mounting brackets.

1.5 INFORMATIONAL SUBMITTALS

1.6 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. UL listed.
- B. RoHS compliant.

2.2 BACKBOARDS

- A. Backboards: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches. Comply with requirements for plywood backing panels specified in Section 061000 "Rough Carpentry."

2.3 19-INCH EQUIPMENT RACKS

- A. Description: post racks with threaded rails designed for mounting telecommunications equipment. Width is compatible with EIA/ECIA 310-E, 19-inch equipment mounting with an opening of 17.72-inches between rails.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. B-line, an Eaton business.
 2. Belden Inc.
 3. CommScope, Inc.
 4. Hubbell Premise Wiring.
 5. Legrand NA (Middle Atlantic Products Division).
 6. Leviton Manufacturing Co., Inc.
 7. Ortronics, Inc.
 8. Panduit Corp.
- C. General Requirements:
1. Frames: Modular units designed for telecommunications terminal support and coordinated with dimensions of units to be supported.
 2. Material: Extruded steel Extruded aluminum .
 3. Finish: Manufacturer's standard, baked-polyester powder coat.
 4. Color: Black .
- D. Floor-Mounted Racks:
1. Overall Height: 72 inches .
 2. Overall Depth: 29 inches .
 3. Upright Depth: 6 inches .
 4. Two-Post Load Rating: 400 lb .
 5. Number of Rack Units per Rack: 38 .
 - a. Numbering: Every rack units, on interior of rack.
 6. Vertical and horizontal cable management channels, top and bottom cable troughs, grounding lug , and a power strip.
 7. Base shall have a minimum of four mounting holes for permanent attachment to floor.
 8. Top shall have provisions for attaching to cable tray or ceiling.
 9. Self-leveling.
- E. Wall-Mounted Racks:
1. Height: As indicated on Drawings .
 2. Depth: 29 inches .
 3. Load Rating: 150 lb .
 4. Number of Rack Units per Rack: 12 .
 5. Wall Attachment: Four mounting holes.
 6. Equipment Access: Integral swing.
- F. Cable Management:

1. Metal, with integral wire retaining fingers.
2. Baked-polyester powder coat finish.
3. Vertical cable management panels shall have front and rear channels, with covers.
4. Provide horizontal crossover cable manager at the top of each relay rack, with a minimum height of two rack units each.

2.4 POWER STRIPS

A. Power Strips: Comply with UL 1363.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Rack mounting.
3. Six 20-A, 120-V ac, NEMA WD 6, Configuration 5-20R receptacles.
4. LED indicator lights for power and protection status.
5. LED indicator lights for reverse polarity and open outlet ground.
6. Close-coupled, direct plug-in line cord.
7. Rocker-type on-off switch, illuminated when in on position.
8. Peak Single-Impulse Surge Current Rating: 33 kA per phase.
9. Protection modes shall be line to neutral, line to ground, and neutral to ground. UL 1449 clamping voltage for all three modes shall be not more than 330 V .

2.5 GROUNDING

A. Comply with requirements in Section 270526 "Grounding and Bonding for Communications Systems" for grounding conductors and connectors.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Chatsworth Products, Inc.
2. Harger Lightning & Grounding.
3. Panduit Corp.

2.6 LABELING

A. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.
- B. Comply with BICSI TDMM for layout of communications equipment spaces.
- C. Comply with BICSI ITSIMM for installation of communications equipment spaces.

- D. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
- E. Coordinate layout and installation of communications equipment in racks and room. Coordinate service entrance configuration with service provider.
 - 1. Meet jointly with system providers, equipment suppliers, and Owner to exchange information and agree on details of equipment configurations and installation interfaces.
 - 2. Record agreements reached in meetings and distribute them to other participants.
 - 3. Adjust configurations and locations of distribution frames, cross-connects, and patch panels in equipment spaces to accommodate and optimize configuration and space requirements of telecommunications equipment.
 - 4. Adjust configurations and locations of equipment with distribution frames, cross-connects, and patch panels of cabling systems of other communications, electronic safety and security, and related systems that share space in equipment room.

3.2 GROUNDING

- A. Comply with NECA/BICSI 607.
- B. Install grounding according to BICSI ITSIMM, "Bonding, Grounding (Earthing) and Electrical Protection" Ch.
- C. Locate TGB to minimize length of bonding conductors. Fasten to wall, allowing at least 2 inches of clearance behind TGB. Connect TGB with a minimum No. 4 AWG grounding electrode conductor from TGB to suitable electrical building ground. Connect rack TGB to near TGB or the TMGB.
 - 1. Bond the shield of shielded cable to patch panel, and bond patch panel to TGB or TMGB.

3.3 IDENTIFICATION

- A. Coordinate system components, wiring, and cabling complying with TIA-606-B. Comply with requirements in Section 270553 "Identification for Electrical Systems."
- B. Comply with requirements in Section 099123 "Interior Painting" for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.
- C. Paint and label colors for equipment identification shall comply with TIA-606-B for Class 2 Class 3 level of administration.
- D. Labels shall be machine printed. Type shall be 3/16 inch in height.

END OF SECTION 271116

SECTION 271313 - COMMUNICATIONS COPPER BACKBONE CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Category 6 twisted pair cable.
 - 2. Twisted pair cable hardware, including plugs, jacks, patch panels, and cross-connects.
 - 3. Cabling identification.
 - 4. Source quality control requirements for twisted pair cable.
- B. Related Requirements:
 - 1. Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for data cabling associated with system panels and devices.

1.3 DEFINITIONS

- A. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.
- B. EMI: Electromagnetic interference.
- C. F/FTP: Overall foil screened cable with foil screened twisted pair.
- D. FTP: Shielded twisted pair.
- E. F/UTP: Overall foil screened cable with unscreened twisted pair.
- F. IDC: Insulation displacement connector.
- G. Jack: Also commonly called an "outlet," it is the fixed, female connector.
- H. LAN: Local area network.
- I. Plug: Also commonly called a "connector," it is the removable, male telecommunications connector.
- J. RCDD: Registered Communications Distribution Designer.
- K. Screen: A metallic layer, either a foil or braid, placed around a pair or group of conductors.

- L. S/FTP: Overall braid screened cable with foil screened twisted pair.
- M. Shield: A metallic layer, either a foil or braid, placed around a pair or group of conductors.
- N. S/UTP: Overall braid screened cable with unscreened twisted pairs.
- O. UTP: Unscreened (unshielded) twisted pair.

1.4 COPPER BACKBONE CABLING DESCRIPTION

- A. Copper backbone cabling system shall provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.
- B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters shall not be used as part of backbone cabling.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Reviewed and stamped by RCDD.
 - 1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
 - 2. System Labeling Schedules: Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.
 - 3. Cabling administration Drawings and printouts.
 - 4. Wiring diagrams to show typical wiring schematics, including the following:
 - a. Telecommunications rooms plans and elevations.
 - b. Telecommunications pathways.
 - c. Telecommunications system access points.
 - d. Telecommunications grounding system
 - e. Cross-connects.
 - f. Patch panels.
 - g. Patch cords.
 - 5. Cross-Connects and Patch Panels: Detail mounting assemblies, and show elevations and physical relationship between the installed components.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 - 1. Layout Responsibility: Preparation of Shop Drawings and cabling administration Drawings by an RCDD .
 - 2. Installation Supervision: Installation shall be under the direct supervision of Technician , who shall be present at all times when Work of this Section is performed at Project site.

3. Testing Supervisor: Currently certified by BICSI as a Technician to supervise on-site testing.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.
 1. Test each pair of twisted pair cable for open and short circuits.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.9 COORDINATION

- A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers along with all trades involved in construction.

1.10 SOFTWARE SERVICE AGREEMENT

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Backbone cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.
- B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame-Spread Index: 25 or less.
 2. Smoke-Developed Index: 50 or less.
- C. Telecommunications Pathways and Spaces: Comply with TIA-569-D.
- D. Grounding: Comply with TIA-607-B.

2.2 GENERAL CABLE CHARACTERISTICS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:

1. Communications, Plenum Rated: Type CMP complying with UL 1685 or Type CMP in listed plenum communications raceway or Type CMP in listed cable routing assembly.
2. Communications, Plenum Rated: Type CM, Type CMG, Type CMP, Type CMR, or Type CMX in metallic conduit installed according to NFPA 70, Article 300.22, "Wiring in Ducts, Plenums, and Other Air-Handling Spaces."

2.3 CATEGORY 6 TWISTED PAIR CABLE

- A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 6 cable at frequencies up to 250MHz.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. 3M.
 2. AMP NETCONNECT; a TE Connectivity Ltd. company.
 3. Belden CDT Networking Division/NORDX.
 4. Berk-Tek Leviton; a Nexans/Leviton alliance.
 5. CommScope, Inc.
 6. General Cable; General Cable Corporation.
 7. Mohawk; a division of Belden Networking, Inc.
 8. SYSTIMAX Solutions; a CommScope Inc. brand.
- C. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.
- D. Conductors: 100-ohm, 23 AWG solid copper.
- E. Shielding/Screening: Shielded balanced twisted pairs (FTP) .
- F. Cable Rating: Riser .
- G. Jacket: Blue thermoplastic.

2.4 TWISTED PAIR CABLE HARDWARE

- A. Description: Hardware designed to connect, splice, and terminate twisted pair copper communications cable.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. 3M.
 2. Belden CDT Networking Division/NORDX.
 3. Berk-Tek Leviton; a Nexans/Leviton alliance.
 4. CommScope, Inc.
 5. General Cable; General Cable Corporation.
 6. Mohawk; a division of Belden Networking, Inc.
- C. General Requirements for Cable Connecting Hardware:
 1. Twisted pair cable hardware shall meet the performance requirements of Category 6 .
 2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.

3. Cables shall be terminated with connecting hardware of same category or higher.
 4. Source Limitations: Obtain twisted pair cable hardware from same manufacturer as twisted pair cable, from single source.
- D. Connecting Blocks: 110-style IDC for Category 6 . Provide blocks for the number of cables terminated on the block, plus 25 percent spare, integral with connector bodies, including plugs and jacks where indicated.
- E. Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.
1. Features:
 - a. Universal T568A and T568B wiring labels.
 - b. Labeling areas adjacent to conductors.
 - c. Replaceable connectors.
 - d. 24 or 48 ports.
 2. Construction: 16-gauge steel and mountable on 19-inch equipment racks.
 3. Number of Jacks per Field: One for each four-pair twisted pair cable indicated .
- F. Plugs and Plug Assemblies:
1. Male; eight position (8P8C); color-coded modular telecommunications connector designed for termination of a single four-pair 100-ohm unshielded or shielded twisted pair cable.
 2. Standard: Comply with TIA-568-C.2.
 3. Marked to indicate transmission performance.
- G. Jacks and Jack Assemblies:
1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair 100-ohm unshielded or shielded twisted pair cable.
 2. Designed to snap-in to a patch panel or faceplate.
 3. Standard: Comply with TIA-568-C.2.
 4. Marked to indicate transmission performance.
- H. Patch Cords: Factory-made, four-pair cables in 36-inch lengths; terminated with an eight-position modular plug at each end.
1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.
 2. Patch cords shall have color-coded boots for circuit identification.
- I. Faceplates:
1. Two Four Six port, vertical single gang faceplates designed to mount to single gang wall boxes.
 2. Plastic Faceplate: High-impact plastic. Coordinate color with Section 262726 "Wiring Devices."
 3. For use with snap-in jacks accommodating any combination of twisted pair, optical-fiber, and coaxial work-area cords.
 - a. Flush-mount jacks, positioning the cord at a 45-degree angle.

2.5 CABLING IDENTIFICATION

- A. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

2.6 SOURCE QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate cables.
- B. Factory test cables on reels according to TIA-568-C.1.
- C. Factory test cables according to TIA-568-C.2.
- D. Cable will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 ENTRANCE FACILITIES

- A. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.

3.2 WIRING METHODS

- A. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools. Install cables parallel with or at right angles to sides and back of enclosure.

3.3 INSTALLATION OF PATHWAYS

- A. Comply with requirements for demarcation point, cabinets, and racks specified in Section 271100 "Communications Equipment Room Fittings."
- B. Comply with Section 270528 "Pathways for Communications Systems."
- C. Comply with Section 270529 "Hangers and Supports for Communications Systems."
- D. Comply with Section 270536 "Cable Trays for Communications Systems."
- E. Drawings indicate general arrangement of pathways and fittings.

3.4 INSTALLATION OF COPPER BACKBONE CABLES

- A. Comply with NECA 1 and NECA/BICSI 568.

B. General Requirements for Cabling:

1. Comply with TIA-568-C.0, TIA-568-C.1, and TIA-568-C.2.
2. Comply with BICSI's "Information Transport Systems Installation Methods Manual (ITSIMM)," Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section.
3. Install 110-style IDC termination hardware unless otherwise indicated.
4. Do not untwist twisted pair cables more than 1/2 inch from the point of termination to maintain cable geometry.
5. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
6. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
7. Install lacing bars to restrain cables, prevent straining connections, and prevent bending cables to smaller radii than minimums recommended by manufacturer.
8. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section Use lacing bars and distribution spools.
9. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation, and replace it with new cable.
10. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
11. In the communications equipment room, install a 10-foot- long service loop on each end of cable.
12. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems," "Pulling and Installing Cable" Section. Monitor cable pull tensions.

C. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend twisted pair cabling, not in a wireway or pathway, a minimum of 8 inches above ceilings by cable supports not more than 60 inches apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

D. Installation of Cable Routed Exposed under Raised Floors:

1. Install plenum-rated cable only.
2. Install cabling after the flooring system has been installed in raised floor areas.
3. Coil cable 6 feet long not less than 12 inches in diameter below each feed point.

E. Group connecting hardware for cables into separate logical fields.

F. Separation from EMI Sources:

1. Comply with recommendations from BICSI's "Telecommunications Distribution Methods Manual" and TIA-569-D for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment.

2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.
3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.
4. Separation between communications cables in grounded metallic raceways, power lines, and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.
5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.5 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569-D, Annex A, "Firestopping."
- C. Comply with "Firestopping Systems" Article in BISC's "Telecommunications Distribution Methods Manual."

3.6 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with TIA-606-B. Comply with requirements for identification specified in Section 270553 "Identification for Communications Systems."
 1. Administration Class: 1 2 3 4.
 2. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.
- B. Paint and label colors for equipment identification shall comply with TIA-606-B for Class 2 Class 3 Class 4 level of administration , including optional identification requirements of this standard.
- C. Comply with requirements in Section 271513 "Communications Copper Horizontal Cabling" for cable and asset management software.
- D. Cable Schedule: Install in a prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.

- E. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, entrance pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.
- F. Cable and Wire Identification:
 - 1. Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
 - 2. Each wire connected to building-mounted devices is not required to be numbered at the device if wire color is consistent with associated wire connected and numbered within panel or cabinet.
 - 3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet.
 - 4. Label each terminal strip, and screw terminal in each cabinet, rack, or panel.
 - a. Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group, extended from a panel or cabinet to a building-mounted device, with the name and number of a particular device.
 - b. Label each unit and field within distribution racks and frames.
 - 5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and -connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
- G. Labels shall be preprinted or computer-printed type, with a printing area and font color that contrast with cable jacket color but still comply with TIA-606-B requirements for the following:
 - 1. Cables use flexible vinyl or polyester that flexes as cables are bent.

END OF SECTION 271313

SECTION 271323 - COMMUNICATIONS OPTICAL FIBER BACKBONE CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. 850 nanometer laser-optimized 50/125 micrometer multimode optical fiber cable (OM3).

1.3 DEFINITIONS

- A. BICSI: Building Industry Consulting Service International.
- B. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.
- C. RCDD: Registered Communications Distribution Designer.

1.4 OPTICAL FIBER BACKBONE CABLING DESCRIPTION

- A. Optical fiber backbone cabling system shall provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.
- B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters shall not be used as part of backbone cabling.

1.5 ACTION SUBMITTALS

- A. Shop Drawings: Reviewed and stamped by RCDD.
 - 1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
 - 2. System Labeling Schedules: Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.
 - 3. Cabling administration drawings and printouts.
 - 4. Wiring diagrams to show typical wiring schematics including the following:

- a. Telecommunications rooms plans and elevations.
 - b. Telecommunications pathways.
 - c. Telecommunications system access points.
 - d. Telecommunications grounding system.
 - e. Cross-connects.
 - f. Patch panels.
 - g. Patch cords.
5. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For installation supervisor, and field inspector.

1.7 CLOSEOUT SUBMITTALS

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 1. Layout Responsibility: Preparation of Shop Drawings and Cabling Administration Drawings by an RCDD.
 2. Installation Supervision: Installation shall be under the direct supervision of Level 2 Installer, who shall be present at all times when Work of this Section is performed at Project site.
 3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.
 1. Test optical fiber cable to determine the continuity of the strand end to end. Use optical fiber flashlight .
 2. Test optical fiber cable while on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector, including the loss value of each. Retain test data and include the record in maintenance data.

1.10 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.11 COORDINATION

- A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Backbone cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.
- B. Telecommunications Pathways and Spaces: Comply with TIA-569-D.
- C. Grounding: Comply with TIA-607-B.

2.2 850 NANOMETER LASER-OPTIMIZED, 50/125 MICROMETER, MULTIMODE OPTICAL FIBER CABLE (OM3)

- A. Description: Multimode, 50/125-micrometer, 12 -fiber, nonconductive, tight buffer, optical fiber cable.
- B. Manufacturers: Subject to compliance with requirements, undefined:
 - 1. AMP NETCONNECT; a TE Connectivity Ltd. company.
 - 2. Belden CDT Networking Division/NORDX.
 - 3. CommScope, Inc.
 - 4. Corning Cable Systems.
 - 5. General Cable.
 - 6. Hitachi Cable America Inc.
- C. Standards:
 - 1. Comply with TIA-568-C.3 for performance specifications.
 - 2. Comply with TIA-492AAAC for detailed specifications.
- D. Maximum Attenuation: 3.50 dB/km at 850 nm; dB/km at 1300 nm.
- E. Minimum Overfilled Modal Bandwidth-length Product: 1500 MHz-km at 850 nm; 500 MHz-km at 1300 nm.
- F. Minimum Effective Modal Bandwidth-length Product: 2000 MHz-km at 850 nm.
- G. Jacket:
 - 1. Jacket Color: Orange .
 - 2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA-598-D.

3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches.
- H. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
 1. Riser Rated, Nonconductive: , complying with UL 1666.
 2. Riser Rated, Nonconductive: Type OFNP or Type OFNR in listed riser or plenum communications raceway.

PART 3 - EXECUTION

3.1 ENTRANCE FACILITIES

- A. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.

3.2 WIRING METHODS

- A. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- B. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.3 INSTALLATION OF OPTICAL FIBER BACKBONE CABLES

- A. Comply with NECA 1, NECA 301, and NECA/BICSI 568.
- B. General Requirements for Optical Fiber Cabling Installation:
 1. Comply with TIA-568-C.1 and TIA-568-C.3.
 2. Comply with BICSI ITSIMM, Ch. 6, "Cable Termination Practices."
 3. Terminate all cables; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
 4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 5. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
 6. Bundle, lace, and train cable to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
 7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.

8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
9. In the communications equipment room, provide a 10-foot- long service loop on each end of cable.
10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
11. Cable may be terminated on connecting hardware that is rack or cabinet mounted.

C. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

D. Installation of Cable Routed Exposed under Raised Floors:

1. Install plenum-rated cable only.
2. Install cabling after the flooring system has been installed in raised floor areas.
3. Coil cable 6 feet long not less than in diameter below each feed point.

E. Group connecting hardware for cables into separate logical fields.

3.4 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569-D, Annex A, "Firestopping."
- C. Comply with BICSI ITSIMM, "Firestopping" Chapter.

END OF SECTION 271323

SECTION 284621.11 - ADDRESSABLE FIRE-ALARM SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Existing fire-alarm system to be modified.
2. Addressable fire-alarm system.
3. Fire-alarm control unit (FACU).
4. Manual fire-alarm boxes.
5. System smoke detectors.
6. Duct smoke detectors.
7. Projected beam smoke detectors.
8. Carbon monoxide detectors.
9. Heat detectors.
10. Continuous linear heat detector system.
11. Multicriteria and multisensor fire detectors.
12. Nonsystem smoke detectors.
13. Air-sampling smoke detectors.
14. Fire-alarm notification appliances.
15. Exit-marking audible notification appliances.
16. Firefighters' two-way telephone communication service.
17. Emergency responder radio coverage system.
18. Firefighters' smoke-control system.
19. Fire-alarm graphic annunciators.
20. Fire-alarm remote annunciators.
21. Fire-alarm addressable interface devices.
22. Digital alarm communicator transmitters (DACTs).
23. Fire-alarm radio transmitters.
24. Video smoke detection.

- B. Related Requirements:

1. Section 087100 "Door Hardware" for magnetic door holders that release in response to fire-alarm outputs.
2. Section 260519 "Low-Voltage Electrical Power Conductors and Cables" or Section 260523 "Control Voltage Electrical Power Cables" for cables and conductors for fire-alarm systems.
3. Section 284700 "Mass Notification" for mass notification features that are required in addition to fire-alarm system and equipment requirements specified in this Section.

1.3 DEFINITIONS

- A. DACT: Digital alarm communicator transmitter.
- B. EMT: Electrical metallic tubing.
- C. FACU: Fire-alarm control unit.
- D. High-Performance Building: A building that integrates and optimizes on a life-cycle basis all major high-performance attributes, including energy conservation, environment, safety, security, durability, accessibility, cost-benefit, productivity, sustainability, functionality, and operational considerations.
- E. Mode: The terms "Active Mode," "Off Mode," and "Standby Mode" are used as defined in the 2007 Energy Independence and Security Act (EISA).
- F. NICET: National Institute for Certification in Engineering Technologies.
- G. PC: Personal computer.
- H. Voltage Class: For specified circuits and equipment, voltage classes are defined as follows:
 - 1. Control Voltage: Listed and labeled for use in remote-control, signaling, and power-limited circuits supplied by a Class 2 or Class 3 power supply having rated output not greater than 150 V and 5 A, allowing use of alternate wiring methods complying with NFPA 70, Article 725.
 - 2. Low Voltage: Listed and labeled for use in circuits supplied by a Class 1 or other power supply having rated output not greater than 1000 V, requiring use of wiring methods complying with NFPA 70, Article 300, Part I.

1.4 SEQUENCING AND SCHEDULING

- A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. When new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service, and label existing fire-alarm equipment "NOT IN SERVICE" until removed from building.
- B. Equipment Removal: After acceptance of new fire-alarm system, remove existing disconnected fire-alarm equipment and wiring.

1.5 ACTION SUBMITTALS

- A. Approved Permit Submittal: Submittals must be approved by authorities having jurisdiction prior to submitting them to Architect.
- B. Product Data: For each type of product, including furnished options and accessories.
 - 1. Include construction details, material descriptions, dimensions, profiles, and finishes.
 - 2. Include rated capacities, operating characteristics, and electrical characteristics.

C. Shop Drawings: For fire-alarm system.

1. Comply with recommendations and requirements in "Documentation" section of "Fundamentals" chapter in NFPA 72.
2. Include plans, elevations, sections, and details, including details of attachments to other Work.
3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
4. panel details as required by authorities having jurisdiction and as indicated on plans. LED display.
5. Detail assembly and support requirements.
6. Include voltage drop calculations for notification-appliance circuits.
7. Include battery-size calculations.
8. Include input/output matrix.
9. Include written statement from manufacturer that equipment and components have been tested as a system and comply with requirements in this Section and in NFPA 72.
10. Include performance parameters and installation details for each detector.
11. Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
12. Provide program report showing that air-sampling detector pipe layout balances pneumatically within airflow range of air-sampling detector.
13. Provide control wiring diagrams for fire-alarm interface to HVAC; coordinate location of duct smoke detectors and access to them.
 - a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
 - b. Show field wiring and equipment required for HVAC unit shutdown on alarm.
 - c. Locate detectors in accordance with manufacturer's written instructions.
 - d. Show air-sampling detector pipe routing.
14. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
15. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.

1.6 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: Submittal must include line item pricing for replacement parts and labor.

1.7 CLOSEOUT SUBMITTALS

1.8 QUALITY ASSURANCE

1.9 FIELD CONDITIONS

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail because of defects in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EXISTING FIRE-ALARM SYSTEM ~~title='MMiller' style='color:#FF0000' user='6372'>TO~~

- A. Existing system to be removed in its entirety.

2.2 ADDRESSABLE FIRE-ALARM SYSTEM

- A. Description:

1. Noncoded, UL-certified addressable system, with multiplexed signal transmission and -and-strobe notification for evacuation.

- B. Performance Criteria:

1. Regulatory Requirements:

- a. Fire-Alarm Components, Devices, and Accessories: Listed and labeled by a NRTL in accordance with NFPA 70 for use with selected fire-alarm system and marked for intended location and application.

2. General Characteristics:

- a. Automatic sensitivity control of certain smoke detectors.
- b. Fire-alarm signal initiation must be by one or more of the following devices:
- 1) Manual stations.
 - 2) Heat detectors.
 - 3) Smoke detectors.
 - 4) Duct smoke detectors.
 - 5) Carbon monoxide detectors.
 - 6) Automatic sprinkler system water flow.
 - 7) Fire pump running.
 - 8) .

- c. Fire-alarm signal must initiate the following actions:
 - 1) Continuously operate alarm notification appliances.
 - 2) Identify alarm and specific initiating device at FACU and remote annunciators.
 - 3) Transmit alarm signal to remote alarm receiving station.
 - 4) Unlock electric door locks in designated egress paths.
 - 5) Release fire and smoke doors held open by magnetic door holders.
 - 6) Switch HVAC equipment controls to fire-alarm mode.
 - 7) Record events in system memory.
 - 8) Indicate device in alarm on graphic annunciator.
 - 9) .
- d. Supervisory signal initiation must be by one or more of the following devices and actions:
 - 1) Zones or individual devices have been disabled.
 - 2) .
- e. System trouble signal initiation must be by one or more of the following devices and actions:
 - 1) Open circuits, shorts, and grounds in designated circuits.
 - 2) Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
 - 3) Loss of primary power at FACU.
 - 4) Ground or single break in internal circuits of FACU.
 - 5) Abnormal ac voltage at FACU.
 - 6) Break in standby battery circuitry.
 - 7) Failure of battery charging.
 - 8) Abnormal position of switch at FACU or annunciator.
 - 9) .
- f. System Supervisory Signal Actions:
 - 1) Initiate notification appliances.
 - 2) Identify specific device initiating event at FACU and remote annunciators.
 - 3) After time delay of 200 seconds , transmit trouble or supervisory signal to remote alarm receiving station.
 - 4) Display system status on graphic annunciator.
- g. Document Storage Box:
 - 1) Description: Enclosure to accommodate standard 8-1/2-by-11 inch manuals and loose document records. Legend sheet will be permanently attached to door for system required documentation, key contacts, and system information. Provide two key ring holders with location to mount standard business cards for key contact personnel.
 - 2) Material and Finish: 18-gauge cold-rolled steel; four mounting holes.
 - 3) Color: Red powder-coat epoxy finish.
 - 4) Labeling: Permanently screened with 1 inch high lettering "SYSTEM RECORD DOCUMENTS" with white indelible ink.
 - 5) Security: Locked with 3/4 inch barrel lock. Provide solid 12 inch stainless steel piano hinge.

2.3 FIRE-ALARM CONTROL UNIT (FACU)

- A. <Click here to find, evaluate, and insert list of manufacturers and products.>

- B. Description: Field-programmable, microprocessor-based, modular, power-limited design with electronic modules.
- C. Performance Criteria:
1. Regulatory Requirements: Comply with NFPA 72 and UL 864.
 2. General Characteristics:
 - a. System software and programs must be held in nonvolatile flash, electrically erasable, programmable, read-only memory, retaining information through failure of primary and secondary power supplies.
 - b. Include real-time clock for time annotation of events on event recorder and printer.
 - c. Provide communication between FACU and remote circuit interface panels, annunciators, and displays.
 - d. FACU must be listed for connection to central-station signaling system service.
 - e. Provide nonvolatile memory for system database, logic, and operating system and event history. System must require no manual input to initialize in the event of complete power down condition. FACU must provide minimum 500-event history log.
 - f. Addressable Initiation Device Circuits: FACU must indicate which communication zones have been silenced and must provide selective silencing of alarm notification appliance by building communication zone.
 - 1) Addressable Control Circuits for Operation of Notification Appliances and Mechanical Equipment: FACU must be listed for releasing service.
 - g. Fire-Alarm Annunciator: Arranged for interface between human operator at FACU and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and programming and control menu.
 - 1) Annunciator and Display: LCD, 80 characters, minimum.
 - 2) Keypad: Arranged to permit entry and execution of programming, display, and control commands.
 - h. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:
 - 1) Pathway Class Designations: NFPA 72, Class B .
 - 2) Install no more than 25 addressable devices on each signaling-line circuit.
 - 3) Install fault circuit isolators to comply with circuit performance requirements of NFPA 72 or with manufacturer's written instructions, whichever is more conservative.
 - i. Serial Interfaces:
 - 1) One dedicated RS 485 port for central-station operation using point ID DACT.
 - 2) One RS 485 port for remote annunciators, Ethernet module, or multi-interface module (printer port).
 - 3) One USB port for PC configuration.
 - 4) One RS 232 port for air-aspirating smoke detector connection.
 - 5) One RS 232 port for voice evacuation interface.
 - j. Notification-Appliance Circuit:
 - 1) Audible appliances must sound in three-pulse temporal pattern, as defined in NFPA 72.
 - 2) Where notification appliances provide signals to sleeping areas, alarm signal must be 520 Hz square wave with intensity 15 dB above average ambient sound level or 5 dB above maximum sound level, or at least 75 dB(A-weighted), whichever is greater, measured at pillow.
 - 3) Visual alarm appliances must flash in synchronization where multiple appliances are in same field of view, as defined in NFPA 72.
 - k. Elevator Recall: Initiate by one of the following alarm-initiating devices:

- 1) Elevator lobby detectors except lobby detector on designated floor.
- 2) Smoke detectors in elevator machine room.
- 3) Smoke detectors in elevator hoistway.
- l. Elevator controller must be programmed to move cars to alternate recall floor if lobby detectors located on designated recall floors are activated.
- m. Water-flow alarm connected to sprinkler in elevator shaft and elevator machine room must shut down elevators associated with location without time delay.
 - 1) Water-flow switch associated with sprinkler in elevator pit may have delay to allow elevators to move to designated floor.
- n. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke-barrier walls must be connected to fire-alarm system.
- o. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to remote alarm station.
- p. Primary Power: 24 V(dc) obtained from 120 V(ac) service and power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, and supervisory signals must be powered by 24 V(dc) source.
- q. Alarm current draw of entire fire-alarm system must not exceed 80 percent of power-supply module rating.
- r. Secondary Power: 24 V(dc) supply system with batteries, automatic battery charger, and automatic transfer switch.
- s. Batteries: Sealed lead calcium .

D. Accessories:

1. Instructions: Computer printout or typewritten instruction card mounted behind plastic or glass cover in stainless steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe functional operation of system under normal, alarm, and trouble conditions.
2. Preaction System Functionality:
 - a. Initiate Presignal Alarm: This function must cause audible and visual alarm and indication to be provided at FACU. Activation of initiation device connected as part of preaction system must be annunciated at FACU only, without activation of general evacuation alarm.

2.4 MANUAL FIRE-ALARM BOXES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Honeywell International (Honeywell Gamewell-FCI).
 2. Honeywell International (Notifier).
 3. Tyco International (Johnson Controls - Autocall).
 4. Tyco International (Johnson Controls - SimplexGrinnell).
- B. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes must be finished in red with molded, raised-letter operating instructions in contrasting color; must show visible indication of operation; and must be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.

1. Double-action mechanism requiring two actions to initiate alarm, breaking-glass or plastic-rod pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to FACU.
2. Station Reset: Key- or wrench-operated switch.
3. Indoor Protective Shield: Factory-fabricated, clear plastic enclosure hinged at top to permit lifting for access to initiate alarm. Lifting cover actuates integral battery-powered audible horn intended to discourage false-alarm operation.
4. Weatherproof Protective Shield: Factory-fabricated, clear plastic enclosure hinged at top to permit lifting for access to initiate alarm.
5. Able to perform at up to 90 percent relative humidity at 90 deg F .
6. Material: Manual stations made of Lexan polycarbonate .
7. Able to be used in indoor outdoor areas.

2.5 SYSTEM SMOKE DETECTORS

A. Photoelectric Smoke Detectors:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Gentex Corporation.
 - b. Honeywell International (Notifier).
 - c. Tyco International (Johnson Controls - Autocall).
 - d. Tyco International (Johnson Controls - SimplexGrinnell).
 - e. System Sensor
2. Performance Criteria:
 - a. Regulatory Requirements:
 - 1) NFPA 72.
 - 2) UL 268.
 - b. General Characteristics:
 - 1) Detectors must be four -wire type.
 - 2) Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to FACU.
 - 3) Base Mounting: Detector and associated electronic components must be mounted in twist-lock module that connects to fixed base. Provide terminals in fixed base for connection to building wiring.
 - 4) Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
 - 5) Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.
 - 6) Detector address must be accessible from FACU and must be able to identify detector's location within system and its sensitivity setting.
 - 7) Operator at FACU, having designated access level, must be able to manually access the following for each detector:
 - a) Primary status.
 - b) Device type.
 - c) Present average value.
 - d) Present sensitivity selected.
 - e) Sensor range (normal, dirty, etc.).
 - 8) Detector must have functional humidity range within 10 to 90 percent relative humidity.

- 9) Color: White .
- 10) Remote Control: Unless otherwise indicated, detectors must be digital-addressable type, individually monitored at FACU for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by FACU.
- 11) Rate-of-rise temperature characteristic of combination smoke- and heat-detection units must be selectable at FACU for 15 or 20 deg F per minute.
- 12) Fixed-temperature sensing characteristic of combination smoke- and heat-detection units must be independent of rate-of-rise sensing and must be settable at FACU to operate at 135 or 155 deg F.
- 13) Multiple levels of detection sensitivity for each sensor.
- 14) Sensitivity levels based on time of day.

2.6 DUCT SMOKE DETECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Gentex Corporation.
2. Honeywell International (Notifier).
3. Tyco International (Johnson Controls - Autocall).
4. Tyco International (Johnson Controls - SimplexGrinnell).

B. Description: Photoelectric-type, duct-mounted smoke detector.

C. Performance Criteria:

1. Regulatory Requirements:
 - a. NFPA 72.
 - b. UL 268A.
2. General Characteristics:
 - a. Detectors must be four -wire type.
 - b. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to FACU.
 - c. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
 - d. Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.
 - e. Detector address must be accessible from FACU and must be able to identify detector's location within system and its sensitivity setting.
 - f. Operator at FACU, having designated access level, must be able to manually access the following for each detector:
 - 1) Primary status.
 - 2) Device type.
 - 3) Present average value.
 - 4) Present sensitivity selected.
 - 5) Sensor range (normal, dirty, etc.).
 - g. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with supplied detector for smoke detection in HVAC system ducts.
 - h. Each sensor must have multiple levels of detection sensitivity.
 - i. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.

- j. Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

2.7 FIRE-ALARM NOTIFICATION APPLIANCES

A. Fire-Alarm Audible Notification Appliances:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Gentex Corporation.
 - b. Honeywell International (Notifier).
 - c. Tyco International (Johnson Controls - Autocall).
2. Description: Horns, bells, or other notification devices that cannot output voice messages.
3. Performance Criteria:
 - a. Regulatory Requirements:
 - 1) NFPA 72.
 - b. General Characteristics:
 - 1) Individually addressed, connected to signaling-line circuit, equipped for mounting as indicated, and with screw terminals for system connections.
 - 2) Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.
 - 3) Chimes, Low-Level Output: Vibrating type, 75 dB(A-weighted) minimum rated output.
 - 4) Chimes, High-Level Output: Vibrating type, 81 dB(A-weighted) minimum rated output.
 - 5) Sounders, High Volume 24 V(dc): Less than 6 mA of alarm current.
 - 6) Sounders, Low Volume 24 V(dc): Less than 4 mA of alarm current.
 - 7) Audible notification appliances must have functional humidity range of 10 to 95 percent relative humidity.
 - 8) ISO Temporal 3 Evacuation Tone: 90 plus or minus 4 dB(A-weighted) at 24 V.
 - 9) ISO Temporal 3 Alert Tone: 95 plus or minus 5 dB(A-weighted) at 24 V.
 - 10) AS2220 Evacuation Tone: 93 plus or minus 4 dB(A-weighted) at 24 V.
 - 11) AS2220 Alert Tone: 93 plus or minus 5 dB(A-weighted) at 24 V.
 - 12) Combination Devices: Factory-integrated audible and visible devices in single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.

B. Fire-Alarm Visible Notification Appliances:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Gentex Corporation.
 - b. Honeywell International (Notifier).
 - c. Tyco International (Johnson Controls - Autocall).
2. Performance Criteria:
 - a. Regulatory Requirements:
 - 1) NFPA 72.
 - 2) UL 1971.
 - b. General Characteristics:
 - 1) Rated Light Output:

- a) 15/30/75/110 cd, selectable in field.
- 2) Clear or nominal white polycarbonate lens mounted on aluminum faceplate.
- 3) Mounting: Wall mounted unless otherwise indicated.
- 4) For units with guards to prevent physical damage, light output ratings must be determined with guards in place.
- 5) Flashing must be in temporal pattern, synchronized with other units.
- 6) Strobe Leads: Factory connected to screw terminals.
- 7) Mounting Faceplate: Factory finished, red .

2.8 FIRE-ALARM REMOTE ANNUNCIATORS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Must match system manufacturer of FACP. See drawings for basis of design.

B. Performance Criteria:

1. Regulatory Requirements:
 - a. NFPA 72.
2. General Characteristics:
 - a. Annunciator functions must match those of FACU for alarm, supervisory, and trouble indications. Manual switching functions must match those of FACU, including acknowledging, silencing, resetting, and testing.
 - 1) Mounting: Flush cabinet, NEMA 250, Type 1.
 - b. Display Type and Functional Performance: Alphanumeric display and LED indicating lights must match those of FACU. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.9 FIRE-ALARM ADDRESSABLE INTERFACE DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bosch Security Systems, Inc.
2. Honeywell International (Notifier).

B. Performance Criteria:

1. Regulatory Requirements:
 - a. NFPA 72.
2. General Characteristics:
 - a. Include address-setting means on module.
 - b. Store internal identifying code for control panel use to identify module type.
 - c. Listed for controlling HVAC fan motor controllers.
 - d. Monitor Module: Microelectronic module providing system address for alarm-initiating devices for wired applications with normally open contacts.

2.10 DIGITAL ALARM COMMUNICATOR TRANSMITTERS (DACTs)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Bosch Security Systems, Inc.
 2. Potter Electric Signal Company, LLC.
 3. United Technologies Corporation (UTC Climate, Controls & Security - Edwards).
- B. Performance Criteria:
1. Regulatory Requirements:
 - a. NFPA 72.
 2. General Characteristics:
 - a. DACT must be acceptable to remote central station and must be listed for fire-alarm use.
 - b. Functional Performance: Unit must receive alarm, supervisory, or trouble signal from FACU and automatically capture one telephone line(s) and dial preset number for remote central station. When contact is made with central station(s), signals must be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter must initiate local trouble signal and transmit signal indicating loss of telephone line to remote alarm receiving station over remaining line. Transmitter must automatically report telephone service restoration to central station. If service is lost on both telephone lines, transmitter must initiate local trouble signal.
 - c. Local functions and display at DACT must include the following:
 - 1) Verification that both telephone lines are available.
 - 2) Programming device.
 - 3) LED display.
 - 4) Manual test report function and manual transmission clear indication.
 - 5) Communications failure with central station or FACU.
 - 6) .
 - d. Digital data transmission must include the following:
 - 1) Address of alarm-initiating device.
 - 2) Address of supervisory signal.
 - 3) Address of trouble-initiating device.
 - 4) Loss of ac supply.
 - 5) Loss of power.
 - 6) Low battery.
 - 7) Abnormal test signal.
 - 8) Communication bus failure.
 - 9) .
 - e. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.

1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.
- B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Preinstallation Testing: Perform verification of functionality of installed components of existing system prior to starting work. Document equipment or components not functioning as designed.
- B. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service in accordance with requirements indicated:
 1. Notify Architect Construction Manager Owner no fewer than seven days in advance of proposed interruption of fire-alarm service.
 2. Do not proceed with interruption of fire-alarm service without Architect's Construction Manager's Owner's written permission.
- C. Protection of In-Place Conditions: Protect devices during construction unless devices are placed in service to protect facility during construction.

3.3 INSTALLATION OF EQUIPMENT

- A. Comply with NECA 305, NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."
 1. Devices placed in service before other trades have completed cleanup must be replaced.
 2. Devices installed, but not yet placed, in service must be protected from construction dust, debris, dirt, moisture, and damage in accordance with manufacturer's written storage instructions.
- B. Install wall-mounted equipment, with tops of cabinets not more than 78 inch above finished floor.
 1. Comply with requirements for seismic-restraint devices specified in Section 270548.16 "Seismic Controls for Communications Systems."
- C. Manual Fire-Alarm Boxes:
 1. Install manual fire-alarm box in normal path of egress within 60 inch of exit doorway.
 2. Mount manual fire-alarm box on background of contrasting color.
 3. Operable part of manual fire-alarm box must be between 42 and 48 inch above floor level. Devices must be mounted at same height unless otherwise indicated.

- D. Install cover on each smoke detector that is not placed in service during construction. Cover must remain in place except during system testing. Remove cover prior to system turnover.
- E. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend full width of duct. Tubes more than 36 inch long must be supported at both ends.
 - 1. Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.
- F. Air-Sampling Smoke Detectors: If using multiple pipe runs, runs must be pneumatically balanced.
- G. Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location. Do not install smoke detectors in sprinklered elevator shafts.
- H. Single-Station Smoke Detectors: Where more than one smoke alarm is installed within dwelling or suite, they must be connected so that operation of smoke alarm causes alarm in smoke alarms to sound.
- I. Remote Status and Alarm Indicators: Install in visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.
- J. Audible Alarm-Indicating Devices: Install not less than 6 inch below ceiling. Install bells and horns on flush-mounted back boxes with device-operating mechanism concealed behind grille. Install devices at same height unless otherwise indicated.
- K. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inch below ceiling. Install devices at same height unless otherwise indicated.
- L. Device Location-Indicating Lights: Locate in public space near device they monitor.

3.4 ELECTRICAL CONNECTIONS

- A. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.
- D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
 - 1. Nameplate must be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."
 - 2. Nameplate must be laminated acrylic or melamine plastic signs with black background and engraved white letters at least 1/2 inch high.

3.5 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect control wiring in accordance with Section 260523 "Control-Voltage Electrical Power Cables."
- C. Install nameplate for each control connection, indicating field control panel designation and I/O control designation feeding connection.

3.6 PATHWAYS

- A. Pathways above recessed ceilings and in inaccessible locations may be routed exposed.
 - 1. Exposed pathways located less than 96 inch above floor must be installed in EMT.
- B. Pathways must be installed in EMT.
- C. Exposed EMT must be painted red enamel.

3.7 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section 087100 "Door Hardware." Connect hardware and devices to fire-alarm system.
 - 1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.
- B. Make addressable connections with supervised interface device to the following devices and systems. Install interface device less than 36 inch from device controlled. Make addressable confirmation connection when such feedback is available at device or system being controlled.
 - 1. Alarm-initiating connection to smoke-control system (smoke management) at firefighters' smoke-control system panel.
 - 2. Alarm-initiating connection to stairwell and elevator-shaft pressurization systems.
 - 3. Smoke dampers in air ducts of designated HVAC duct systems.
 - 4. Magnetically held-open doors.
 - 5. Electronically locked doors and access gates.
 - 6. Alarm-initiating connection to elevator recall system and components.
 - 7. Alarm-initiating connection to activate emergency lighting control.
 - 8. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
 - 9. Supervisory connections at valve supervisory switches.
 - 10. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
 - 11. Supervisory connections at elevator shunt-trip breaker.
 - 12. Data communication circuits for connection to building management system.
 - 13. Data communication circuits for connection to mass notification system.
 - 14. Supervisory connections at fire-extinguisher locations.

15. Supervisory connections at fire-pump power failure including dead-phase or phase-reversal condition.
16. Supervisory connections at fire-pump engine control panel.
17. .

3.8 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 270553 "Identification for Communications Systems."
- B. Install framed instructions in location visible from FACU.

3.9 GROUNDING

- A. Ground FACU and associated circuits in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."
- B. Ground shielded cables at control panel location only. Insulate shield at device location.

3.10 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

3.11 MAINTENANCE

- A. Maintenance Service: Beginning at Substantial Completion, maintenance service must include 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation. Parts and supplies must be manufacturer's authorized replacement parts and supplies.
 1. Include visual inspections in accordance with "Visual Inspection Frequencies" table in "Testing" paragraph of "Inspection, Testing and Maintenance" chapter in NFPA 72.
 2. Perform tests in "Test Methods" table in "Testing" paragraph of "Inspection, Testing and Maintenance" chapter in NFPA 72.
 3. Perform tests per "Testing Frequencies" table in "Testing" paragraph of "Inspection, Testing and Maintenance" chapter in NFPA 72.

END OF SECTION 28 46 21

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 WORD INCLUDES

- A. Contact the Ohio Utility Protection Services (811) and utility companies at least 48 hours prior to any site clearing / excavating operations.
- B. Locate, identify, verify, and protect existing trees and vegetation to remain based on owners direction.
- C. Protect benchmarks, survey control points, and ex. site improvements to remain from damage or displacement. All damaged or disturbed benchmarks, survey control points or property pins shall be replaced by a Professional Surveyor registered in the State of Ohio.
- D. Contractors shall remain within property lines, lease lines, easement areas, designated perimeter limits, or limits of work areas shown on drawing.
- E. Clearing and grubbing. Include complete removal of any remaining stumps & vegetation. Protect plants, trees, vegetation noted to remain.
- F. Topsoil stripping. Apply herbicide to areas to be paved after stripping topsoil.
- G. Removal of above-grade site improvements and removal of any below grade improvements (ex. utilities, building foundations, etc. as applicable in order to install improvements shown on Contract Drawings.
- H. Locate, identify, and mark utilities within site boundaries to remain or be removed. Protect utilities to remain. Disconnect, cap, or seal and abandon site utilities in place per utility co. requirements. If noted on plans backfill pipes to be abandoned in place with grout or LSM. Notify engineer immediately if unknown utilities or utility connections are encountered.
- I. Identify and accurately locate capped utilities and other subsurface structural, electrical, technological, and mechanical conditions, as applicable. Note utility locations on contractor's as-built mark-up plans and submit copy to engineer. Coordinate clearing work and comply with all utility company requirements before starting work.
- J. Backfill any excavated areas with compacted fill suitable for the area. Refer to the backfill specifications and geotechnical report (if applicable) for additional information.
- K. Provide and maintain temporary soil erosion and sedimentation control measures per the project's SWPPP & specifications.
- L. Remove debris from site. Leave site in clean condition ready for earthwork.

- M. Make new openings in curbs and gutters neat, as close as possible to profiles indicated and only to extent necessary for new work.
- N. At concrete, paving, and other materials where edges of cuts remain exposed in the complete work, make cuts using power-saving equipment. Do not overcut at corners of cut openings.
- O. Contractor shall delineate limits of pavement removal in the field, neatly saw cut pavement at limits, remove and dispose off-site the existing pavement. Pavement removal shall include all base and subbase aggregate material.

1.2 DEFINITIONS

- A. "Topsoil": natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shades of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, and other objects more than 1-1/2 inches in diameter; and free of weeds, roots, and other deleterious materials.
- B. Caliper: Instrument used to measure tree diameter.
- C. Clearing: Removal and disposal of above-ground featured items defined herein.
- D. Grubbing: Removal and disposal of below-ground items defined herein.
- E. Salvage: Shall include, but not limited to such as items as castings, piping, brick, steel, iron, copper, brass, aluminum and other metals, wiring, conduits, lighting, signs, etc.

1.3 MATERIALS OWNERSHIP

- A. Except for materials indicated to be stockpiled, salvaged, or to remain on OWNER'S property, cleared materials shall become CONTRACTOR'S property and shall be removed from the site.
- B. The ARCHITECT / ENGINEER will direct the CONTRACTOR whether and/or where to store excess stripped topsoil on the property.
- C. If materials are determined to be salvageable and are not shown on the plans to be salvaged, the contractor shall notify the ARCHITECT / ENGINEER in writing via email and temporarily store items for them to make a claim. If after one week of notification the contractor is responsible for dispose of them.

1.4 SUBMITTALS

- A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.
- B. Record drawings/log of site clearing items.

- C. Site Clearing Plan; Submit schedule and methods for accomplishment of temporary and permanent erosion control work as applicable for clearing and grubbing, grading operations, borrow pits and haul roads; a plan for disposal of waste materials; and a schedule of operation at locations of high siltation potential in sufficient detail to clearly indicate how siltation of streams, lakes and reservoirs and the interruption of normal stream flows will be held to a practical minimum.

1.5 QUALITY ASSURANCE

- A. Pre-installation conference: conduct conference at project site

1.6 PROJECT CONDITIONS

- A. "Traffic": minimize interference with adjoining roads, streets, parking lots, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction (AHJ).
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction (AHJ)
- B. "Improvements on adjoining property": authority for performing indicated removal and alteration work on property adjoining OWNER'S property will be obtained by OWNER before award of contract.
- C. "Salvageable improvements": carefully remove items indicated to be salvaged and store on OWNER'S premises where indicated, or alternate location where applicable.
- D. Existing facilities, structures, and utilities are shown in accordance with available field survey data and record drawings. The indicated locations of trees, underground utilities and structures are approximate. Other trees and utilities may exist which are not indicated. CONTRACTOR shall notify utility locator service before site clearing in accordance with State Revised Code "Protecting underground utility facilities during construction of public improvement".
- E. The Contractor shall employ a qualified utility locating service for all underground utilities outside the public R/W.

PART 2 – NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction. Replace if damaged to satisfaction of the OWNER and ENGINEER.

- B. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties, walkways, roadways, and drives. Install items per the Storm Water Pollution Prevention Plan.
- C. Locate and clearly flag trees and vegetation to remain or to be relocated. Refer to SWPPP plans for additional information.
- D. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to OWNER.
- E. Comply with seasonal and permitting restrictions on when the Contractor may perform the clearing and grubbing operations.

3.2 TREE PROTECTION & REMOVAL

- A. Tree removal is prohibited between April 1st and September 30th due to federally endangered Indiana Bat and Northern Long-Eared Bat which may have roosting habitats in the project area. All tree cutting work must be completed before the April 1st deadline and may not begin until after October 1st.
- B. Remove all trees indicated on the Contract Documents to be removed, and their major roots existing within the area of new pavements and structures.
- C. Areas designated to receive pavement or structures shall be grubbed a depth of 18-inches. Measure cut from existing ground surface or proposed ground surface.
- D. Apply herbicide to remaining roots and vegetation to inhibit growth.
- E. Depressions made by grubbing shall be filled with suitable material and compacted to conform to the original adjacent grades.
- F. Erect and maintain a temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete.
 - 1. Do not store construction materials, debris, excavated material, or material stockpiling within drip line of remaining trees.
 - 2. Do not permit vehicles, equipment, stored materials, temporary facilities, or foot traffic within drip line of remaining trees.
- G. Except in areas to be excavated, stump holes and other holes from which obstructions are removed shall be backfilled with suitable material and compacted in accordance with the following:
 - 1. All embankments, except rock embankments, shall be constructed using moisture and density control. All subgrade, except rock and shale in cut sections, shall be constructed using moisture control and density control.

- H. Do not excavate within drip line of trees, unless otherwise indicated.
- I. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
 - 1. Cover exposed roots with burlap and water regularly to prevent roots from dying out. Backfill with soil promptly.
 - 2. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
 - 3. Coat cut faces of roots more than 1-1/2 inches in diameter with emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
 - 4. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction in a manner approved by the Landscape Architect.
 - 5. Use only hand methods for grubbing within drip line of remaining trees.
- J. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by the ARCHITECT, ENGINEER or OWNER.
 - 1. Employ a qualified Arborist, licensed in jurisdiction where project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
 - 2. Replace trees that cannot be repaired and restored to full-growth status, as determined by the qualified Arborist.
- K. Protection of trees and shrubs scheduled to remain shall be assigned to the general CONTRACTOR and shall include tops, trunks and roots. Temporary tree protection fences are required because of proximity to the work. Tree protective fencing should be 6' high chain link (2" mesh) or safety orange mesh fencing. Any pruning required shall be with the approval and direction of the Landscape Architect. The general CONTRACTOR shall be responsible for the survival of protected trees for one (1) year after the construction project is substantially completed.
- L. Low hanging branches and unsound or unsightly branches on trees or shrubs within the project area which are designated to remain shall be removed as directed. Branches of trees extending over the roadbed shall be trimmed to give a clear height of 20 feet above the pavement surface or as directed by the ARCHITECT and ENGINEER.

3.3 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. Verify that utilities have been disconnected and capped before proceeding with site clearing.
 - 2. Arrange to shut off affected utilities with utility companies.
- B. Existing utilities: do not interrupt utilities serving facilities occupied by OWNER or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify ARCHITECT, City and utility owner and ENGINEER in writing not less than two days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without ARCHITECT, utility owner or City's and ENGINEER'S written permission.
 3. The CONTRACTOR is to indicate in construction schedule any known utility interruption.
- C. Excavate for and remove underground utilities indicated to be removed. Include capping/plugging abandon ends of pipes and backfilling pipes/conduits that are to be abandoned in place with low strength mortar or grout.

3.4 CLEARING, GRUBBING AND TOPSOIL REMOVAL

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions, and grubbing roots. Strip all objectionable growth. Remove from the site all debris resulting from the stripping operations at frequent intervals to prevent accumulation of material. On-site disposal of material is not permitted.
1. Do not remove trees, shrubs, and other vegetation indicated to remain or relocated.
 2. Completely remove stumps, roots, obstructions, and debris extending to a depth of 24 inches below exposed & final subgrade. Do not dispose of on-site.
- B. In a time defined prior to the start of construction, fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
- C. Place fill material in horizontal layers not exceeding 8-inch loose depth and compact each layer in accordance with requirements for engineered fill.

3.5 TOPSOIL STRIPPING

- A. Strip topsoil to its full depth from entire area to be graded. Stockpile where directed by OWNER and where it will not interfere with construction activities. Install silt fence and/or silt sock round stockpile area. Topsoil to be reused shall be free from roots, brush and debris. Excess topsoil shall be deposited and/or spread on property as directed by the ARCHITECT/ENGINEER. Refer to Geotechnical report if available, and landscape drawings if available, and specifications for additional information.
- B. If stockpiling on-site, remove sod and grass before stripping topsoil.
- C. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
1. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.

- D. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water away. Cover stockpiles to prevent windblown dust.
 - 1. Limit height of topsoil stockpiles to 72 inches.
 - 2. Do not stockpile topsoil within drip line of remaining trees.
 - 3. Dispose of excess topsoil as specified for waste material disposal.
 - 4. Install and maintain silt fence around any topsoil stockpiles.

3.6 EXISTING SITE IMPROVEMENTS

- A. Remove existing above-and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, buildings, foundations, utilities, and aggregate base as applicable.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Neatly saw-cut faces vertically.
 - 2. If noted on the drawings address existing wells and septic systems abandonment and/or removal per local Health Department Requirements and Standards.
 - 3. Wet down during the demolition operations to prevent dust from arising. Minimize spread of dust and airborne particles.
 - 4. Raze, remove and dispose of all buildings and foundations, structures, fences, guardrails, old pavement, abandoned pipe lines, storage tanks, septic tanks, vaults and other obstructions any portions of which are within the limits of the project, except utilities and those items for which other provisions have been made for removal. All designated salvageable material shall be removed, without unnecessary damage in sections or pieces which may readily be transported and shall be stored and protected by the CONTRACTOR at specified places within the project limits.
 - 5. Building demolition shall be performed per the Architect plans and specifications for building removal.
- C. Underground Storage Tanks
 - 1. Existing underground storage tanks encountered shall be removed by a certified UST removal contractor and reported to the state. If encountered on the project, contact an Environmental Engineer for further direction.

3.7 DISPOSAL

- A. "Disposal": remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off-site at a State certified construction debris or hazardous waste landfill.
 - 1. Do not burn or bury removed materials on project site.

2. If hazardous materials are encountered during clearing operations, notify the ENGINEER for additional instructions. Comply with laws and ordinances concerning removal, handling and protection against exposure or environmental pollution.
3. In order to retard and prevent the spread of destructive insects limit the movement of regulated articles according to state Law.
4. Observe requirements for handling and transporting of regulated articles in quarantined areas as defined by state requirements.
5. Follow all federal and state requirements for quarantines and regulated articles.

END OF SECTION 31 10 00

SECTION 31 20 00 - EARTH MOVING

PART 1 - GENERAL

- A. For this project a Geotechnical Study and Report was provided by Wertz Geotechnical dated July 15, 2021 and is included as part of the bid package. The Geotechnical Report governs where any conflict occurs between this section and the recommendations in the report.

1.1 WORK INCLUDES

- A. Preparing sub grades for slabs-on-grade, walks, pavements, lawns, and plantings.
- B. Aggregate base course for asphalt paving.
- C. Subsurface drainage backfill for walls and trenches.
- D. Engineered fill.
- E. Base bids on excavating and filling with materials encountered at site except where special fill or backfill materials are specified herein or indicated on Drawings. No allowance or extra payments will be made by reason of variations in types of soil encountered or variations in their moisture contents. Furnish additional fill material required and included as a part of the work. Include removal of excess or objectionable materials as part of the work.

1.2 DEFINITIONS

- A. Backfill: soil materials used to fill an excavation.
 - 1. Initial Backfill: backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: backfill placed over initial backfill to fill an excavated area to final grade.
- B. Base Course: layer placed between the sub-base course and asphalt paving.
- C. Sub-base course: layer placed over the excavated sub-grade in a trench before laying pipe. Layer placed between the sub-grade and base course for asphalt paving, or layer placed between the sub-grade and a concrete pavement or walk.
- D. Sub-grade: surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below sub-base, drainage fill, or topsoil materials.
- E. Borrow Soils: satisfactory soil imported from off-site for use as fill or backfill as approved by the Geotechnical Engineer.

- F. Drainage Course: layer supporting slab-on-grade used to minimize capillary flow of pore water.
- G. Excavation: removal of material encountered above sub-grade elevations.
 - 1. Additional Excavation: excavation below subgrade elevations as recommended by the testing agency and approved by the OWNER/ENGINEER to reach specified compaction level. Additional excavation, replacement, and proof-roll unit costs are to be included in the base contract amount.
 - 2. Bulk Excavation: excavations more than 10 feet in width and pits more than 30 feet in either length or width.
 - 3. Unauthorized Excavation: excavation below sub-grade elevations or beyond indicated dimensions without direction by the testing agency and approved and directed by the OWNER/ENGINEER. Unauthorized excavation, as well as remedial work recommended by the testing agency and approved and directed by the OWNER/ENGINEER, shall be without additional compensation.
- H. Fill Soils: suitable soil materials, as determined by the testing agency geotechnical engineer and the OWNER/ENGINEER, used to raise existing grades.
- I. Shale: Laminated material, formed by the consolidation in nature of soil, having a finely stratified structure. For the purpose of these Specifications, the following bedrock types shall also be considered as shale: mudstone, claystone, siltstone and clay bedrock.
- J. Rock: rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material exceeding 1 C.Y. for bulk excavation or 3/4 C.Y. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment, without systematic drilling, ram hammering, ripping, or blasting, when permitted.
- K. Structures: buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- L. Utilities: Include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings, as applicable.
- M. Optimum Moisture: The water content at which the maximum density is produced in a soil as determined ASTM D698 (Standard Proctor), or field test strip.
- N. Field Testing: Testing of fill and subgrade compaction shall be as directed by the OWNER/ENGINEER and performed by the testing agency.
- O. Laboratory Dry Weight: The maximum laboratory dry weight shall be the weight provided by the Laboratory when the sample is tested in accordance with ASTM

D698.

1.3 SUBMITTALS

A. Product data for the following:

1. Notify and provide data to regulatory authorities and OWNER/ENGINEER prior to commencement of work.
2. Provide notice of: encounter with unknown utilities; subgrades before filling; areas requiring testing or inspection.
3. Materials Sources: Name of fill material source, location, date of sample, sieve analysis, and laboratory compaction characteristics.
4. Disposal Locations: Name and location of final destination for all materials hauled off site.

B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D2487 of each on site and borrow soil material proposed for fill and backfill.
2. Current laboratory compaction curve according to ASTM D698 for each on site and borrow soil material proposed for fill and backfill.
3. Field reports; in-place soil density tests.
4. One optimum moisture – maximum density curve for each type of soil encountered.
5. Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.
6. Test reports must be submitted daily to the Architect and Owner.
7. Water Content

C. Samples: for the following (if indicated by X below):

1. X 30-lb samples sealed in airtight containers, of each proposed soil material from on-site or borrow sources and engineered fill materials delivered to geotechnical testing agency for running proctor tests. Document borrow material source(s) for each sample submitted. Documentation shall include name of source, location, date of sample, sieve & grain size analysis, soil characteristics, unit weight, and Std. Proctor laboratory compaction results at designated optimum moisture content.

1.4 QUALITY ASSURANCE & REPORTS

A. Reference Standards:

1. American Association of State Highway and Transportation Officials (AASHTO).
2. American Society for Testing and Materials (ASTM).
3. Ohio State Department of Transportation "Construction Materials Specifications", 2019 or current edition.

B. "Codes and Standards" - perform earthwork complying with requirements of authorities having jurisdiction.

C. Tolerances: As indicated herein.

D. "Geotechnical Testing Agency Qualifications" - an independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

E. Soil testing service: The OWNER will engage a qualified independent testing agency to perform material evaluation tests for all geotechnical work specified herein. The testing agency shall provide the OWNER/ENGINEER a letter certifying soil material used and compaction results. All requested extra work and/or change orders based on existing soil conditions or tests of soils that do not meet the project specifications shall be approved and directed by the OWNER/ENGINEER.

F. Testing: Requirements as specified herein.

G. The testing agency shall provide results from field density testing during construction to OWNER/ENGINEER. Note material sampled and characteristics of soil. CONTRACTOR is to be advised immediately of tests failing to meet specifications. CONTRACTOR is solely responsible to correct deficiencies and to supply test and proof rolling results to Engineer in order to confirm suitability.

1.5 PROJECT CONDITIONS

A. Subsurface Conditions: Subsurface soils investigations have been made at the site.

B. Existing Utilities: do not interrupt utilities serving facilities occupied by OWNER others unless permitted in writing by OWNER/ENGINEER, and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify OWNER/ENGINEER not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without OWNER/ENGINEER written permission.
3. The utilities protection service does not locate utilities outside public R/W's. The CONTRACTOR shall employ a qualified utility locating service for all underground utilities on the project.
4. Cut and cap, demolish, and completely remove from site existing underground utilities indicated to be removed in accordance with both City and utility provider requirements. Coordinate with utility companies to shut off services if lines are active. The Engineer may, with written approval, allow abandoned utilities greater or equal to 6" diameter, located under parking or buildings, to be completely filled with non-shrink grout or LSM.
5. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult Utility OWNER/ENGINEER immediately for directions. Cooperate with OWNER/ENGINEER and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to the satisfaction of the Utility OWNER/ENGINEER and the utility owner representative.

1.6 PROTECTION

- A. Safety: Provide protective measures necessary for the safety of workmen, to the public and adjacent property. Prevent cave-ins, collapse of walls, structures, and slopes, both on and adjacent to the site.
- B. Standards: Comply with regulations of local authorities having jurisdiction, including all applicable O.S.H.A. requirements.
- C. Repair: Includes the removal and replacement with new materials affected by settlement.

1.7 ENVIRONMENTAL CONDITIONS:

- A. Do not apply soil treatment when temperature is at or below freezing or when ground is frozen or frost is expected.
- B. Do not apply soil treatment when surface water is present.

1.8 EXISTING CONDITIONS:

- A. Accept the site in the condition which it exists at the time of the award of the contract and perform all work to the grades indicated.
- B. Protect plant material, lawns and other features not designated for removal.

- C. Protect bench marks, existing structures, fences, sidewalks, paving and curbs from excavating equipment and vehicular traffic.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soil Materials:
 - 1. Complying with American Association of State Highway and Transportation Officials (AASHTO) M145, soil classification Groups A-1, A-2-4, A-2-5, and A-3. Soil classification Group A-6 may be satisfactory if approved by the testing laboratory.
 - 2. Complying with ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, AND SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. CL can be used if approved by the geotechnical testing agency engineer and approved by the OWNER.
 - 3. Compacted fill and backfill shall be free of deleterious matter such as frozen materials, organics, wood, debris, or rock larger than 4 inches.
 - 4. All material shall have a liquid limit and plasticity index not exceeding 40 and 15 respectively when tested in accordance with ASTM D-4318.
 - 5. The minimum dry unit weight shall not be less than 110 PCF maximum dry density as determined by ASTM D-1557 (Modified Proctor).
 - 6. All fill and backfill materials shall be obtained from on site or from off-site sources and shall be approved by the Geotechnical Engineer prior to placement.
 - 7. Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- C. Unsatisfactory Soils:
 - 1. ASTM D 2487 soil classification groups GC, SC, MH, CH, OL, OH, and PT, or a combination of these group symbols.
 - 2. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
 - 3. Unsatisfactory soil materials are those defined in AASHTO M145 soil classification Groups A-2-6, A-2-7, A-4, A-5, and A-7; also, peat and other highly organic soils. Material that fails to meet requirements for suitable materials; or contains any of the

following:

- a. Organic clay, organic silt, or peat; as defined in ASTM D2487.
 - b. Vegetation, wood, roots, leaves, or organic, degradable material.
 - c. Stones or rock fragments over six inches in any dimension.
 - d. Porous biodegradable matter, excavated pavement, construction debris, rubbish, or refuse.
 - e. Ice, snow, frost, or frozen soil particles.
 - f. Slag.
- D. General Fill: Suitable, unclassified soils.
- E. Structural Fill: Suitable material that is classified by the Unified Soil Classification System (USCS) in accordance with ASTM D2487 as GW, GP, GM, SW, SP, SM, or if approved CL. Verify that the largest particles in the fill are no greater in dimension than one-half the thickness of the compacted lift thickness.
- 1. Representative samples of the proposed fill materials should be collected at least one week prior to the start of the filling operations. The samples should be tested to determine the maximum dry density, optimum moisture content, particle size distribution and plasticity characteristics. These tests are needed to determine if the material is acceptable as structural fill and for quality control during the compaction process.
 - 2. All on site material that is stockpiled and designated to be used as Structural Fill shall be field tested and evaluated by the testing agency Geotechnical Engineer to determine if it meets the requirements ODOT and the additional requirements as set forth in this section. Written acceptance from the testing agency and owner shall be obtained prior to be accepted as Structural Fill.
 - 3. The fill should be placed in layers of not more than 8 inches in thickness, with each layer being compacted to a minimum density of 100 percent of the maximum dry density and within $\pm 2\%$ of the optimum moisture content, as determined by the Standard Proctor Method ASTM D-698. Moisture control (increasing or decreasing the natural moisture content) of the engineered fill materials may be necessary for compaction.
 - 4. Rock, shale and boulders is prohibited from being used as structural fill and shall be hauled and disposed of offsite.
 - 5. Silt shall not be used as fill in new pavement or building areas.
 - 6. The Structural Fill shall not be in a frozen condition during placement and should not

be placed on a frozen subgrade.

- F. Granular Engineered Fill: naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a no. 200 sieve.
 - 1. Engineered fill materials should consist of non-expansive materials. Pyritic and/or potentially expansive materials, such as mine tailings and slag should not be used as engineered fill material. Materials selected for use as engineered fill shall be properly moisture conditioned, inorganic and free of organic matter, cobbles, boulders, waste construction debris, or other deleterious materials.
 - 2. Fill materials shall have a Standard Proctor maximum dry density greater than 110 pounds per cubic foot (pcf), an Atterberg Liquid Limit less than 40, a Plasticity Index of less than 15, organic content less than 1% and a maximum particle size of 2 inches or less.
- G. Drainage fill:
 - 1. Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel, (ASTM D 448 Coarse - aggregate grading size 57), with 100% passing of 1-1/2" sieve and not more than 5% passing a No. 8 sieve. Aggregate shall meet MSHA specification for No. 6 aggregate. Provide by CONTRACTOR from off- site source.
 - 2. Aggregates used for subsurface storm water storage, underdrains, or storm sewer backfill shall be washed limestone, washed gravel, or river rock. The aggregates shall be 100 percent crushed in all cases.
- H. Backflow at Below Grade Walls
 - 1. Provide a 24" wide zone of free draining gravel behind all below grade.
- I. Pavement Backfill:
 - 1. Base: material shall comply with the requirements of ODOT Section 304 Aggregate Base Course.
 - 2. Sub Grade Preparation: material shall comply with the requirements of ODOT Section 203 and Section 204, Aggregate Base.
- J. Backfill for Utilities:
 - 1. See Section 31 23 33 Trenching and Backfill
- K. Filter Material: narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading size 67; with 100 percent passing a 1- inch sieve and 0 to 5 percent passing a no. 4 sieve.

L. Impervious Fill:

1. Where noted on plans): clayey gravel and sand mixture capable of compacting to a dense state at optimum moisture content. In special instances the Engineer may recommend the use of bentonite clay or an impervious (EDPM or approved equal) material. Special instances are not included in base bid.

M. Top Soil:

1. Clean natural topsoil free of vegetation, debris and other deleterious matter, and approved by OWNER/ARCHITECT or ENGINEER Representative. Upper 6 inches of topsoil stripped may be used, if suitable, otherwise use imported, screened, loose, fertile, friable, free of grass, brush, roots and rocks > 1-1/2" diameter, loamy soil possessing characteristics representative of productive growing soils in the area.

N. Drainage Fabric, Separation Fabric, Erosion Control Blankets and Erosion Control Fiber Mesh

1. See Section 31 32 19 Geotextile Fabric PART 3

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify existing ground surfaces have been stripped of topsoil, root mat and existing pavement, unsatisfactory soils, concrete spoil, obstructions and deleterious material.
- B. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- C. Protect sub-grades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- D. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties, walkways, and roadways.
- E. Protect trees, shrubs, lawns, rock out-croppings, and other features remaining as a portion of final landscaping.
- F. Protect benchmarks/project control, existing structures, fences, sidewalks, paving, and curbs from equipment and vehicular traffic.
- G. Protect above and below grade utilities which are to remain.

- H. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation. Monitor shoring system and surrounding ground surface during construction to detect movement. If movement becomes significant, take contingency steps to brace excavation and adjacent utility lines.
- I. Notify OWNER/ARCHITECT or ENGINEER Representative of unexpected subsurface conditions and discontinue work in affected area until notified to resume work.
- J. Grade excavation top perimeter to prevent surface water run-off into excavation.
- K. Material cut or excavated from building areas which is suitable for backfilling may be stored on site to be distributed later.
- L. Remove unsuitable and/ or excess material from site immediately.
- M. Establish extent of excavation by area and elevation; designate and identify datum elevation.
- N. Set required lines and levels.
- O. Maintain bench marks, project control monuments, and other reference points. Relocate if necessary and reference all benchmarks to remain so that it can be reestablished if disturbed.
- P. Before starting excavation, establish location and extent of underground utilities occurring in work area.
- Q. Notify utility companies to remove and relocate lines which are in way of excavation. Maintain, reroute or extend as required, existing utility lines to remain which pass through work area.
- R. Protect utility services uncovered by excavation.
- S. Upon discovery of unknown utility or concealed condition, discontinue affected work and notify OWNER/ ENGINEER representative immediately.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared sub-grades, and from flooding project site and surrounding area. Unsuitable soils as a result of improper dewatering are to be removed and replaced at the General CONTRACTOR's expense.
- B. Protect sub-grades from softening, undermining, washout, and damage by rain or water accumulation. Unsuitable soils as a result of improper sub-grade protection are to be

removed and replaced at the CONTRACTOR's expense.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
2. Install a dewatering system or drainage trench, when necessary to keep sub- grades dry and convey ground water away from excavations in accordance with the recommendations of the geotechnical report. Maintain system until dewatering is no longer required.
3. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding Project site and surrounding area.
4. Do not allow water to accumulate in excavations.
5. If presence of subsurface water is encountered during excavation, provide interior drainage.
6. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations.
7. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas.

3.3 EXPLOSIVES

- A. The use of explosives is prohibited.

3.4 EXCAVATION, GENERAL

- A. Unclassified excavation: excavation to, and beyond, sub-grade elevations as necessary to reach specified compaction level, regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions. Unclassified excavated material may include rock, soil materials, and obstructions. Changes in the contract sum or the contract time will be authorized in writing by the OWNER/ENGINEER for excavation or removal of unclassified material.
- B. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials as directed and approved by testing agency geotechnical engineer and the OWNER/ENGINEER.
- C. Replacement of soils shall be included in both the contract time and contract sum. No adjustments shall be authorized to either component for such occurrences.

- D. Verify areas to be backfilled are free of debris, snow, ice or water, and ground surfaces are not frozen.
- A. Proof roll exposed subgrade in building and paving areas with 20 cu. yd. (min.) fully loaded dump truck or similar acceptable construction equipment, to detect unsuitable soil conditions. Commence proof rolling operations after a suitable period of dry weather to avoid degrading acceptable subgrade surfaces. Make 8 passes over each section with proof rolling equipment, with the last 4 passes perpendicular to the first 4 passes. Testing agency geotechnical engineer and the representative must be present for proof roll.
- E. Cut out soft areas of subgrade not readily capable of in-situ compaction. Backfill and compact to density equal to requirements for suitable backfill material. Refer to Section 2.0.
- F. Site backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet or spongy subgrade surfaces.
- G. Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of materials excavated.
 - 1. Maintain sides and slopes of excavations in safe conditions until completion of backfilling.
- H. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross-braces, in good serviceable condition.
 - 1. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.
 - 2. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch.
- B. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavations for footings and foundations: do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other

work.

2. Excavation for underground tanks, basins, and mechanical or electrical utility structures: excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended for bearing surface. Extend excavation sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.
3. Refer to geotechnical report for additional recommendations.
4. Locate and mark existing underground utilities and services before beginning structural excavation.
5. Provide excavation for structures and footings, as required for construction, bracing and removal of forms, applying waterproofing, and to permit inspection.
6. Machine slope banks to angle of repose or less until shored. Do not allow excavation to interfere with normal 45 degrees angle bearing splay of any foundation.
7. Ensure bottom of excavation is reasonably level.
8. Maintain excavations in as near their natural moisture conditions as possible.
9. Fill over-excavated areas under structure bearing surfaces in accordance with testing agency geotechnical engineer direction.
10. Do not allow construction equipment to create "pumping" of soils.
11. Remove boulders or cobbles.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.
- B. Where rock or concrete spoil is encountered, carry excavation 18" below subgrade and backfill with suitable material approved by the testing agency geotechnical engineer and the OWNER/ENGINEER.

3.7 EXCAVATION FOR UTILITY TRENCHES

- A. See Section 31 23 23 Trenching and Backfill.

3.8 APPROVAL OF SUB-GRADE

- B. Notify testing agency when excavations have reached required sub-grade.

- C. If testing agency determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed with written approval of testing agency geotechnical engineer and the OWNER.
 - 1. Additional excavation and replacement material included in the CONTRACTOR's sum will be addressed either by unit price or allowance.
- D. Proof roll sub-grade with fully loaded, 20 yd (min.) tandem dump truck to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated sub-grades. The testing agency geotechnical engineer must be present for proof roll.
- E. Reconstruct sub-grades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as recommend by the testing agency geotechnical engineer and and directed by OWNER/ENGINEER.

3.9 UNAUTHORIZED EXCAVATION

- A. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the testing agency geotechnical engineer and the OWNER/ENGINEER.
- B. Unauthorized excavation, as well as remedial work directed by the testing agency geotechnical engineer and the OWNER/ENGINEER shall be at CONTRACTOR's expense.
- C. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete or LSM fill may be used when approved by the testing agency geotechnical engineer and the OWNER/ENGINEER.
 - 1. Fill unauthorized excavations under other construction or utility pipe as directed by the testing agency geotechnical engineer and the OWNER/ENGINEER.
 - 2. Consists of material removal beyond indicated subgrade elevations or dimensions without specific direction of the testing agency geotechnical engineer and the OWNER/ENGINEER.
 - 3. Correct unauthorized excavation, as well as remedial work as directed by the testing agency geotechnical engineer and the OWNER/ENGINEER, at no additional cost to OWNER.
 - 4. Backfill and compact other unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by the testing agency geotechnical engineer and the OWNER/ENGINEER.

3.10 ADDITIONAL EXCAVATION:

- A. When excavation has reached required subgrade elevations, notify soils testing laboratory for examination of conditions.
- B. If unsuitable bearing materials are encountered at required subgrade elevations, excavate deeper and replace excavated material as directed by soils testing laboratory.
- C. Removal of unsuitable material and its replacement as directed will be paid on basis of Contract conditions relative to changes in Work. Proof rolling is to be included.

3.11 COLD WEATHER PROTECTION

- A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F. (1-degree C.).

3.12 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow materials and satisfactory excavated soil materials when and where directed by the testing agency geotechnical engineer and the OWNER/ENGINEER. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water away. Cover stockpiles to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
 - 2. Prevent saturation of soil above the optimum moisture content.
 - 3. Install silt fence/ silt sock around periphery of any topsoil stockpiles

3.13 BACKFILL

- A. Place and compact backfill in excavations promptly, or within time as specified by the Contract Documents, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, damp proofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Inspecting and testing underground utilities.
 - 4. Concrete and masonry have cured 28 days and is adequately braced.
 - 5. Removing concrete formwork.

6. Removing trash and debris.
7. Removing temporary shoring and bracing, and sheeting.
8. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.14 FILL

- A. Preparation: remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.
- B. Plow, scarify, bench, or break up sloped surfaces steeper than 8 H to 1 V so fill material will bond with existing material. Bench into the existing slope per ODOT Document GB2 Special Benching and Side fill Embankment Fills and in addition as follows:
 - a. Scalp the existing slope according to ODOT Item 201.
 - b. Cut horizontal benches in the existing slope to a sufficient width to blend the new embankment with the existing embankment and to accommodate placement, and compaction operations and equipment.
 - c. Bench the slope as the embankment is placed and compact in layers.
 - d. Begin each bench at the intersection of the existing slope and the vertical cut of the previous bench. Recompect the cut materials along with the new embankment.
- C. Place and compact fill material in layers to required elevations at locations as follows:
 1. Under grass and planted areas, use satisfactory screened topsoil.
 2. Under walks and pavements, ODOT 304 Aggregate Base and if subgrade is deficient provide engineered fill. Extend five (5) beyond the pavement edge and shall include the support slopes to their full width.
 3. Under steps and ramps, use structural fill.
 4. Under building slabs, use structural fill unless noted otherwise on structural drawings. Extend five (5) beyond the building edge and shall include the support slopes to their full width.
 5. Under footings and foundations, use structural fill unless noted otherwise on structural drawings.
 6. Drainage fill material shall be proof rolled to a uniform stable condition prior to placement of vapor retarder.
 7. Do not place fill on frozen ground

3.15 MOISTURE CONTROL

- A. Uniformly moisten or aerate sub-grade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove & replace, or scarify & air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 % and is too wet to compact to specified dry unit weight

3.16 COMPACTION OF BACKFILLS AND FILLS

- A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure. Take care to prevent wedging action of backfill against structures by carrying material uniformly around structure to approximately same elevation in each lift.
- C. Compact soil to not less than the following percentages of maximum dry unit weight according to Std. Proctor test ASTM D698.
 - 1. Unless specified elsewhere in the Geotechnical Report, under structures, building slabs and steps the compaction should be a minimum of 100 percent of the optimum density.
 - 2. Under walkways, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill material at 98 percent (Standard Proctor).
 - 3. Under lawn or unpaved areas, scarify and re-compact top 6 inches below sub- grade and compact each layer of backfill or fill material at 95 percent.
 - 4. Top 12" of sub-grade under roadways, drives, parking areas, foundations, backfill, footings, pads, paved pedestrian walks and courts, loading docks and paving primarily for vehicle traffic, the compaction shall be a minimum of 100 percent.

3.17 SUB-BASE AND BASECOURSES

- A. Under pavements and walks, place sub-base course on prepared sub-grade and as follows:
 - 1. Place base course material oversub-base.

2. Compact sub-base and base courses at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 100 percent of maximum dry unit weight according to ASTM D 698 (standard proctor).
 3. Shape sub-base and base to required crown elevations and cross-slope grades.
 4. When thickness of compacted sub-base or base course is 6 inches or less, place materials in a single layer.
 5. When thickness of compacted sub-base or base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.
- B. Pavement shoulders: place shoulders along edges of sub-base and base course to prevent lateral movement. Construct shoulders, at least 60 inches wide, of satisfactory soil materials and compact simultaneously with each sub-base and base layer to not less than 100 percent of maximum dry unit weight according to ASTM D 698.

3.18 GRADING

- A. See Section 31 22 00 Grading

3.19 PROTECTION

- A. Protecting graded areas: protect newly graded areas from traffic, freezing, and erosion. Keep all areas graded to drain, free of ruts, ponding water, trash, and debris. CONTRACTOR is to pump off all ponding water immediately. Keep free of trash and debris.
- B. Repair and reestablish grades to specify tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and re-compact.
- C. Where settling occurs before project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible, as satisfactory to the OWNER/ENGINEER.
- D. Protect areas with slopes exceeding 3 H to 1 V with erosion-control fiber mesh and with erosion-control blankets installed and stapled according to

manufacturer's written instructions.

- E. Unless noted otherwise, protect areas with slopes not exceeding 3 H to 1 V by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.

Anchor straw mulch by crimping into topsoil with suitable mechanical equipment, use tackifier, or erosion control netting. Maintain during construction

3.20 FIELD QUALITY CONTROL

- A. Testing agency: The OWNER will engage a qualified independent Geotechnical Engineering testing agency to perform field quality-control testing/compliance.
- B. Allow testing agency to inspect and test sub-grades and each fill/backfill layer. Proceed with subsequent earthwork only after field test results for previously completed work comply with requirements.
- C. Footing Sub-grade: at footing sub-grades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing sub-grades may be based on a visual comparison of sub-grade with tested sub-grade when approved by the Geotechnical Engineer.
- D. Testing agency will test compaction of soils in place according to ASTM D 698, ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Paved and building slab areas: at sub-grade and at each compacted fill and backfill layer, at least one test for every 2,000 S.F. or less of paved area or building slab, but in no case fewer than three tests. In each compacted fill layer, make one field density test for every 2,000 sq. feet of overlaying building slab or paved area, but in no case less than 2 tests. Field density tests shall be made at all walkway entrances and ramps into the proposed building.
 - 2. Foundation wall backfill: at each compacted backfill layer, at least one test for each 100 feet or less of wall length, but no fewer than two tests.
 - 3. Trench backfill: at each compacted initial and final backfill layer, at least one test for each 150 feet or less of trench length, but no fewer than two tests.
 - 4. Footing Subgrade: For each strata of soil on which footings will be placed, conduct at least one test to verify required design bearing capacities. Subsequent evaluation and approval of each footing subgrade should be performed by Geotechnical Testing Agency.

5. Lawns, athletic fields and areas receiving topsoil: Perform field density tests on a spot-check basis to assist the CONTRACTOR in determining if compaction is in accordance with the specifications.
- E. When testing agency reports that sub-grades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten, aerate, or remove and replace soil to depth required; re-compact and retest until specified compaction is obtained.

3.21 TESTING AND INSPECTION

- A. INSPECTION AGENCY: Inspect and test construction of embankments, fills, backfills, trenches, and subgrades and report to the OWNER/ENGINEER conformance in all particulars to specification requirements.
- B. Scheduling:
 1. Assign qualified personnel to be on site at all times when operations are scheduled.
 2. The CONTRACTOR should note that no earthwork operation shall be permitted in their absence.
- C. Responsibilities:
 1. Evaluation of subgrade preparation and suitability.
 2. Moisture content and field density tests on all layers of fill and backfill material placed.
 3. Evaluation of degree of compaction attained for all fill and backfill material placed.
 4. Testing and evaluation of borrow material.
 5. Sources of borrow and of select fill.
 6. Footing subgrade suitability.
 7. Inspection of installation of subdrainage system.
- D. Results of Tests:
 1. Make results available to the OWNER/ENGINEER immediately upon completion of areas of layers.
- E. Final Report: The Geotechnical Testing Agency shall prepare a written report

that summarizes the work inspected during the course of the project. A discussion of all deviations from the contract documents and specifications, with their related impact on the final construction, shall be described in detail. The engineer of record shall review this final report and recommend corrective measures (as deemed necessary) that must be made prior to final acceptance of the work. Prior to final payment, a written report certifying that the work meets the requirements of the contract documents, specifications, and all governing agencies shall be prepared, submitted, and approved by the ENGINEER.

3.22 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off-site.
 - 1. Do not burn or bury removed materials on project site.
 - 2. If hazardous materials are encountered during clearing operations, notify the Engineer for additional instructions. Comply with laws and ordinances concerning removal, handling and protection against exposure or environmental pollution.

END OF SECTION 31 20 00



DRILLING | MATERIAL TESTING | ENGINEERING

GEOTECHNICAL EXPLORATION REPORT

FOR THE

**CANTON WATER DEPT. SERVICE SHOP ADDITION
2664 HARRISBURG ROAD NE
CITY OF CANTON, OHIO
WGE #20221037**

PREPARED FOR

**MOTTER & MEADOWS ARCHITECTS
600 MARKET AVENUE NORTH
CANTON, OHIO 44702**

BY

**WERTZ GEOTECHNICAL ENGINEERING, INC.
400 COLLIER DRIVE
DOYLESTOWN, OHIO 44230**



DRILLING | MATERIAL TESTING | ENGINEERING

March 15, 2022

**Motter & Meadows Architects
600 Market Avenue North
Canton, Ohio 44702**

ATTN: David Patterson, Architect

**RE: Geotechnical Exploration Report for the Canton Water Dept. Service Shop
Addition, City of Canton, Ohio; WGE #20221037**

Dear Mr. Patterson:

Wertz Geotechnical Engineering has completed the requested subsurface investigation for the proposed Canton Water Dept. Service Shop Addition Project in the City of Canton, Ohio. The purposes of this investigation are to define the subsurface conditions at the project site and to make general recommendations relative to site preparation and earthwork, foundation design, construction, and other pertinent geotechnical aspects of the project. These professional services have been performed, the findings obtained, and the recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. If you have any questions or concerns regarding the information presented in this submittal, or have need of additional services, please contact our office at (330) 991-0041.

Sincerely,

A handwritten signature in black ink that reads "Leroy Wertz".

Leroy Wertz, P.E.
Senior Project Engineer

A handwritten signature in black ink that reads "Kelly Luecke".

Kelly Luecke, P.E.
Project Engineer



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PROJECT DESCRIPTION

SITE DESCRIPTION

The site of the Service Shop Addition project is the existing Canton Water Department Service Department Shop at 2664 Harrisburg Road NE in the City of Canton, Ohio. The 25,400 square foot addition is proposed along the entirety of the southern wall of the existing shop, extending approximately 120 feet to the south. The eastern portion of the development area is within a gravel vehicle and materials storage area. The western portion is within an area of grass and trees.

Communication with Motter and Meadows Architects indicated the building addition will be a one-story steel structure, possibly pre-engineered, warehouse type building. A minor area of pavement is also proposed to the west of the building addition. Structural loads, finished floor elevations and a final grading plan were not provided at the time of this report. We assume that the proposed addition will be slab-on-grade and that maximum foundation loadings for the columns for the structure will not exceed 100 kips, and that any lower perimeter wall loads would not exceed 3 kips per linear foot.

The site is relatively flat, and generally slopes downward to the east and west from a high point within the project location. Existing grades in the development area range from approximate elevation 1062 feet to 1058 feet. Cut and fill depths for the building pad are not expected to exceed 3 feet.

If our project understanding or any of our project assumptions are incorrect, we should be contacted in order to determine if our recommendations remain valid.

DESCRIPTION OF REGIONAL GEOLOGICAL SETTING

The project site in Canton, Stark County, Ohio is situated in the Killbuck-Glaciated Pittsburgh Plateau Physiographic Region, which is defined by ridges and flat uplands covered with thin drift and dissected by steep valleys. The valley segments alternate between broad drift-filled and narrow rock-walled reaches (Ohio Department of Natural Resources Division of Geological Survey, 1998).

According to the USDA Web Soil Survey, the site area is mapped by the local soil and water conservation district as Chili-Urban land complex, a material consisting of outwash, deposited on terraces (USDA, 2020). A USDA Web Soil Survey site map is presented in Figure 2.

According to publicly available mine data from ODNR, no active or inactive surface or underground sand and gravel, limestone, or coal mining activities are present within the site. An historic surface coal mine site is present approximately 650 feet east of the project area.

According to 24k Ohio Division of Geological Survey (ODNR-DGS) Bedrock Geology Maps, bedrock in the area primarily consists of the Allegheny and Pottsville Groups, undivided, of which

major lithologies consist of shale and siltstone. The minor lithologies consist of limestone and sandstone (Ohio Department of Natural Resources Division of Geological Survey, 1991). Bedrock is reported by ODNR-DGS at approximately 950 feet MSL in elevation, which is approximately 210 feet below existing site grades. A Geologic Map is presented in Figure 3.

FIELD INVESTIGATION & LABORATORY TESTING

Five (5) borings were advanced to depths ranging from 10 to 15 feet below the existing grades at the project site on March 1st, 2022, utilizing the CME-45 all-terrain rotary drilling rig with 2.25" hollow stem augers, operated by Wertz Geotechnical Engineering, Inc. (WGE) drilling staff. The boring locations were selected by Motter and Meadows, and field marked by WGE personnel utilizing a handheld GPS unit at the approximate locations shown on the attached Figure 1 Geotechnical Boring Location Plan.

Standard penetration testing and sampling were performed at the depth intervals shown on the attached Boring Logs utilizing a 140-lb automatic hammer falling 30 inches to drive a 2-inch outer-diameter split spoon sampler over three six-inch intervals. Collected samples were examined and visually classified by our personnel in the field based on the visual-manual procedure (ASTM D-2488). Representative samples were retained and transported to our office for further examination and the assignment of laboratory testing by one of our geotechnical engineers.

Moisture content testing was performed per ASTM D-2216. Twenty-three (23) moisture content tests were conducted on the retained samples. A description of the results is included in Attachment A, Geotechnical Boring Logs.

Static groundwater level observations and hole depth soundings were made upon completion of each boring and were followed by backfilling the holes. Groundwater level observations made at each boring are indicated on the attached Boring Logs. It should be noted that groundwater levels and zones of saturation should be expected to fluctuate seasonally based on variation in amounts of rainfall, evapotranspiration, runoff from impervious areas, and several other factors.

SUBSURFACE CONDITIONS

Soil boring data collected at the site indicated a shallow upper layer of clayey soils underlain by sand and gravel soils. These can be described for engineering purposes as the following:

- Borings B-1, B-2 and B-4 were advanced in areas with topsoil less than 12 inches thick. Borings B-3 and B-5 were advanced into an 8 to 12 inch thick upper layer of gravel fill.
- Borings B-1, B-2 and B-5 encountered an upper layer of soft to medium stiff clayey soil extending to 3 feet below grade. The soils were damp/moist to moist clayey silts and silty clays with trace organics. The blow counts of Borings B-2 and B-5 indicated a medium stiff consistency, but further analysis by the WGE geologist in the soils laboratory suggested the soils should be considered soft to medium stiff. The moisture

content in the upper clays ranged from 16% to 25%. No clayey soils were encountered in Borings B-3 and B-4.

- With the exception of the clayey soils described above, all the encountered soils were sand/gravel soils or sand soils. These soils ranged from dry/damp to moist, and loose to very dense. Moist, loose sand/gravel soils were predominant.
- No groundwater was encountered during the geotechnical exploration.
- For all the borings, please refer to the attached Boring Logs for specific information related to the types, depths, and stratification of the material encountered onsite.

GEOTECHNICAL RECOMMENDATIONS

We offer the following for your consideration based on our analysis of the subsurface conditions encountered at the locations indicated; and the assumption that conditions between and away from the borings are similar to those that are known:

GENERAL CONSIDERATIONS

It is WGE's opinion that the native (non-fill) loose and better sand and sand/gravel soils, as well as properly compacted engineered fill are suitable for support of the planned structure with conventional spread and strip footing shallow foundation systems. It is WGE's engineering opinion that soft and soft/medium stiff clayey soils are not suitable for bearing foundation loads of the proposed structure. If soft or soft/medium stiff soils are encountered near the foundation subgrade, the foundations should extend through the fill material and bear on the underlying natural (non-fill) medium stiff clay, loose silt, sand and sand/gravel and/or or better soils. Any unsuitable foundation bearing soils would be undercut and backfilled with low strength mortar (LSM).

The floor slab and pavement subgrades should be densified via multiple passes of heavy compaction equipment and proof rolled. Any soft or yielding (pumping/rutting) areas should be undercut to a stable subgrade and backfilled with approved compacted engineered fill in accordance with the *Earthwork General Guidelines* below. The upper moist and soft to soft/medium stiff soils are generally weak and may not support heavy construction traffic. Earthwork during the drier summer months is recommend so that subgrade soils can be dried and recompacted.

Due to the upper layer of soft to soft/medium stiff clayey soils encountered in Borings B-1, B-2 and B-5, pockets of shallow undercuts should be anticipated. The undercutting excavation should extend laterally beyond the slab and pavement limits a distance equal or greater than the difference in elevation between the bottom of the undercut excavation and the planned bearing elevation.

Recommendations are provided in the Earthwork General Guidelines section below for the quality, compaction, testing and inspection of engineered fill. Care should be taken to evaluate foundation, slab and pavement subgrades prior to stone or concrete placement. All subgrades should be observed by a qualified soils technician under the supervision of a geotechnical engineer, and field density tests should be made to ensure compaction to specification.

EXCAVATIONS

No groundwater was encountered during the geotechnical exploration. It is our opinion that any water influx into the excavations less than 15 feet below existing grades can likely be controlled by pumping from local sumps within the excavation.

Excavations should either be sloped back or shored in accordance with Occupational Safety & Health Administration (OSHA) regulations and any other applicable local codes. Parameters for design of temporary shoring are included in those regulations. Due to the presence of very loose silts and uncontrolled fill material on the site, with respect to temporary excavation side slopes, the site soils should be classified as Type "C" per OSHA. Therefore, temporary excavations should be cut back to a temporary slope no steeper than a 1.5:1 (horizontal: vertical).

The existing soils encountered onsite can likely be excavated with a large-sized hydraulic excavator equipped with a standard earth bucket.

EARTHWORK GENERAL GUIDELINES

- Prior to construction, all existing sod, topsoil, trees, vegetation, materials storage debris and/or existing pavements should be completely stripped from within the footprint of the proposed building and areas to be cut or to receive engineered fill.
- All surfaces cut to subgrade elevation or subgrades to receive fill should be proof rolled under the direction of an on-site geotechnical engineer or his direct assigns. Any areas of soft or yielding soils, or obviously contaminated zones should be undercut or stabilized as directed by the engineer.
- The engineered fill should be clean, inert soil which should be approved by the geotechnical engineer. The engineered fill should have a dry density greater than 100 pcf, liquid limit less than 40% and an organic content less than 1%.
- Engineered fill material should be placed on the approved subgrade in controlled lifts. Each lift should be compacted to a stable condition at a minimum of 98% maximum dry density per ASTM D-698, with a moisture content between 2.0% below to 2.0% over optimum moisture. All filling operations should be observed by a qualified soils technician under the supervision of a geotechnical engineer. Field density tests should be made to ensure compaction to specification.

- All surfaces should be sealed and sloped after each day or prior to inclement weather to promote positive drainage of water offsite.
- Construction traffic should be kept off any wet subgrades. If site work is performed during times of drier weather, the need for additional repairs and stabilization to the subgrade may be substantially reduced. Therefore, it is recommended that site work be performed during these times.

BEARING CAPACITY AND FOUNDATIONS

Shallow spread and strip footing foundation systems are recommended for transmitting structural foundation loads to the subsoil. Estimated maximum total and differential settlements for footings designed in accordance with the recommendations provided in this report are approximately 1 inch and ½ inch, respectively.

In general, the native (non-fill) loose silts, medium stiff clays, or approved compacted engineered fill materials can support a maximum net allowable bearing pressure of 2,000 psf. The following provisions for foundation design and construction should apply:

- The foundation subgrades, for an allowable design bearing pressure of 2,000 psf, should consist of natural medium stiff or better clay soil, loose or better sand and silt soils, or approved engineered fill. The foundation subgrade should be evaluated and approved by a geotechnical engineer, or their representative, prior to concrete placement. Any deleterious foundation subgrade soils be undercut and backfilled with lean concrete or compacted stone as directed by our field engineer.
- The foundation subgrades should be concreted in a dry and frost-free condition as soon after exposure as possible.
- The ground surface surrounding structures should be graded to direct surface drainage of water away from all exterior foundation walls and members.
- All exterior footings should be located below the depth of potential frost penetration (39 inches).

SEISMIC SITE CLASSIFICATION

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Seismic Site Classification is required to determine the Seismic Design Category for a structure. The Seismic Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, Standard Penetration Test (SPT) resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7. Borings at this site were extended to a maximum depth of 15 feet. The site properties below the boring depths to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area.

If the foundation system is designed in accordance with the recommendations herein, the site would be characterized as Seismic Site Class "D". This Seismic Site Classification should be used for design of the structure, according to the Ohio Building Code and Related Codes, section 1613.5.2 "Site Class Definitions."

FLOOR SLAB AND PAVEMENT SUPPORT

Concrete slabs and asphalt pavement would be adequately supported on site soils prepared according to "Earthwork General Guidelines", or on engineered fill placed and compacted to those specifications. All floor and pavement subgrades should be proof rolled after they are graded and immediately prior to granular base placement. Any unstable areas will need to be scarified, dried and recompact to a stable condition; or undercut and backfilled with compacted engineered fill. Any organically contaminated soils in building and pavement areas should be undercut and backfilled with approved compacted engineered fill.

Floor slab subgrades should be evaluated prior to stone placement by our personnel. All industrial floors should have a minimum of 4 inches granular base (ODOT #304 crushed limestone or an approved equal). All interior slabs for offices should have a minimum of 4 inches of free draining granular base (ODOT #57 crushed limestone). A Modulus of Subgrade Reaction (k) of 100 pci should be used for design of the floor slabs.

A pavement design can be performed upon request after review of the site-specific traffic loadings and subgrade stabilization conditions. Catch basins should be provided with finger drains to allow drainage of the stone base.

STANDARD OF CARE AND LIMITATIONS

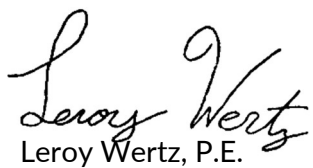
Our recommendations for this project were developed utilizing the soil information obtained from the test borings that were made at the proposed site. These geotechnical tests only depict the soil conditions at the specified locations and time at which they were made. The soil conditions at other locations on the site may differ from those occurring at the boring locations. Additionally, the conclusions and recommendations have been based upon the available soil information and the design details furnished to us. We should be immediately notified, if during construction, any conditions different from those found in this investigation are evident or our project assumptions are incorrect. We will advise you of any modifications to our conclusions and recommendations deemed necessary, after observing the exposed conditions and/or changes to the project scope. The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied.

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. Wertz Geotechnical Engineering, Inc. is not responsible for the conclusions, opinions, or recommendation made by others based upon the data included herein. We hope you will find this report satisfactory. Please contact our office at (330) 991-0041 if we can be of further service or you have questions regarding this submittal.

Respectfully submitted,



Kelly Luecke, P.E.
Project Engineer



Leroy Wertz, P.E.
Senior Project Engineer

FIGURE 1

Geotechnical Boring Location Map



LEGEND

 Boring Location



GEOTECHNICAL
ENGINEERING

400 Collier Drive, Doylestown, Ohio 44230
330-991-0041
OFFICE@WERTZGEO.COM

GEOTECHNICAL BORING LOCATION MAP

CLIENT
**MOTTER & MEADOWS
ARCHITECTS**
600 MARKET AVE NORTH,
CANTON, OH 44702

SITE
**2664 HARRISBURG ROAD
NE, CANTON, OH 44705**

PROJECT NAME
**CANTON WATER
DEPARTMENT SERVICE
SHOP ADDITION**

LAYOUT BY BK	DATE: 3/1/2022
DRAWN BY BK	FIGURE NO. 1
CHECKED BY LW	

Wertz Geotechnical Engineering (WGE) shall not be held liable for improper or incorrect use of the data presented and/or contained herein. These data and related graphics are not legal documents and are not intended to be used as such. WGE does not guarantee the positional or thematic accuracy of the GIS data presented in this figure. WGE gives no warranty, expressed or implied, as to the accuracy, reliability, or completeness of these data.

FIGURE 2

USDA Web Soil Survey Map

Soil Map—Stark County, Ohio



Map Scale: 1:1,790 if printed on A landscape (11" x 8.5") sheet.

0 25 50 100 150 Meters

0 50 100 200 300 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

3/1/2022
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Stark County, Ohio

Survey Area Data: Version 18, Sep 14, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 15, 2020—Aug 21, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CuB	Chili-Urban land complex, undulating	11.2	94.9%
Ge	Ginat silt loam	0.6	5.1%
Totals for Area of Interest		11.8	100.0%

FIGURE 3

ODNR Bedrock Geology Map

CANTON WATER DEPT. SERVICE SHOP ADDITION PROJECT GEOLOGIC MAP



Estimated bedrock encounter depth is approximately 210 feet below current site grades.

ATTACHMENT A

Geotechnical Boring Logs



WERTZ GEOTECHNICAL ENGINEERING, INC.
DRILLING | MATERIAL TESTING | ENGINEERING

400 COLLIER DRIVE
DOYLESTOWN, OHIO, 44230
(330) 991-0041

PROJECT: Canton Water Department Service Shop Addition PROJECT NO.: 20221037 DRILL RIG: CME 45 BORING ID: B-1 Page 1 of 1
LOCATION: Canton, Ohio METHOD: Hollow Stem DATE STARTED: 3/1/2022
LOGGED BY: BK AUGER SIZE: 2.25 inches DATE COMPLETED: 3/1/2022
DRILL CREW: TT & CF HAMMER: Auto SPT ELEVATION: 1059 feet MSL
GROUNDWATER ENCOUNTER DEPTH: None GROUNDWATER AT COMPLETION: None TOTAL DEPTH: 10' CAVE DEPTH: 7'

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE DEPTH	BLOW COUNTS (BLOWS/FOOT)	RECOVERY (INCHES)	POCKET PEN (TSF)	GRAPHIC LOG	LITHOLOGY
1		AS	-	-	-		9" TOPSOIL
2	1	1.0-2.5	1-1-3	12	0.5		Moist, soft, brown, silty CLAY, minor fine to coarse sand, trace organics. Wn%: 23.2
3							
4	2	3.5-5.0	3-3-3	13			Moist, loose, brown, silty fine to coarse SAND AND GRAVEL, trace clay. Wn%: 12.1
5							
6							
7	3	6.0-7.5	3-2-3	4			Moist, loose, brown, silty fine to coarse SAND AND GRAVEL, trace clay, Wn%: 14.3
8							
9	4	8.5-10.0	3-4-8	15			Moist, medium dense, brown, silty fine to coarse SAND AND GRAVEL, trace clay. Wn%: 19.2
10							
11							Note: Ground surface elevations at boring locations estimated using data from Stark Co. GIS Map topography.
12							
13							
14							
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16							
17							
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DOYLESTOWN, OHIO, 44230
(330) 991-0041

PROJECT: Canton Water Department Service Shop Addition PROJECT NO.: 20221037 DRILL RIG: CME 45 BORING ID: B-2 Page 1 of 1
LOCATION: Canton, Ohio METHOD: Hollow Stem DATE STARTED: 3/1/2022
LOGGED BY: BK AUGER SIZE: 2.25 inches DATE COMPLETED: 3/1/2022
DRILL CREW: TT & CF HAMMER: Auto SPT ELEVATION: 1060 feet MSL
GROUNDWATER ENCOUNTER DEPTH: None GROUNDWATER AT COMPLETION: None TOTAL DEPTH: 15' CAVE DEPTH: 9'

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE DEPTH	BLOW COUNTS (BLOWS/FOOT)	RECOVERY (INCHES)	POCKET PEN (TSF)	GRAPHIC LOG	LITHOLOGY
1		AS	-	-	-		5" TOPSOIL
2	1	1.0-2.5	2-2-3	18	1		Moist, medium stiff, brown CLAY, minor silt, trace organics. Wn%: 24.9
3							
4	2	3.5-5.0	3-3-4	16			Moist, loose, brown, silty, fine to coarse SAND AND GRAVEL. Wn%: 8.5
5							
6							
7	3	6.0-7.5	2-3-5	15			Moist, loose, brown, silty, fine to coarse SAND AND GRAVEL. Wn%: 12.3
8							
9	4	8.5-10.0	4-5-10	8			Moist, medium dense, brown, silty, fine to coarse SAND AND GRAVEL. Wn%: 13.0
10							
11							
12							
13							
14	5	13.5-15.0	21-21-50/1				Damp to moist, very dense, brown, silty, fine to coarse SAND AND GRAVEL. Wn%: 5.6
15							
16							Note: Ground surface elevations at boring locations estimated using data from Stark Co. GIS Map topography.
17							
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PROJECT: Canton Water Department Service Shop Addition PROJECT NO.: 20221037 DRILL RIG: CME 45 BORING ID: B-3 Page 1 of 1
LOCATION: Canton, Ohio METHOD: Hollow Stem DATE STARTED: 3/1/2022
LOGGED BY: BK AUGER SIZE: 2.25 inches DATE COMPLETED: 3/1/2022
DRILL CREW: TT & CF HAMMER: Auto SPT ELEVATION: 1061 feet MSL
GROUNDWATER ENCOUNTER DEPTH: None GROUNDWATER AT COMPLETION: None TOTAL DEPTH: 15' CAVE DEPTH: 7'

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE DEPTH	BLOW COUNTS (BLOWS/FOOT)	RECOVERY (INCHES)	POCKET PEN (TSF)	GRAPHIC LOG	LITHOLOGY
1		AS	-	-	-		8" GRAVEL FILL.
2	1	1.0-2.5	4-6-5	18			Damp, medium dense, brown, fine to coarse SAND, some gravel, minor silt. Wn%: 10.8
3							
4	2	3.5-5.0	4-4-3	18			Damp to moist, loose, brown, silty, fine to coarse SAND, some gravel. Wn%: 7.1
5							
6							
7	3	6.0-7.5	7-5-4	11			Moist, loose, brown, silty, fine to coarse SAND, some gravel. Wn%: 12.2
8							
9	4	8.5-10.0	3-3-4	14			Moist, loose, brown, silty, fine to coarse SAND, some gravel. Wn%: 16.1
10							
11							
12							
13							
14	5	13.5-15.0	23-27-26	18			Damp, very dense, brown, silty, fine to coarse SAND AND GRAVEL. Wn%: 7.4
15							Note: Ground surface elevations at boring locations estimated using data from Stark Co. GIS Map topography.
16							
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400 COLLIER DRIVE
DOYLESTOWN, OHIO, 44230
(330) 991-0041

PROJECT: Canton Water Department Service Shop Addition PROJECT NO.: 20221037 DRILL RIG: CME 45 BORING ID: B-4 **Page 1 of 1**
LOCATION: Canton, Ohio METHOD: Hollow Stem DATE STARTED: 3/1/2022
LOGGED BY: BK AUGER SIZE: 2.25 inches DATE COMPLETED: 3/1/2022
DRILL CREW: TT & CF HAMMER: Auto SPT ELEVATION: 1059 feet MSL
GROUNDWATER ENCOUNTER DEPTH: None GROUNDWATER AT COMPLETION: None TOTAL DEPTH: 15' CAVE DEPTH: 8'

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE DEPTH	BLOW COUNTS (BLOWS/FOOT)	RECOVERY (INCHES)	POCKET PEN (TSF)	GRAPHIC LOG	LITHOLOGY
1		AS	-	-	-		10" TOPSOIL.
2	1	1.0-2.5	3-7-6	18			Damp to moist, medium dense, brown, silty, fine to coarse SAND AND GRAVEL, minor clay. Wn%: 11.4
3							
4	2	3.5-5.0	5-4-4	3			Moist, loose, brown, silty, fine to coarse SAND, minor gravel.
5							
6							
7	3	6.0-7.5	3-3-3	6			Moist, loose, brown, silty, fine to coarse SAND AND GRAVEL. Wn%: 11.7
8							
9	4	8.5-10.0	10-10-11	15			Damp, medium dense, brown, fine to coarse SAND, minor gravel. Wn%: 6.7
10							
11							
12							
13							
14	5	13.5-15.0	7-5-6	18			Damp to moist, medium dense, brown, fine to medium SAND, trace gravel. Wn%: 4.0
15							Note: Ground surface elevations at boring locations estimated using data from Stark Co. GIS Map topography.
16							
17							
18							
19							
20							
21							
22							
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WERTZ GEOTECHNICAL ENGINEERING, INC.
DRILLING | MATERIAL TESTING | ENGINEERING

400 COLLIER DRIVE
DOYLESTOWN, OHIO, 44230
(330) 991-0041

PROJECT: Canton Water Department Service Shop Addition PROJECT NO.: 20221037 DRILL RIG: CME 45 BORING ID: B-5 Page 1 of 1
LOCATION: Canton, Ohio METHOD: Hollow Stem DATE STARTED: 3/1/2022
LOGGED BY: BK AUGER SIZE: 2.25 inches DATE COMPLETED: 3/1/2022
DRILL CREW: TT & CF HAMMER: Auto SPT ELEVATION: 1061 feet MSL
GROUNDWATER ENCOUNTER DEPTH: None GROUNDWATER AT COMPLETION: None TOTAL DEPTH: 15' CAVE DEPTH: N/A'

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE DEPTH	BLOW COUNTS (BLOWS/FOOT)	RECOVERY (INCHES)	POCKET PEN (TSF)	GRAPHIC LOG	LITHOLOGY
1		AS	-	-	-		12" GRAVEL FILL.
2	1	1.0-2.5	5-3-5	18	1.25		Damp to moist, medium stiff, brown, clayey SILT, minor fine to coarse sand. Wn%: 16.2
3							
4	2	3.5-5.0	4-3-4	6			Moist, loose, brown, silty, fine to coarse SAND AND GRAVEL. Wn%: 9.0
5							
6							
7	3	6.0-7.5	5-3-3	13			Moist, loose, brown, silty, fine to coarse SAND AND GRAVEL. Wn%: 10.0
8							
9	4	8.5-10.0	4-5-15	16			Moist, medium dense, brown and black, silty, fine to coarse SAND AND GRAVEL. Note: Black organic inclusions. Wn%: 10.7
10							
11							
12							
13							
14	5	13.5-15.0	11-14-15	18			Dry to damp, medium dense, brown, fine to coarse SAND AND GRAVEL. Wn%: 3.2
15							Note: Ground surface elevations at boring locations estimated using data from Stark Co. GIS Map topography.
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SECTION 31 22 00 - GRADING

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. This section includes the following.
 - 1. Rough Grading
 - 2. Finish Grading
 - 3. Stockpiling of topsoil and subsoil
 - 4. Disposal of unsuitable and excess materials

1.2 DEFINITIONS

- A. “Topsoil”: natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shades of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, and other objects more than 1-1/2 inches in diameter; and free of weeds, roots, and other deleterious materials.

1.3 SUBMITTALS

- A. For projects with storm water management systems provide final As Built survey and letter certifying storm water detention, retention, bio-retention cells have been constructed to the plan dimensions shown on the plans.

1.4 QUALITY ASSURANCE

- A. Pre-installation conference: Conduct conference at project site PART 2

PART 2 – PRODUCTS

2.1 NA

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify survey benchmarks and intended elevations of work.
- B. Verify all Storm Water Pollution Prevention Plans erosion control measures have been installed correctly prior to commencing work.

- C. Immediately notify the if suspected hazardous materials are encountered and cease operations in that area.
- D. Identify areas loosened by frost action, softened by flowing or weather, or containing unsuitable materials.

3.2 PREPARATION

- A. Remove material loosened by frost action, softened by flooding or weather, or containing unsuitable material. Replace and compact to same requirements as for specified fill in Section 31 20 00 EARTH MOVING.
- B. Stake and flag all known utility locations.
- C. Identify required lines, levels, grades and benchmarks/datum's.
- D. Locate and protect all above ground and below ground utilities, structures, signage, landscaping, light poles, poles and other item.to remain.
- E. Notify all private utility owners of work near their facilities.

3.3 GENERAL

- A. Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

3.4 EROSION CONTROL

- A. All erosion control must comply with:
 - 1. Ohio Rainwater and Land Development Manual and the projects Storm Water Pollution Prevention Plans.
 - 2. Protect areas with slopes exceeding 3H to 1V with erosion-control fiber mesh and with erosion-control blankets installed and stapled according to manufacturer's written instructions.
 - 3. Unless noted otherwise, protect areas with slopes not exceeding 3H to 1V by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/ acre to from a continuous blanket 1-1/2" in loose depth over a seeded area. Spread by hand, blower, or other suitable equipment.

3.5 ROUGH GRADING

- A. During all grading work the CONTRACTOR shall provide positive drainage across the site to the temporary storm water facilities.
- B. Topsoil remove and stockpile
 - 1. Strip all topsoil from areas that are to be excavated, landscaped, graded, or to have a structure built on it.
 - 2. Do not strip topsoil when wet or during inclement weather such as rain or snow.
 - 3. Separate all organic matter such as root zones, trash debris etc. from topsoil. Dispose of organic material off-site.
 - 4. Provide an area on site to stockpile the topsoil for future use on site or to be hauled away. Provide silt fence around the stockpile area. Keep topsoil away from other site soils.
- C. Subsoil removal and stockpiling
 - 1. Remove subsoil from areas that are to be excavated, landscaped, graded, or to have a structure built on it. See project Geotechnical Report for topsoil depth.
 - 2. Do not strip subsoil when wet or during inclement weather such as rain or snow.
 - 3. Provide an area on site to stockpile the topsoil for future use on site or to be hauled away. Provide silt fence around the subsoil area. Keep subsoil away from other site soils.
- D. Rough grade lawn area to a maximum of 4 H to 1 V. Steeper grades will require ground cover planting. Provide roundings at top and bottom of banks and at breaks in grade.
- E. Benching Slopes: All slopes that are steeper than 4H to 1V shall be benched horizontally to key the fill material into the slope for firm bearing and stability.
- F. Stability: Any damaged or displaced subsoil shall be replaced to the same requirements as called for in Section 31 20 00 Earth Moving.
- G. Disc level surfaces.
- H. Rough grade the site to achieve lines and grades indicated with allowances for imported fill thickness.
- I. Provide positive drainage from all buildings per the slope and grades show on the Site Grading Plan.

3.6 FINISH GRADING

- A. Prior to commencing with finish grading perform the following:
 - 1. Verify the subgrade prior to the placement of soil is properly contoured to the

elevations shown on the plans and compacted per the requirements of Section 31 20 00 Earth Moving

2. Verify that all backfill has been accepted and approved.
- B. Fine grade the site to the final plan elevations shown on the Grading Plan. All uneven areas and depressions shall be corrected to allow for positive drainage. Follow the profile of the subgrade and bring to the final elevations as shown on the plans.
 - C. Scarify sub-grade to a minimum depth of 5 inches before placement of topsoil. Remove all waste material.
 - D. Minimum depth for compacted screened topsoil shall be 6 inches for grass and adequate depth for other planting materials.
 - E. Protect newly graded areas from the elements. Repair all settlement and erosion and re-establish grades to the required elevations prior to acceptance.
 - F. If unstable soil or subgrade is encountered during construction the CONTRACTOR shall notify the OWNER/ARCHITECT or ENGINEER to approve corrective actions.
 1. If approved, the CONTRACTOR shall remove some or all of the unstable soil, place synthetic fabric and over material, or place aggregate refill, the finish graded section using approved material and compacted per Section 31 20 00 Rough Grading.
 2. The CONTRACTOR shall coordinate this work with the OWNER/ARCHITECT or ENGINEER in way that final measurements of the corrective measures taken can be measured and quantified.

3.7 STOCKPILING

- A. As part of the Site Clearing Plan called for in Section 31 20 00 Site Clearing provide an area on site to stockpile topsoil and excavated subsoil. Do not place the stockpiles over existing or new utilities unless approval is granted by the OWNER/ARCHITECT or ENGINEER.
- B. Provide positive drainage away from stockpile to prevent ponding or flooding of project area. Direct all drainage to temporary storm water facilities.
- C. The topsoil and subsoil stockpile shall be sloped no steeper than 2H:1V and at a maximum height of eight (8) feet,
- D. Provide silt fence around stockpile and immediately stabilize dormant stockpiles within seven (7) days per the specifications as shown on the projects Storm Water Pollution Prevention Plans. Dormant is considered any stockpile not actively used for more than thirty (30) days.

3.8 EXCESS MATERIAL

- A. Dispose of extra or unsuitable topsoil or subsoil material off-site.

3.9 TOLERANCES

- A. Excavations and Embankment work shall be performed and conform to the projects Grading Plan and if available cross sections and profiles. All work shall conform to the tolerances within this section. The CONTRACTOR shall understand and satisfy themselves as to the nature and distribution of the materials that they excavate.
- B. The CONTRACTOR shall verify their work with templates, slope boards or other approved devices accepted by the industry and to the satisfaction of the OWNER/ARCHITECT or ENGINEER.
- C. The following are the accepted tolerances that work shall conform to:
 - 1. For cut and fill slopes deviations of ½ inch measured in a horizontal plane will not be permitted and will need corrective actions.
 - 2. Shoulders and ditches, the horizontal measurements from the centerline shall not be less than the plan dimensions, and the elevations thereof shall not be higher than specified, but may vary not more than ½ inch below the established grades.
 - 3. Subgrades surface shall in no location vary more than ½-inch from a ten foot straight edge applied to the surface parallel to the centerline of pavement, nor more than ½-inch from subgrade elevation established by construction layout stakes.
 - 4. Finished Grade shall be installed within ½-inch from plan elevation shown on the Grading Plans.

3.10 CLEANING

- 1. Once finish grading has occurred leave all areas clean and raked, ready to receive grass seed or landscaping.

END OF SECTION 31 22 00

SECTION 31 23 33 - TRENCHING AND BACKFILL

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. This section includes the following.
 - 1. Underground utility trench excavation and safety
 - 2. Backfill materials and placement for underground utilities
 - 3. Utility identification marking tape and trace wire

1.2 DEFINITIONS

- A. Percent Compaction or Compaction Density: The field density of compacted material, expressed as a percentage of maximum dry density.
- B. Field Dry Density of Field Density: In-place density as determined by ASTM D1556 (Sand Cone Method), ASTM D 2167 (Rubber Balloon Method), or ASTM D 6938 (Nuclear Method).
- C. Maximum Dry Density: Laboratory density as determined by ASTM D698 (Standard Proctor) and occurring at the optimum moisture content of the soil being tested.
- D. Pipe Embedment: Comprised of the following or combination of:
 - 1. Foundation: Required only when the native trench bottom does not provide a firm working platform or the necessary uniform and stable support for the installed pipe.
 - 2. Bedding: The zone between the bottom of trench and the bottom of pipe. Provides a firm, stable and uniform support of the pipe.
 - 3. Haunching: Zone from the bottom of the pipe to the springline of the pipe.
 - 4. Initial Backfill: From the top of the bedding or foundation layer to six (6) inches above the top of pipe, unless otherwise noted on the Construction Document trench details. Also, known as pipe cover.
 - 5. Final Backfill: After the initial backfill or pipe cover to the final surface or the pavement subgrade.
 - 6. Backfill: Both initial and final backfill.

1.3 SUBMITTALS

- A. Provide material for pipe bedding, initial and final backfill including the following:
 - 1. Name of Source
 - 2. Location
 - 3. Date of Sample
 - 4. Sieve Analysis
 - 5. Laboratory Compaction Characteristics
- B. Where submittals review format, whether hard copy or software based, includes pre-determined language that includes the word “approved”, the following shall apply:
 - 1. “Approved” shall be defined as “Reviewed, No Exceptions Taken”.
 - 2. “Approved as Noted” shall be defined as “Reviewed, Exceptions as Noted”.

1.4 QUALITY ASSURANCE

- A. The CONTRACTOR shall compact all backfill material in accordance with the specifications of the pipe manufacturer.
- B. The OWNER shall provide quality control acceptance field testing services of compacted backfill material, unless otherwise noted. The testing agency shall provide the OWNER/ARCHITECT and ENGINEER a letter certifying compaction results.

1.5 DELIVERY SOTRAGE AND HANDLING

- A. If the trench detail calls for geotextile fabric it shall be protected from sunlight’s ultraviolet rays during transportation and storage. Do not leave geotextile fabric exposed to sunlight’s ultraviolet rays for more than five (5) days during installation.
- B. Do not leave PVC piping exposed to sunlight’s ultraviolet rays for more than five (5) days during installation, transportation, or storage.

PART 2 – PRODUCTS

2.1 BACKFILL MATERIALS

- A. Trench bedding and Initial Backfill for the following pipes and fittings shall follow the pipe manufactures recommendations, the Trench detail shown on the Construction Documents. Where discrepancies occur Trench details on plan govern for material.

B. The following are pipe bedding and cover requirements:

1. Reinforced Concrete Pipe and Fittings
 - a. Bedding shall consist of coarse interlocking aggregate No. 57, 6, 67, 68, 7, 78, or 8 stone for 60-inch or smaller pipe. For 66-inch or larger diameter pipe No. 4 aggregate may be used.
 - b. Pipe Cover shall consist of compacted ASTM D Class I stone course interlocking aggregate No. 57, 6, 67, 7, 78, or 8 stone.
2. High Density Polyethylene (HDPE) Pipe and Fittings
 - a. Bedding shall consist of coarse interlocking ASTM D2321 Class I aggregate No. 57 stone.
 - b. Pipe Cover shall consist of compacted course interlocking ASTM D2321 Class I aggregate No. 57 stone.
3. Ductile Iron Pipe and Fittings
 - a. Bedding shall be Select Granular Backfill (Spent core sand or foundry sand is strictly prohibited).
 - b. Pipe Cover shall consist of compacted Select Granular Backfill (Spent core sand or foundry sand is strictly prohibited)
4. Polyvinyl Chloride (PVC) Pipe and Fittings
 - a. Pipe bedding shall be No. 57, 6, 67, 68, 7, 78, or 8 stone.
 - b. Pipe cover shall be No. 57, 6, 67, 68, 7, 78, or 8 stone.
5. Pavement Underdrain / Curb Drains
 - a. ASTM No 57 Stone

C. Final Backfill (above pipe cover) shall consist of the following:

1. Premium Backfill where trenches fall underneath or within the zone of influence at a 1:1 slope of all pavement, concrete curbs and sidewalks or structures and shall consist of ODOT 304 Aggregate Base. The materials shall be well graded with no particles larger than two (2) inches and having a maximum gradation meeting the limits described in the ODOT specifications. The backfill shall be compacted in 6-inch lifts with equipment acceptable to the pipe manufacturer.
2. Regular backfill from trench may be used for all areas not under pavement. Suitable material may be Class I, II, III or excavated materials installed in maximum 8" lifts, 93% compacted. No rocks over 1-1/2" are acceptable in upper 8" of backfill.

2.2 EQUIPMENT

- A. Compaction equipment shall be capable of consistently achieving the specified compaction requirements without damaging pipes.

2.3 UTILITY IDENTIFICATION

- A. Tracer Wire: Continuous, single-stranded copper wire, insulated, maximum 10 AWG. Clear plastic covering, imprinted with inscription describing specific utility in large letters.
- B. Detectable Warning Tape: acid-and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches wide and 5 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection. Tape shall be manufactured using a 0.8 mil clear virgin polypropylene film, reverse printed and laminated to a 0.35 mil solid aluminum foil core, and then laminated to a 3.75 mil clear virgin polyethylene film. Tape shall be printed using a diagonally striped design for maximum visibility, and meet the APWA Color-Code standard for identification of buried utilities. Detectable marking tape shall be Pro-Line Safety Products (or approved equal) and made in the USA., detectable by metal detector when tape is buried a maximum of 12” to 18” below grade; colored as follows:

1. APWA Uniform Color Codes

- a. RED – Electric Power Lines, Cables, Conduit, and Lighting Cables.
- b. YELLOW – Gas, Oil, Steam, Petroleum, or Gaseous Material.
- c. ORANGE - Communication, Alarm or Signal Lines, Cables, or Conduit.
- d. BLUE – Potable Water
- e. GREEN – Sewers and Drain Lines (Tape shall indicate storm or sanitary)
- f. WHITE - Proposed Excavation Limits or Route
- g. PINK – Temporary Survey Markings, Unknown / Unidentified Facilities
- h. PURPLE – Reclaimed Water, Irrigation, and Slurry Lines PART 3

PART 3 – EXECUTION

3.1 EXAMINATION

- A. When the CONTRACTOR trenching operations encounter existing or abandoned underground storage tanks (UST’s), the operations shall be temporarily discontinued and notify the OWNER/ARCHITECT/ENGINEER. The OWNER/ARCHITECT/ENGINEER will contact an Environmental Engineer to

determine the disposition thereof and further direction provided.

- B. When the CONTRACTOR trenching operations encounter remains of prehistoric people's site or artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and notify the OWNER/ARCHITECT/ENGINEER. The OWNER/ARCHITECT/ENGINEER will contact archeological authorities to determine the disposition thereof and further direction provided.

3.2 PREPARATION

- A. As per Section 31 20 00, Earth Moving

3.3 SAFETY

- A. Trench boxes or sheeting and shoring shall be used for trenches per OSHA specifications.

3.4 PROTECTION OF IN-PLACE CONDITION

- A. As per Section 31 20 00, Earth Moving

3.5 RESTORATION

- A. As per Section 31 20 00, Earth Moving

3.6 TRENCH EXCAVATION

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frostline, 48" unless noted otherwise by the Contract Documents.
- C. Excavate trenches to uniform widths, in accordance with OSHA guidelines, to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
- D. Trench bottoms: excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape sub-grade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench sub-grade.
 - 1. For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed sub-grade.
 - 2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of

trench to support bottom 90 degrees of pipe circumference.

3. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- E. Preserve material below and beyond the line of excavation.
- A. Locate all stockpile excavated trench material at least four (4) feet from edge of excavations and prevent cave-in or bank slides.
- B. Remove rocks larger than six (6) inches or as required by plan notes, seal if required, and backfill with bedding material.
- C. See Section 31 20 00, Earth Moving for additional requirements.

3.7 UNAUTHORIZED EXCAVATION

- A. CONTRACTOR is responsible for backfilling unauthorized excavations.
- B. Unauthorized excavations which extend to and expose rock will be sealed with at least six (6) inches of LSM, concrete, or sprayed with bitumen within eight (8) hours of exposure. If sealing is delayed more than eight (8) hours, over excavate at least six (6) inches below the bottom to expose the fresh rock and seal within six (6) hours.

3.8 BACKFILL

- A. CONTRACTOR is responsible to obtain all inspections and approvals for trench and pipe installation.
- B. All trenches and excavations shall be backfilled as soon as practical after the pipe has been installed unless other protection of the pipe is directed or shown on the plans.
- C. Coordinate backfilling with utilities testing.
- D. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- E. The backfill around the pipe up to the top of pipe shall be placed in loose layers not exceeding six (6) inches per layer and thoroughly compacted by hand or power tampers approved by the ARCHITECT or ENGINEER. Great care shall be used to obtain thorough compaction under the haunches and along the side of pipes. Over the top of pipe, backfill layers of approximately eight (8) inch depth shall be added with each layer compacted separately and thoroughly until the trench is completely and uniformly filled to a depth of two feet above the top of the pipe.
- F. Backfilling against pipe structures, whose joints involve the use of cement mortar or other concrete, or where buttresses are constructed, shall not be done until mortar has set at least 12 hours.

- G. Compaction over one foot above the pipe shall be done with approved mechanical tampers. Compaction density be per the pipe manufacture specifications.
- H. Backfill materials shall be brought up evenly by depositing the material in layers approximately eight (8) inches in loose depth and without damaging the pipe by shock, jar or excessive free fall. Each layer shall be thoroughly compacted by power tampers operated with care so as to not to damage the underlying pipe or appurtenances. Hand tampers may be used in corners or narrow places inaccessible to power tampers. If compaction is done using hydraulically-operated backhoe mounted compactors with minimum rated impulse force of 6,400 pounds with a minimum 2,000 cycles per minute, the backfill material may be deposited in layers not more than two (2) feet in loose depth. Layers in excess of two feet may be deposited only if tests, conducted at the CONTRACTOR'S expense, show, to the satisfaction of the ARCHITECT and ENGINEER that the specified degree of compaction is being achieved. There shall be at least three feet of compacted backfill over the pipe before this method of compaction may be employed.
- I. For all areas not under pavement, sidewalks and curbs the backfill shall be compacted to 90% of the maximum dry density at $\pm 2\%$ of optimum moisture content as determined by tests approved by or conducted by the ARCHITECT/ENGINEER. Backfill shall be compacted to not less than 98% of the maximum dry density at $\pm 2\%$ of optimum moisture content for areas under pavement, sidewalks and curbs.
- J. Backfill shall be kept completed up to a point within 100 feet of the end of the newly installed pipe unless directed by the ARCHITECT or ENGINEER. During backfill operations, no sheeting or shoring shall be removed without permission from the ARCHITECT or ENGINEER.
- K. Backfill trench to the pavement subgrade or the finished grade less topsoil.
- L. Provide 4 inch thick, concrete-base slab support for piping or conduit less than thirty (30) inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway sub-base.
- M. Backfill trenches excavated under footings and within 18 inches of bottom of footings; fill with concrete to elevation of bottom of footings with approval of ENGINEER.
- N. Place backfill as to not disturb or damage nearby work or facilities.
- O. Maintain all fill materials within two (2) percent of optimum moisture, to attain required compaction density.
- P. Place and compact material in equal continuous layers.
- Q. Maximum compacted depth is six (6) inches for aggregate material and eight (8) inches for soil materials, unless shown differently in the plans.
- R. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.

3.9 COMPACTION

- A. As per Section 31 20 00, Earth Moving.

3.10 UTILITY IDENTIFICATION

- A. Install marking tape over all site utilities, twelve (12) inches below finish grade or as shown on the Trench Details in the plans. Install six (6) inches below subgrade under pavements and slabs.
- B. Install tracer wire at top center of parking tape; pull wire taut to remove slack.
- C. Extend tracer wire to utility boxes, manholes, hand holes, and junctions etc. to allow for connection to subsurface location equipment.

3.11 FIELD QUALITY CONTROL AND ASSURANCE

A. General

1. The CONTRACTOR shall perform field quality control tests separate from acceptance testing. CONTRACTOR test results will not be used by the OWNER/ARCHITECT or ENGINEER for acceptance.
2. Field density testing for quality assurance shall be done in accordance with ASTM D1556, STM D2167, or ASTM D6938.
3. Compaction tests shall be deemed to comply with specifications when no more than one (1) test of any three (3) consecutive tests performed falls below the specified relative compaction. The one test shall be no more than three (3) percentage points below the specified compaction. The CONTRACTOR shall pay for the costs for any retesting or additional work not conforming to these specifications.
4. Where compaction tests indicate a failure to meet the specified compaction, the ARCHITECT/ENGINEER/CONTRACTOR take additional tests in each direction until the extent of the failing area is identified. Rework the failed area until the specified compaction has been achieved.

B. COMPACTION

1. Material shall be placed and compacted in layers until the dry density is not less than the percentage of maximum dry density indicated in the table below determined by ASTM D698

Max Lab Dry Wt. (lbs/ft ³)	Min. Compaction Requirements (% Lab Max.)
90 to 104.9	100
105 to 119.9	98
120 or more	95

2. The OWNER/ARCHITECT or ENGINEER will evaluate field density test results in relation to maximum dry density as determined by testing the material in accordance with ASTM D698 (Standard Proctor).
3. Location of field density tests shall be determined by the OWNER/ARCHITECT and ENGINEER.
4. Minimum frequency of the field density tests shall be as follows:
 - A. Under pavement, sidewalks, curbs, other structures: 1 per lift for every 150 lineal feet of trench.
 - B. Not under pavement, sidewalks, curbs, other structures: 1 per alternate lift for every 250 lineal feet of trench.
 - C. If requested by the OWNER/ARCHITECT or ENGINEER, the contractor shall take more frequent tests.

3.12 SHRINKAGE

- A. Backfill trench to a height to allow for the shrinkage or consolidation of the backfill material over time.
- B. If backfill settles over trenches prior to subgrade work install additional backfill to level off areas.

END OF SECTION 31 23 33

SECTION 32 12 16 - ASPHALT PAVING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Work included in this section pertains to all materials, equipment, finishing methods, installation, striping, symbols, etc. that relate to flexible paving.

1.02 DEFINITIONS

- A. ODOT: Ohio Department of Transportation Construction and Materials Specifications (most current edition).

1.03 APPLICABLE SPECIFICATIONS

- A. The following standards form a part of these specifications:
 - 1. The American Society for Testing Materials Standards (ASTM):
 - a. C 29 Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate.
 - b. C 127 Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.
 - c. D 75 Standard Practice for Sampling Aggregates.
 - 2. ODOT standard specifications (latest edition):
 - a. Section 304 - Aggregate Base.
 - b. Section 441 - Asphalt Concrete - Mix Design and Quality Control.
 - c. Section 407 - Tack Coat.
 - d. Section 412 - Crack Sealing Asphalt Pavements.
 - e. Section 418 - Asphalt Pavement Joint Adhesive.
 - f. Section 633 Conditioning Existing Pavement Prior to Hot Mix Asphalt (ASPHALT) Overlay
 - g. Section 635 - Cleaning and Preparation of Pavement Surfaces for Pavement Markings.
 - h. Section 640 - Pavement Markings.
 - i. DELETED

1.04 SYSTEM DESCRIPTION

- A. Provide hot mix asphalt paving according to materials, workmanship, and other applicable requirements of standard state specification.
- B. Special Conditions

1. Protection of work in place

- a. All paving work shall be protected from construction traffic at all times after completion. All damaged work shall be replaced with no additional payment.

1.05 SUBMITTALS

A. Quality Assurance / Control Submittals:

1. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
2. Job-Mix Designs: Certification by authorities having jurisdiction, of approval of each job mix proposed for the Work:
 - a. Certification: Provide material certificates signed by the material producer and the CONTRACTOR, certifying that each mixture does not contain ferrous material or ferrous minerals of any kind.

1.06 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

B. Asphalt testing service: OWNER will engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixes (if required by the OWNER).

C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of the ODOT Construction Materials and Specifications for asphalt paving work, except where modified, changed or added to in this specification:

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to the Section.

D. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
 - a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
 - b. Review condition of subgrade and preparatory work.
 - c. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
 - d. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Asphalt shall be delivered to the site per ODOT requirements and maintain asphalt temperature to apply at the temperatures called for in Section 401.

1.08 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Asphalt is to be delivered and installed at required temperature per mix design.
2. Asphalt trucks are to be tarped and properly insulated during cold weather conditions (less than 50 degrees F).
3. If the distance of hauling asphalt exceeds 20 miles insulate truck beds to maintain workable temperatures and covers are fastened against the wind.
4. Do not exceed a 50 mile distance hauling asphalt from the plant unless approved by the engineer and a written guarantee by the asphalt manufacture that the integrity of the asphalt delivered to the site will meet ODOT requirements for installation.
5. In no case shall more than 90 minutes elapse from loading the asphalt mixture on the truck to discharge into the spreading equipment.
6. The CM/OWNER or ENGINEER has the right to reject and send back any mix design that does not meet the required asphalt delivered temperature at the time of spreading at no cost to the owner for loss of material.
7. Temperature required for paving material component will determine temperature required for scheduled paving operation.
8. No mixture shall be spread when the subbase is wet or when other conditions prevent proper spreading, finishing or compaction.
9. Tack Coat: Comply with minimum atmospheric and surface temperature of course to be installed.
10. DELETED
11. ODOT 301 - Asphalt Temperature: Minimum air temperature for placement based on nominal compacted lift thickness is 40 degrees F. The minimum mixture temperature when delivered to the paver is 250 °F (120 °C). When using warm mix asphalt the minimum temperature is 230 °F (110 °C). The mixture temperature should be checked at a minimum, 4 times per day and more if required. The temperature should be documented in the project records
12. ODOT 441 - Asphalt Temperature: Minimum surface temperature for placement based on nominal compacted lift thickness as follows per ODOT Section 401.06.
 - a. 36 degrees F and rising at time of placement (greater than 3 inch). If paving on aggregate or subgrade use air temperature of 40 degrees F or higher.
 - b. 40 degrees F and rising at time of placement (1.5 to 2.9 inches).
 - c. 50 degrees F and rising at time of placement (1.0 to 1.4 inches).
 - d. 60 degrees F and rising at time of placement (less than 1.0 inch).
 - e. 40 degrees F and rising at time of placement (variable Intermediate Course, 0 to 3.0 inches).
 - f. In addition to the above surface temperatures requirements do not place surface courses if the air temperature is less than 40 degrees F.

13. Surface temperature measurements should be taken using the following procedures:
 - a. When taking a reading in the sun, place the thermometer on the pavement and then shade that area with a clipboard, cardboard, or other available shading material. Then take the temperature reading after approximately 3 minutes. The intent is not to shade the area to allow it to cool, but to protect the thermometer from obtaining a false reading due to direct exposure to the sun.
 - b. The surface temperature should not be taken under the only shade tree or at the only sunny (unshaded) spot on the project. The surface temperature should be taken at a representative area.
 - c. The surface temperature should be taken in the lane to be paved and not the adjacent berm.
 - d. On Portland cement concrete pavements where flexible repairs have been performed, the surface temperature of the Portland cement concrete will be the governing temperature.
 - e. A new surface temperature should be taken when the existing pavement surface material changes (asphalt concrete to port land cement concrete or vice versa) to ensure that the new surface meets the minimum temperature specification. If this specification is not met, paving operations must be discontinued until the surface reaches specification temperature. Paving operations may be moved to a different area of the project where the surface meets minimum specification temperature
14. **~~Seasonal limitation, place asphalt surface course between May 1st and October 31st. When placing surface course outside of seasonal limitations, provide a limited warranty against defects in such work.~~**
15. During a rain event, a load of material in the process of being dumped into the paver may be placed, with the requirement that the rollers follow closely behind the paver and a construction joint is formed at the end of the run. Do not allow waiting trucks to be to be dumped and placed. The material in the waiting trucks will retain sufficient heat for proper placing and compacting for an hour or more depending on the ambient temperature. Water can be kept from accumulating on the covers of the trucks and draining into the asphalt mixture by raising the truck beds slightly. These loads may be placed when conditions improve if the asphalt temperature is acceptable and the surface being paved is in a reasonably dry condition.
16. Asphalt delivery trucks are not allowed to clean out truck beds on the pavement that will be paved. The material that remains in truck beds is cold, will not compact correctly often causing a bump in the pavement and likely a future pot hole. Spreading or broadcasting the cold material across the pavement prior to paving does not solve the problem. The contractor shall designate a cleanout area and ensure truck drivers are using it.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Aggregate base shall be in accordance with ODOT Item 304 Aggregate Base. The following materials are prohibited: Slag, crushed ACBFS, granulated slag, open hearth slag or steel slag.

- B. Asphalt Base Course shall be ODOT Item 301 - Asphalt Concrete Base
- C. Intermediate course shall be in accordance with ODOT 441 - Asphalt Concrete Intermediate Course, Type 2, PG 64-22 (448)
- D. Surface course shall be in accordance with ODOT 441 - Asphalt Concrete Surface Course, Type 1, PG 64-22 (448)
- E. Gutter sealer shall be in accordance with ODOT CMS 705.04.
- F. Tack coat shall be in accordance with ODOT Item 407 - Tack Coat.
- G. The OWNER will engage the services of a testing laboratory to insure compliance with all specifications.
- H. Recycled Asphalt is permitted provided that it meets ODOT specifications Section 401 and does not exceed the limits of Table 401.04. Recycled Asphalt Shingles (RAS) are prohibited.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 - 2. Proof roll with a loaded 10-wheel, tandem-axle dump truck loaded with at least 20 tons of material.
 - 3. Excavate soft spots, unsatisfactory soils, and area of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.
- C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION OF COMPACTED AGGREGATE BASE

- A. The entire area to receive compacted aggregate shall be proof rolled with a tandem dump truck loaded with at least 20 tons. The proof rolling shall be executed prior to installing the compacted aggregate. All soft and yielding areas shall be repaired.
 - 1. The acceptable observed subgrade deflection shall be 1/2 inch or less measured at the rear tire in the cross section perpendicular direction to traffic direction using a 10-foot straight-edge and 3/8 inch or less measured at the rear tire in the parallel direction of traffic using a 10-foot straight-edge.

- B. Compacted aggregate shall be installed immediately after acceptance of the subgrade proof roll operation by the soils engineer and Engineer.
 - 1. The subgrade shall be repaired and the proof roll operation repeated if approved subgrade is disturbed by construction traffic, rain or other circumstance prior to placing the compacted aggregate.
 - 2. The proof roll operation shall be repeated in the event the subgrade is left exposed for 3 work days or more prior to placing the compacted aggregate.
 - 3. No not spread on frozen surfaces or use frozen material.
- C. Place the aggregate material in accordance with applicable sections of the Ohio Department of Transportation CMS and as hereinafter specified.
- D. Aggregate material shall be compacted to thickness indicated on the Drawings. Each lift shall be compacted with approved rollers to no less than 100 percent of the maximum dry density as determined by Method C of AASHTO T99, as modified in Article 2.03.24.
- E. Do not exceed a compacted lift thickness of:
 - 1. 8 inches when using vibratory rollers greater than 12 tons.
 - 2. 6 inches with vibratory rollers weighing 10 to 12 tons.
 - 3. 4 inches with no vibratory roller. If the contractor is compacting with a vibrating plate compactor, the maximum lift thickness is 4 inches. If the contractor is compacting with a roller without any vibration, the maximum lift thickness is 4 inches.
 - 4. Can use a lighter roller with equivalent centrifugal force.
 - 5. Centrifugal force is the weight with vibration.
 - 6. Contractor needs to document the roller weight requirements are met.
- F. Place in equal lifts when the specified thickness exceeds 8 inches.
 - 1. Example: if 12-inch lift is specified, place in two 6 inch lifts
- G. All compacted aggregates for all bituminous pavements shall be install in multiple lifts, as indicated on the drawings.
- H. Grade Control: During construction maintain lines and grades, including crown and cross-slope of compacted aggregate course.

3.03 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving. Existing surfaces to receive asphalt must be clean prior to the installation of any portion of the work. Clean the surface on which the asphalt concrete is to be placed and keep it free of accumulations of materials that would, in the judgment of the OWNER/ CM/ ENGINEER, contaminate the mixture, prevent bonding or interfere with spreading operations. Methods used may include but not be limited to the use of a sweeper that can wet and vacuum the area free of dirt and debris, clay, and dust, or any other foreign material.

- B. Repair pavement failures and perform crack repair according to their respective specification requirements prior to installation of any asphalt surface course.
- C. Cold-milling and/or grinding may be necessary to ensure that the asphalt edges at concrete abutments such as approaches, sidewalks, curbing, and drainage basins have smooth transitions. Butt mill at transitions to existing pavement.
- D. After site review, detail whether wedge milling is necessary to assure positive drainage and transition. Install leveling course, if required, on the project per the site details and quantities shown on the plan sheets.
- E. Any oil or grease spots shall be scraped and treated to prevent bleeding through the tack coat. Bad oil spills may require removal with a wire brush or other suitable tool. Maintain clean pavements prior to applying emulsified tack coat. When approved sub-grade or pavement coursed previously constructed under the Contract become loosened, rutted, or otherwise defective, the CONTRACTOR must correct the deficiency according to the contract item or items involved before the spreading of a subsequent pavement course.
- F. Placement shall not occur when weather is inclement. The forecast shall be for rising temperatures for all paving efforts.
- G. Detail and submit to the OWNER/ CM/ ENGINEER a paving plan on the site plan sheet prior to placement of asphalt.
- H. Trucks shall have smooth, clean, and tight metal beds that do not have mixture sticking to the truck bed and from which the entire quantity of asphalt can be discharged smoothly into the spreading equipment. Trucks shall have a tarp and insulation as needed to protect mixture from wind, rain, and cold temperatures. Trucks for hauling asphalt mixture shall be in good, safe working condition. Tarp shall be fastened to truck to protect against wind.
- I. Surface course longitudinal joints shall run with the traffic pattern. Therefore, pulling across the driving lanes shall not be allowed unless express permission is given by the OWNER/CM.
- J. The entire parking lot surface course shall be paved on the same day. The timing and process should be discussed with and approved by the OWNER/ CM/ ENGINEER before proceeding with the work.
- K. Paving Equipment must be capable of placing, spreading, and finishing courses of asphalt to the specified thicknesses. Asphalt shall be free of marks, segregation and be placed to the required uniform elevation with a smooth texture not showing tearing, shoving, or gouging. Auger extensions are required if segregation occurs while pavers are extended beyond the basic screed width. Hand work shall be minimized to ensure the best possible finished surface.

3.04 TACK COAT

- A. Ensure surface is thoroughly clean and dry.
- B. The tack coat contained in the distributor tank shall be homogeneous.

- C. The tack coat shall be applied to a prepared clean pavement. Material shall be applied uniformly across the width of the designated area. Partial coverage installations are NOT acceptable
- D. The tack coat shall not be applied on a wet pavement surface or when the pavement surface temperature is below the requirements shown for asphalt.
- E. Tack / Prime Coat Distributor Truck must have an insulated tank, heating system and a distributor capable of maintaining a uniform application of emulsified asphalt under pressure throughout the area to be paved. This requires a pump in good working order, full circulating spray bars, and free flowing nozzles. Small, isolated areas may be tacked with a wand.
- F. Tack coat is to be applied uniformly across the entire surface to be paved without streaking. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
- G. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

TYPICAL TACK COAT APPLICATION RATES

Surface Type	Application Rate (gal/yd ²)
New Asphalt	0.05 to 0.06
Oxidized Asphalt	0.08 to 0.09
Milled Asphalt Surface	0.08 to 0.09
Milled PCC Surface	0.06 to 0.08
PCC Surface	0.06 to 0.08

3.05 ASPHALT PLACING

- A. Machine place asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix shall be mechanically tamped. Place each course to required grade, cross section, and thickness when compacted.
 - 1. Place asphalt base course in number of lifts and thicknesses indicated. The following are maximum lift thicknesses:

MINIMUM / MAXIMUM LIFT THICKNESSES

Item	Min Lift	Max Lift	Taper to 0" *	Uniform Thickness Required
301 Asphalt Concrete Base	3"	6"	No	No
302 Asphalt Concrete Base	4"	7.75"	No	No
441 Asphalt Concrete Surface Course, Type 1 (448)	1"	1.5"	No	No
441 Asphalt Concrete Intermediate Course, Type 1 (448)	1"	1.5"	Yes	No
441 Asphalt Concrete Intermediate Course, Type 2 (448)	1.75"	3"	Yes	No

- 2. Place asphalt surface course in single lift.

3. Spread mix at minimum temperature of 250 to 275 degrees F. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
 4. Regulate paver machine speed to obtain smooth, continuous surface free of pulls, and tears in asphalt paving mat.
- B. Place paving in consecutive strips not less than 10 feet (3 m) wide unless infill edge strips of a lesser width are required.
1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.
 2. When placing the asphalt course do not place joint for paving pass/strip over the same joint as the previous asphalt course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.
- D. Special Conditions
1. Fenced areas: All fence fabric shall be removed from poles prior to paving fence areas.
 2. The paving machine shall not be allowed to track over or back track over any finished course of freshly placed bituminous mixture while the mixture is still hot or warm. Tracking the paving machine over freshly placed bituminous courses shall render that section of pavement unacceptable. All unacceptable pavements shall be removed and replaced with no additional payment.

3.06 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of asphalt course.
1. Clean contact surfaces and apply tack coat to joints.
 2. Offset longitudinal joints, in successive courses, a minimum of 24 inches.
 3. Offset transverse joints, in successive courses, a minimum of 24 inches.
 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
 5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
 6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.07 COMPACTION

- A. General: Begin compaction as soon as placed asphalt paving will bear roller weight without excessive displacement. Compact asphalt paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers. Equipment per ODOT Section 410.12.

1. The Job Mix Formula (JMF) provides the optimal compaction temperature for the design. The mixture should be checked frequently to ensure the asphalt is being compacted at, or near that temperature. For asphalt concrete base pavements refer to Items 301 and 302 for minimum allowed mix temperature. In all cases the mixture should not be allowed to cool below a workable temperature for adequate compaction (175° F to 275° F) and the majority of compaction should be accomplished before the temperature reaches 225° F.
 - B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to Comply with requirements.
 - C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while asphalt is still hot enough to achieve specified density. Continue rolling until asphalt course has been uniformly compacted to the following density:
 1. Average Density: 96 percent of reference laboratory density according to ASTM D 6927 or AASHTO T 245, but not less than 94 percent nor greater than 100 percent.
 - D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
 - E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
 - F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
 - G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
 - H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.
- 3.08 INSTALLATION TOLERANCES
- A. Pavement Thickness: Compact each course to produce the thickness indicated within the tolerances specified in ODOT Section 401.19.
 1. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot (3-m) straightedge applied transversely or longitudinally to paved area. Longitudinal and transverse slopes indicated within the tolerances specified in ODOT Section 401.19.
 2. DELETED
- 3.09 FINAL ACCEPTANCE CRITERIA FOR HEAVY AND STANDARD DUTY PAVING
- A. Acceptance Submittals

1. No bituminous pavements will be accepted until it has been demonstrated by the CONTRACTOR that the pavements are in accordance with the Drawings and Specifications. The CONTRACTOR shall submit the following:
 - a. Job mix formula from a state approved / certified asphalt manufacturing facility for each type of bituminous mixture. The job mix formula shall contain, at minimum, the aggregate gradation, percent bitumen, source and type of bitumen and the laboratory maximum compacted density for the mixture.

B. Variation from Job Mix Formula or Required Gradations:

1. Calibrated equipment and qualified personnel must always be accessible during the construction of this ASPHALT. The CONTRACTOR shall provide the necessary equipment, materials, and labor to complete the job acceptable to the OWNER/CM. Variations in the size and amount of equipment will depend on the size of the area being paved.
2. It is imperative that all documents list a 'Person-in-Charge' who is responsible for the over-site of the previously listed activities. This individual will be the point of contact for the OWNER/CM and they shall work with the OWNER/CM to ensure timely project completion and specification compliance. This individual shall be knowledgeable in all aspects of asphalt design, production, and installation and shall be an employee of the company holding the contract with the OWNER/CM, even if the ASPHALT is being produced and supplied by a separate vendor.
3. Daily maximum theoretical specific gravity values must be made available to the CONTRACTORS density technician for verifying in-place density within four hours of start of production.
4. Asphalt content, gradation, and bulk specific gravity (Gmb) testing shall be done a minimum of once every 400 tons of asphalt supplied or every third day for low tonnages that when added together successively do not equal 400 tons.
5. Acceptable average measures are made by use of a correlated nuclear density gauge, Pavement Quality Indicator or PaveTracker (non-nuclear) or by cutting (4) cores per lift, per day and testing per AASHTO T-166, Method C. Additional testing shall be performed on any given day once 400 tons of asphalt is placed.
6. Any average in-place density measure for surface course mixtures that is less than required for the day will result in a reduction in asphalt pay equal to the following chart. After reaching the 30% reduction mark the pavement shall be removed and replaced by the CONTRACTOR or left in place with no compensation due the CONTRACTOR. Base and leveling installation of asphalt shall meet local DOT specifications for in-place density measures. Surface course longitudinal joints shall be measured 6" from the joint, centered upon core or density gauge, and shall meet the mat density requirements minus 2.0% at a minimum. Base and leveling course longitudinal joint density measures shall achieve between 95% - 100% of maximum achievable individually, with an average of 98% on any given day.

7.

In-Place Density Pay Schedule, Surface Course Mat Density

Pay Factors, % (percent)	In-Place Density, % Maximum Theoretical Specific Gravity, Gmm
100	> 92.0%
100 - 0.5 for each 0.1% below 92.0%	91.0% to 92.0%

95 - 1.0 for each 0.1% below 91.0%	90.0% to 91.0%
85 - 1.5 for each 0.1% below 90.0%	89.0% to 90.0%

- 8.
9. Process Control testing shall be in accordance with state standards for frequency and methods where the work being performed is done with a minimum of testing meeting the above QC requirements.
10. Protect the asphalt until such time that traffic can be placed upon the properly compacted asphalt and show no signs of deformation.

3.10 SITE SPECIFIC IDENTIFICATION

- A. Remove and store bumper blocks and other lot accessories during operations, reinstall after work is completed, and replace any and all broken bumper blocks.
- B. Remove all waste materials from the site and dispose of according to local ordinances.
- C. Complete all work in compliance with ADA requirements.
- D. Supply OWNER/CM with Notarized Certificate of Compliance and total (tons, cu. yds., number) used for all products supplied to the project for each pay item.
- E. Supply OWNER/ CM/ ENGINEER with yield calculations for all products used on the project. (Example: placement of 1,300 sq. yds. of Asphalt, 1-3/4" compacted thickness will require 128 tons when the unit weight = 150 pcf.)

3.11 DISPOSAL

- A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
 1. Do not allow milled materials to accumulate on-site.

END OF SECTION 321216

SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.01 WORK INCLUDES

- A. Work included in this section pertains to all materials, equipment, finishing methods, installation etc. that relate to rigid paving.
- B. This section includes exterior cement concrete pavement for the following:
 - 1. Driveways and Roadways
 - 2. Curbs and Gutters
 - 3. Walkways
 - 4. Curb Ramps
 - 5. Dumpster Area(s)

1.02 DEFINITIONS

- A. Cementitious materials: Portland cement alone or in combination with one or more of the following blended hydraulic cement, expansive hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, silica fume, and air cooled blast furnace slag.

1.03 SUBMITTALS

- A. Product data for each type of manufactured material and product indicated:
- B. Design mixes: for each concrete pavement mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Material test reports: from a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
 - 1. ODOT Section 499 Concrete General
 - 2. ASTM C 33 – Standard Specification for Fine and Concrete Aggregate
 - 3. ASTM C 39 – Compressive Strength of Cylindrical Concrete Specimens
 - 4. ASTM C 94 – Ready Mix Concrete
 - 5. ASTM C 873 – Compressive Strength of Concrete Cylinders Cast In Place in Cylindrical Molds
- D. Material certificates: signed by manufacturers certifying that each of the following materials complies with requirements:
 - 1. Cementitious materials and aggregates.
 - 2. Steel reinforcement and reinforcement accessories.

3. Admixtures.
4. Curing compounds.
5. Joint fillers.

1.04 QUALITY ASSURANCE

- A. Installer qualifications: an experienced installer who has completed pavement work similar in material, design, and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer qualifications: manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
 1. Manufacturer must be certified according to the national ready mix concrete association's plant certification program.
- C. Testing agency qualifications: an independent testing agency, acceptable to the [OWNER] [CM], qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
- D. Source limitations: obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.
- E. ACI publications: comply with ACI 301, "Specification for Structural Concrete," unless modified by the requirements of the Contract Documents.
- F. Concrete testing service: The OWNER will engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixes.

1.05 PROJECT CONDITIONS

- A. Traffic control: maintain access for vehicular and pedestrian traffic as required by Owner and Engineer for other construction activities.
- B. Don't not place pavement when base surface or ambient temperature is less than 40 deg F, or base is wet or frozen.

PART 2 - PRODUCTS

2.01 FORMS

- A. Form materials: plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
 1. Use flexible or curved forms for curves of a radius 100 feet or less.
- B. Form-release agent: commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.02 STEEL REINFORCEMENT

- A. Plain-steel welded wire fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Deformed-steel welded wire fabric: ASTM A 497, flat sheet.
- C. Epoxy-coated welded wire fabric: ASTM A 884/A 884M, class A coated, plain steel.
- D. Reinforcement bars: ASTM A615/A 615M, grade 60, deformed (carbon steel bars).
- E. Epoxy-coated reinforcement bars: ASTM A 775/A 775M; with ASTM A 615/a 615M, grade 60, deformed bars.
- F. Steel bar mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, grade 60, deformed bars; assembled with clips.
- G. Plain steel wire: ASTM A 1064/A 1064M-16b, as drawn.
- H. Joint dowel bars: plain steel bars, ASTM A 615/A 615M, grade 60. Cut bars true to length with ends square and free of burrs.
- I. Epoxy-coated joint dowel bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, grade 60, plain steel bars.
- J. Tie bars: ASTM A 615/a 615M, grade 60, deformed.
- K. Bar supports: bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement bars, welded wire fabric, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
 - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer coated wire bar supports and chairs adequate to support weight of concrete, installers, and prevent displacement or misalignment.
- L. Epoxy repair coating: liquid two-part epoxy repair coating, compatible with epoxy coating on reinforcement.

2.03 CONCRETE MATERIALS

- A. General: use the same brand and type of cementitious material from the same manufacturer and supplier throughout the project.
- B. Portland cement: ASTM C 150, type I OR II.
 - 1. Type I is restricted to fresh water and low sulfate soil areas
 - 2. Type II is to be used in high sulfate areas and areas subject to high salt concentrations, typically associated with salt water areas and pavement subject to use of deicing salts.
 - 3. Fly ash: ASTM C 618, class F or C.

C. Aggregate: ASTM C 33, uniformly graded, from a single source, with coarse aggregate as follows:

1. Class Designation: 4S, 4M, or 1N (pavement, walks etc., severe weathering regions).
2. Maximum aggregate size: 3/4 inch nominal.
3. Do not use fine or coarse aggregates containing substances that cause spalling.

D. Water: ASTM C 94.

2.04 ADMIXTURES

A. General: admixtures certified by manufacturer to contain not more than 0.1 percent water- soluble chloride ions by mass of cement and to be compatible with other admixtures.

B. Air-entraining admixture: ASTM C 260.

C. Chemical Admixtures for concrete (with Engineer approval):

1. Water-reducing admixture: ASTM C 494, type A.
2. Water-reducing and retarding admixture: ASTM C 494, type D
3. Water-reducing and accelerating admixture: ASTM C 494, type E.
4. Water-reducing High-range, admixture: ASTM C 494, type F.

2.05 CURING MATERIALS

A. Absorptive cover: AASHTO M 182, class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sy. Dry.

B. Moisture-retaining cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: potable.

D. Evaporation retarder: waterborne, monomolecular film forming, manufactured for application to fresh concrete.

E. Clear solvent-borne liquid-membrane-forming curing compound: ASTM C 309, type 1, class b.

F. Clear waterborne membrane-forming curing compound: ASTM C 309, type 1, class b.

G. White waterborne membrane-forming curing compound: ASTM C 309, type 2, class b.

H. Products: subject to compliance with requirements, provide one of the following (or approved equal):

1. Evaporation Retarder (or approved equal):
 - a. Finishing Aid Concentrate; Burke Group, LLC.
 - b. Sure Film; Dayton Superior Corporation.
 - c. Eucobar; Euclid Chemical Co.
 - d. Confilm; Master Builders, Inc.

2. Clear Solvent-Borne Liquid-Membrane-Forming Curing Compound (or approved equal):
 - a. Res-X Cure All Resin; Burke Group, LLC.
 - b. Day-Chem Rez Cure; Dayton Superior Corporation.
 - c. Kurez DR; Euclid Chemical Co.
 - d. 3100-Clear; W. R. Meadows, Inc.
3. Clear Waterborne Membrane-Forming Curing Compound (or approved equal):
 - a. Aqua Resin Cure; Burke Group, LLC.
 - b. Day Chem Rez Cure (J-11-W); Dayton Superior Corporation.
 - c. 1100 Clear; W. R. Meadows, Inc.
4. White Waterborne Membrane-Forming Curing Compound (or approved equal):
 - a. Aqua Resin Cure; Burke Group, LLC.
 - b. 1200-White; W. R. Meadows, Inc.

2.06 RELATED MATERIALS

- A. Expansion-and isolation-joint-filler strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Closed cell foam specifically manufactured for expansion joints.
- C. Wheel stops: precast, air-entrained concrete; 4,000-psi minimum compressive strength. Provide chamfered corners and drainage slots on underside, and provide holes for dowel-anchoring to substrate.
 1. Dowels: galvanized steel, epoxy coated, diameter of 3/4 inch, minimum length.
- D. Slip-resistive aggregate finish: factory-graded, packaged, rustproof, non-glazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- E. Bonding agent: ASTM C 1059, type ii, non-redispersible, acrylic emulsion or styrene butadiene.
- F. Epoxy bonding adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:
 1. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
 2. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.07 CONCRETE MIXES

- A. Prepare design mixes, proportioned according to ACI 211.1 and ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the trial batch method.
 - 1. Do not use Owner's field quality-control testing agency as the independent testing agency.
- C. Proportion mixes to provide concrete with the following properties:
 - 1. Compressive strength (28 days): 4000 psi, unless noted otherwise.
 - 2. Flexural strength (28 days); 650 psi.
 - 3. Maximum water-cementitious materials ratio: 0.45.
 - 4. Slump limit: 4 inches.
 - a. Slump limit for concrete containing high-range water-reducing admixture: not more than 8 inches after adding admixture to plant, or site-verified, 3-inch slump.
- D. Cementitious materials: limit percentage, by weight, of cementitious materials other than Portland cement according to ACI 301 requirements for concrete exposed to deicing chemicals.
- E. Cementitious materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:
 - 1. Fly Ash: 0%
 - 2. Ground Granulated Blast-Furnace Slag (GGBFS): 0%
 - 3. Micro-Silica: 0%
 - 4. When using multiple pozzolans materials, do not exceed the individual maximum contents above for each material. A combination of pozzolans materials may not exceed 50% of the total cementitious content by weight.
- F. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows, within a tolerance of plus or minus 1.5 percent:
 - 1. Air content: 5.5 percent for 3/4-inch maximum aggregate.
- G. Coloring agent: add coloring agent to mix according to manufacturer's written instructions.

2.08 CONCRETE MIXING

- A. Ready-mixed concrete: comply with manufacturers' requirements and with ASTM C 94.
- B. Ready-mixed concrete: comply with manufacturers' requirements and with ASTM C 94 and ASTM C 1116.
 - 1. When air temperature is between 85 deg f and 90 deg f, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg f, reduce mixing and delivery time to 60 minutes.
- C. Project-site mixing: comply with requirements and measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixers of 1 C.Y. or smaller capacity, continue mixing at least one and one-half minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
2. For mixers of capacity larger than 1 C.Y., increase mixing time by 15 seconds for each additional 1 C.Y.
3. Provide batch ticket for each batch discharged and used in the work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Proof-roll prepared sub-base surface with tandem 20 C.Y. dump truck with rock, to check for unstable areas and verify need for additional compaction. Proceed with pavement only after nonconforming conditions have been corrected and sub-grade is ready to receive pavement.
- B. Owners' representative(s) must be present at time of proof-rolling for proof-roll to be acceptable to Owner/Engineer.
- C. Remove loose material from compacted sub-base surface immediately before placing any concrete.

3.02 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form release agent to ensure separation from concrete without damage or discoloration.

3.03 STEEL REINFORCEMENT

- A. General: comply with CRSIs "Manual of Standard Practice" for fabricating reinforcement and with recommendations in CRSIs "Placing Reinforcing Bars" for placing and supporting reinforcement.
 1. Apply epoxy repair coating to uncoated or damaged surfaces of epoxy-coated reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement at all times.
- D. Install welded wire fabric. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

- E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap to adjacent mats.

3.04 JOINTS

- A. General: construct construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
 - 1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Construction joints: set construction joints at side and end terminations of pavement, and at locations where pavement operations are stopped for more than one-half hour, unless pavement terminates at isolation joints.
 - 1. Provide preformed galvanized steel or plastic keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
 - 2. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
 - 3. Provide tie bars at sides of pavement strips where indicated.
 - 4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 5. Use epoxy bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Isolation / Expansion joints: form joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
 - 1. Locate isolation and expansion joints adjacent to structures and fixed anchorage points.
 - 2. Extend joint fillers full width and depth of joint.
 - 3. Terminate joint filler less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 - 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 - 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 - 6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction joints: form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
 - 1. Grooved joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to the following radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
 - a. Radius: 1/4 inch.

2. Sawed joints: form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
- E. Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt- coat one-half of dowel length to prevent concrete bonding to one side of joint.
- F. Edging: tool edges of slabs, gutters, and curbs in concrete after initial floating with an edging tool to the following radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.
 1. Radius: 1/4 inch.
- G. Saws: Use diamond blade saws equipped with cutting guides, blade guards, water cooling systems, dust control, and cut depth control. Early entry saws require approval of Engineer.

3.05 CONCRETE PLACEMENT

- A. Inspection: before placing concrete, inspect and complete formwork installation, reinforcement steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from sub-base surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten sub-base to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment. Box out around MH frame and grates. Install expansion joints.
- D. Comply with requirements and with recommendations in ACI 304R for Measuring, Mixing, Transporting, and Placing Concrete.
- E. Do not add water to concrete during delivery, at project site, or during placement.
- F. Deposit and spread concrete in a continuous operation between pre-determined transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place. Cold Joints are not acceptable.
- G. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R, "Guide for Consolidation of Concrete".
 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- H. In lieu of properly supporting wwf on chairs (300# man) CONTRACTOR may place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

1. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer, or use bonding agent if approved by Engineer.
- I. Screed pavement surfaces with a straightedge and strike off. Commence initial floating using bull floats or darbies to form an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading dry-shake surface treatments.
- J. Curbs and gutters:
1. When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements to the Engineer. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.
 2. Curbs: all curbs shall match called out curbing on Contract Documents. Cast-in-place concrete shall be used unless other design is required to match existing conditions. Concrete shall be Class C. Slump shall be a maximum of 4 inches and minimum 28-day strength shall be 4000 psi with 6 to 8 percent entrained air. Max w/c ratio 0.45
 - a. Expansion joints shall be specified and shall be shown on the drawings. Color of the joint sealer shall match that of the concrete.
 - b. Four inch under drains in porous backfill shall be installed under all combination curbs and gutters. Under drains shall extend to the nearest feasible drainage basins. Combination curb and gutter may be used only to match or repair existing work.
- K. Walks: For commercial projects thickness shall be 8 inches over 4 inches of compacted no. 304 limestone gravel base unless directed otherwise by the Engineer. The concrete shall have tooled edges which are then disguised by a light/medium broom finish. Except where required for structural purposes, reinforcing bars or welded wire fabric should be omitted unless otherwise specified by the Contract Documents. For conventional concrete walks, use Class C concrete with clean natural sand, limestone aggregate, and 6 to 7 percent entrained air.
1. Curing compounds: specify only non-staining type. It has been found that clear chlorinated rubber compounds cause staining which cannot be removed.
- L. Curb ramps for persons with disabilities: see the ADAAG 4.7.
1. Companion ramps: state laws require that when a curb ramp is built on one side of a street, a companion ramp is required on the opposite side of the street. When project limits would normally end within a street intersection, the limits must be extended to allow construction of a companion ramp on the far side of the intersection. For projects in which federal funding is involved, this requirement must carefully be coordinated with federal requirements regarding limits of federal participation.
- M. Slip-form pavers: when automatic machine placement is used for pavement, submit revised mix design and laboratory test results that meet or exceed requirements to the Engineer. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement.

1. Compact sub-base and prepare sub-grade of sufficient width to prevent displacement of paver machine during operations.
- N. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 75 percent of its 28-day compressive strength.
- O. Cold-weather placement: comply with ACI 306R-16 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
 2. Do not use frozen materials or materials containing ice or snow.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
- P. Hot-weather placement: place concrete according to recommendations in ACI 305R-10 and as follows when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water.
 2. Cover reinforcement steel with water-soaked burlap so steel temperature will not exceed ambient air temperature remove before embedding in concrete.
 3. Fog-spray forms, reinforcement steel, and sub-grade just before placing concrete. Keep sub-grade moisture uniform without standing water, soft spots, or dry areas.
- Q. Concrete paving:
1. Metal nosings on exterior stairs are prohibited.
 2. Stairs, rails and cheek walls, slopes to drain. Any stairs should be kept to a minimum. Ramps are to be used whenever possible within ADAAG Guidelines.
 3. All sidewalks, stairs and ramps must withstand vehicular loading.
 4. Where not noted on drawings, curbs to match adjacent 6 inch x 18 inch curb or verify with Engineer.
 5. Use concrete for walkways, drives, service courts, parking areas, dumpster pads, compactor pads, loading dock ramps, aprons, and bus pull offs. All items shall be designed for particular items and be verified by the Engineer.
 6. Radiused intersections shall be poured monolithic and should extend to the outer limits of the curves. Segmented curves are prohibited.
 7. Cross slope of all walks shall be 1/4 inch per foot (max.) and 1/8 inch per foot.
 8. Walks abutting buildings shall bear on the foundation or be doweled.
 9. The full width of sidewalks adjacent to curbs shall be 1/4 inch above the curb.
 10. Temperature steel in stair nosings must have a minimum of 1-1/2" of concrete cover.
 11. [CONTRACTORS] are required to wet sub-base prior to placing the concrete.
 12. Curbs shall be poured concrete with #5 top and bottom reinforcing and without gutters. Provide contraction joints at 15 ft. max intervals. Filler strips must be specified.
 - a. Dropped curbs for drive and handicapped access shall be formed for all new work.
 - b. Remove existing curb back to nearest existing joint when new curbs extend into existing curb lines.

- c. Paving base should extend a minimum of 6 inches beyond the edge of the surface if curbs are not provided.
- 13. Combined fire service/sidewalks shall be designed to accommodate Fire Department's largest vehicles' (minimum 12 ft. wide) turning radius and provisions for outrigger support.

3.06 CONCRETE FINISHING

- A. General: wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited.
- B. Float finish: begin the second floating operation when bleed-water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power- driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots, and fill low spots. Re-float surface immediately to uniform granular texture.
- C. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float- finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.
- D. Finishes:
 - 1. Vehicle Paving: Heavy broom.
 - 2. Sidewalk: Light broom.
 - 3. Gutters and Curbs: Light broom.
 - 4. Pedestrian Ramps: Medium broom perpendicular to slope.

3.07 CONCRETE PROTECTION AND CURING

- A. General: protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1-90 for cold-weather protection and follow recommendations in ACI 305.1-6 for hot-weather protection during curing.
- B. Evaporation retarder: apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb. /S.F. before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.
- D. Curing methods: cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.

- c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's requirements. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.08 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:

1. Elevation: 1/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-foot long, unlevelled straightedge not to exceed 1/4 inch.
4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.09 WHEEL STOPS

- A. If shown on plans, securely attach wheel stops into pavement with not less than two galvanized steel, epoxy coated dowels embedded in holes cast into wheel stops. Firmly bond each dowel to wheel stop and to pavement. Extend upper portion of dowel 5 inches into wheel stop and lower portion a minimum of 18 inches into pavement.

3.10 FIELD QUALITY CONTROL

- A. Testing agency: Inspect and test concrete materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this section.
- B. Testing Services: Testing shall be performed according to the following requirements:
1. Sampling Fresh Concrete: Representative samples of fresh concrete shall be obtained according to ASTM C 172, except modified for slump to comply with ASTM C 94.
 2. Slump: ASTM C 143; one test at point of placement for each compressive-strength test, but not less than one test for each day's pour of each type of concrete and every 50 yds. Additional test will be required when concrete consistency changes.

3. Air Content: ASTM C 231, pressure method; one test for each compressive-strength test, but not less than one test for each day's pour of each type of air-entrained concrete.
 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each set of compressive- strength specimens.
 5. Compression Test Specimens: ASTM C 31/C 31M; one set of four standard cylinders for each compressive-strength test, unless otherwise indicated. Cylinders shall be molded and stored for laboratory-cured test specimens unless field-cured test specimens are required.
 6. Compressive-Strength Tests: ASTM C 39; one set for each day's pour of each concrete class exceeding 5 C.Y., but less than 25 C.Y., plus one set for each additional 50 C.Y. One specimen shall be tested at 7 days and two specimens at 28 days; one specimen shall be retained in reserve for later testing if required.
 7. When frequency of testing will provide fewer than five compressive-strength tests for a given class of concrete, testing shall be conducted from at least five randomly selected batches, or from each batch if fewer than five are used.
 8. When total quantity of a given class of concrete is less than 50 C.Y., Engineer may waive compressive-strength testing if adequate evidence of satisfactory strength is provided.
 - a. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, current operations shall be evaluated and corrective procedures shall be provided for protecting and curing in-place concrete.
 - b. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive compressive-strength test results equal or exceed specified compressive strength and no individual compressive-strength test result falls below specified compressive strength by more than 500 psi.
- C. Test results shall be reported in writing to Owner/Engineer, concrete manufacturer, and contractor within 24 hours of testing. Reports of compressive-strength tests shall contain project identification name and number, date of concrete placement, name of concrete testing agency, concrete type and class, location of concrete batch in pavement, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.
- D. Nondestructive testing: impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer and Owner but will not be used as the sole basis for approval or rejection.
- E. Additional tests: testing agency shall make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Engineer. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.
- 3.11 REPAIRS AND PROTECTION
- A. Remove and replace concrete pavement that is broken, damaged, or defective, or does not meet requirements in this section with characteristics exceeding those specified in this specification.
 - B. Drill test cores where directed by Owner/Engineer when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.

- C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for substantial completion inspections.
- E. Refer to Storm Water Pollution Prevention Plan (SWPPP) for additional information re washout area(s).

END OF SECTION 32 13 13

SECTION 329200 – TURFS AND LAWNS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide seeded lawns as shown on the construction documents and specified.

1. Soil preparation
2. Seeding lawns
3. Mulching
4. Maintenance

1.2 SUBMITTALS

A. Submit seed vendor's certification for required grass seed mixture, indicating percentage by weight, and percentages of purity, germination, and weed seed for each grass species.

B. Submit the following materials certification:

1. Fertilizer(s) analysis
2. Tackifier
3. Asphaltic emulsion
4. Seed

C. Submit materials test report

1.3 QUALITY ASSURANCE

A. Pre-installation conference: Conduct conference at project site

B. Provide and pay for materials testing. Testing agency shall be acceptable to the Engineer.
Provide the following data:

1. Test representative material samples proposed for use.
2. Topsoil
 - a. pH factor
 - b. Mechanical analysis

c. Percentage of organic content

d. Recommendations on type and quantity of additives required to establish satisfactory pH factor and supply of nutrients to bring nutrients to satisfactory level for planting.

1.4 PROJECT CONDITIONS

- A. Work Notification: Notify Owner at least 14 days prior to start of seeding operations.
- B. Protect existing utilities, paving, and other facilities from damage caused by seeding operations.
- C. Perform seeding work only after planting and other work affecting ground surface has been completed.
- D. Restrict traffic from lawn areas until grass is established. Erect signs and barriers as required.
- E. Provide hose and lawn watering equipment as required.
- F. When watering spigots are not available, the Contractor shall supply water from a water tank truck which he shall furnish. Permits shall be taken out in each municipality for use of the fire hydrants as required.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver seed and fertilizer materials in original unopened containers, showing weight, analysis, and name of manufacturer. Store in a manner to prevent wetting and deterioration.

1.6 WARRANTY

- A. The contractor is responsible to provide a full uniform lawn as approved by the owner. The contractor shall provide a warranty of one full growing season after the first full year of grass establishment. The contractor shall reseed areas with specified materials which fail to provide a uniform stand of grass until all affected areas are accepted by the Owner and Engineer of Record.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Lawn Seed: Fresh, clean, and new crop seed mixture.
 - 1. Mixed by an approved method.
 - 2. Seed with the following mixture:
Temporary Seeding:

Seeding Dates

	Species	lb/1,000sf	lb/ Per Acre
March 1 to August 15	Oats	3	128(4 bushel)
	Tall Fescue	1	40 lbs
	Annual Ryegrass	1	40lbs
	Perennial Ryegrass	1	40 lbs
	Tall Fescue	1	40 lbs
	Annual Ryegrass	1	40 lbs
	Annual Ryegrass	1.25	55 lbs
	Perennial Ryegrass	3.25	142 lbs
	Creeping Red Fescue	0.4	17 lbs
	Kentucky Bluegrass	0.4	17 lbs

August 16 to November 1

Rye	3	112 (2 bushel)
Tall Fescue	1	40 lbs
Annual Ryegrass	1	40 lbs
Wheat	3	120 (2 bushel)
Tall Fescue	1	40 lbs
Annual Ryegrass	1	40 lbs
Perennial Ryegrass	1	40 lbs
Tall fescue	1	40 lbs
Annual Ryegrass	1	40 lbs
Annual Ryegrass	1.25	40 lbs
Perennial Ryegrass	3.25	40 lbs
Creeping Red Fescue	0.4	40 lbs
Kentucky Bluegrass	0.4	0 lbs

November 1 to February 29 Use Mulch or Dormant Seeding Only

Permanent Seeding:

Normal seeding times are as follows:

March 15 to June 10
 August 15 to October 1

Common Name	Percentage by Weight	Percentage by Purity	Percentage Germination	Percentage Weed Seed
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	(Minimum)	(Minimum)	(Maximum)	
Kentucky Bluegrass	80%-90%	90%	85%	0.5%
Perennial Ryegrass	10%-20%	90%	88%	0.5%

B. Fertilizer

1. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - a. Type A composition: Starter fertilizer containing 18% nitrogen, 24% phosphoric acid, and 6% potash by weight (18-24-6), or similar approved composition.
 - b. Type B composition: Top dressing fertilizer containing 31% nitrogen, 3% phosphoric acid, and 10% potash by weight (31-3-10), or similar approved composition.

C. Mulches

1. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
2. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
3. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.
4. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

D. Tackifier: Liquid concentrate diluted with water forming a transparent 3-dimensional film-like crust permeable to water and air and containing no agents toxic to seed germination.

E. Asphaltic Emulsion Binder: Refined petroleum asphalt emulsified in alkaline water without use of clay, starch, or emulsified in alkaline water without use of clay, starch, or like deleterious substances, and not more than 0.75% of saponifiable acids, of a fluid consistency with no petroleum solvents or other diluting agents toxic to seed germination.

F. Water: Potable. Hoses or other methods of transportation furnished by Contractor. Contractor to pay for and supply all water.

G. Ground Limestone: Containing not less than 85% of total carbonates and ground to such fineness that 50% will pass through a 100-mesh sieve and 90% will pass through a 20-mesh sieve.

H. Inoculating Bacteria

- a. The inoculant for treating leguminous seeds shall be a pure culture of nitrogen-fixing bacterial selected for maximum vitality, not more than one-year old. All cultures shall be subjected to the approval of the Engineer.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Examine finish surfaces, grades, topsoil quality, and depth. Do not start seeding work until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Limit preparation to areas which will be immediately seeded.
- B. Loosen topsoil of lawn areas to minimum depth of 4". Remove stones over 1" in any dimension and sticks, roots, rubbish, and extraneous matter.
- C. Grade lawn areas to a smooth, free-draining even surface with a loose, moderately coarse texture. Roll and rake. remove ridges, and fill depressions as required to drain.
- D. Apply Type A fertilizer to indicated turf areas at a rate equal to 1.0 lb. of actual nitrogen per 1,000 sq. ft. (220 lbs./acre).
- E. Restore prepared areas to specified condition if eroded, settled, or otherwise disturbed after fine grading and prior to seeding.

3.3 INSTALLATION

A. Lawn Seeding

2. Seed immediately after preparation of bed. Seed only between April 1 and June 1 and between August 15 and October 15, or at such other times acceptable to the Engineer.
3. Seed indicated areas within contract limits and areas adjoining contract limits disturbed as a result of construction operations.
4. Sow grass seed at a rate of 8.0 lbs. per 1,000 sq. ft.
5. After seeding, rake or drag surface of soil lightly to incorporate seed into top 1/8" of soil. Roll with light lawn roller.
 - a. Type A Fertilizer: 1 lb. per 1,000 square feet or 220 lbs./acre.
 - b. Tackifier: 60 gals./acre.
 - c. Limestone: Rate determined by soil test.

B. Mulching

1. Place straw mulch on seeded areas within 24 hours after seeding.
 2. Place straw mulch uniformly in a continuous blanket at the rate of 2 1/2 tons per acre, or 50-90 lb. per 1,000 sq. ft. of area (2-3 bales). A mechanical blower may be used for straw mulch application when acceptable to the Owner.
- C. Provide straw bale checking in ditches or problem swales at intervals required to adequately slow water velocity and impede soil loss.

3.4 HYDROSEEDING

- A. Hydroseeding: Mix specified seed and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
1. Mix slurry with tackifier.
 2. Spray-apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate shown in the previous paragraphs above.
 3. Spray-apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry coat at a rate so that mulch component is deposited at not less than the rates, dry weight, and seed component is deposited at not less than the specified seed-sowing rate shown in the previous paragraphs above. Apply slurry cover coat of fiber mulch (hydromulching) at not less than the 2,000 lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate shown in the previous paragraphs above.

3.5 MAINTENANCE

- A. The Contractor shall be responsible for continued proper care of the lawn areas one full growing season after final acceptance of the site. The period of maintenance for seeding and sodding shall extend for as long as necessary to establish over the entire lawn areas a uniformly close stand of grasses, free of weeds and undesirable grasses or 12 months after final completion, whichever comes first. A uniformly close stand of grass is defined as bare spots no larger than 6" diameter that constitute less than 2% of the entire lawn. Upon written acceptance of lawn area by the Engineer, the Owner will assume maintenance responsibility.
- B. Maintain seeded lawn areas, including watering, spot weeding, mowing, applications of herbicides, fungicides, insecticides, and re-seeding until a full, uniform stand of grass free of weeds, undesirable grass species, disease, and insects is achieved and accepted by the Owner in behalf of the Engineer.
1. Water daily to maintain adequate surface soil moisture for proper seed germination. Continue daily watering for not less than 30 days. Thereafter, apply 1/2" of water twice weekly until acceptance.
 2. Repair, rework, and re-seed all areas that have washed out, are eroded, or do not catch.

3. Mow lawn areas as soon as lawn top growth reaches a 3-3/4" height. Cut back to 2 1/2" in height. Repeat mowing as required to maintain specified height. A minimum of three months of mowings will be required for acceptance.
- C. Maintain seeded banks, ditches, medians, and fields to the extent of establishment only. Re-grade and re-seed washed out or eroded areas as required until a suitable cover is established.

3.6 ACCEPTANCE

- A. Seeded areas will be inspected at completion of installation and accepted subject to compliance with specified materials and installation requirements.
 1. Seeded areas will be acceptable provided all requirements, including maintenance, have been complied with, and a healthy, uniform, close stand of the specified grass is established free of weeds, undesirable grass species, disease, and insects.
 2. No individual lawn areas shall have bare spots or unacceptable cover totaling more than 2% of the individual areas, in areas requested to be inspected. Bare spots does not exceed an area of 5-inch x 5-inch.
- B. Upon final acceptance, the Owner will assume lawn maintenance.

3.7 CLEANING

- A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from seeding operations.
- B. During work, keep premises neat and orderly including organization of storage areas. Remove trash, including debris resulting from removing weeds or rocks from planting areas, preparing beds, or planting plants, from site daily as work progresses. Keep walkway and driveway areas clean by sweeping or hosing.

END OF SECTION 32 92 00

SECTION 333000 - SANITARY SEWERAGE UTILITIES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. This Section specifies the requirements for furnishing and placing sanitary sewer pipe, laterals, stubs, and appurtenances. The pipe shall be of the size, type and location, and to the lines, grades and elevations shown on the Construction Documents and constructed in accordance with these specifications.
- B. Record location of pipes runs, connections, catch basins, cleanouts, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
- D. Conform to VILLAGE and Authorities having Jurisdiction (AHJ) requirements.

1.02 APPLICABLE PUBLICATIONS

- A. The following publications of the latest issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto.
 - 1. American Society for Testing and Materials Standards (ASTM).
 - a. A 48 Specification for Gray Iron Castings
 - b. A 615 Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - c. A 746 Standard Specification for Ductile Iron Gravity Sewer Pipe.
 - d. C 33 Standard Specification for Concrete Aggregates.
 - e. C 76 Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
 - f. C 150 Standard Specification for Portland Cement.
 - g. C 443 Specification for Joints for Concrete Pipe and Manholes Using Rubber Gaskets.
 - h. C 476 Specification for Grout for Masonry.
 - i. C 478 Specification for Circular Precast Reinforced Concrete Manhole Sections.
 - j. C 969 Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.
 - k. D 2241 PVC Pressure-Rated Pipe (SDR Series).
 - l. D 2321 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

- m. D 3034 Specification for Polyvinyl Chloride (PVC) Pipe and Fittings (4" to 15"). PVC pipe shall be made from class 12454-B materials or better in accordance with ANSI/ASTM D 1784. PVC fittings and couplings shall conform to requirements of the PVC pipe for classifications and size.
 - n. D 3212 Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
 - o. F 477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe. Lubricants for joints shall be furnished by the pipe manufacturer. The rubber gaskets shall be factory installed in the bell of the pipe, fittings and couplings. The plain end of the pipe shall be clearly marked by the manufacturer to show depth of penetration into the bell or coupling.
 - p. F 679 Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings (18"-27").
 - q. F 1417 Standard Test Method for Installation Acceptance of Plastic Non-Pressure Sewer Lines Using Low-Pressure Air.
2. American Water Works Association (AWWA)
- a. C 105 Polyethylene Encasement for Ductile-Iron Pipe Systems.
 - b. C 110 Standard for Ductile-Iron and Gray-Iron Fittings.
 - c. C 111 Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - d. C 600 Installation of Ductile Iron Water Mains and Their Appurtenances.
3. American Concrete Institute (ACI)
- a. ACI 318 Building Code Requirements.

1.03 SUBMITTALS

A. Product Data:

- 1. Pipe material and fittings
- 2. (N/A) Corrosion proof liner selected for protecting concrete pipe from sewer gases. Contractor shall submit data on the selected liner for approval prior to construction .
- 3. Any Special pipe fittings as detailed in the Contract Documents.

B. Shop Drawings:

- 1. Cast in Place Manholes: Include plans, elevations, sections, details, design calculations, concrete design-mix report, frames, and covers.
- 2. Field Quality Control Test Reports

1.04 DEFINITIONS

- A. ABS: Acrylonitrile-Butadiene-Styrene Plastic.
- B. FRP: Fiberglass-Reinforced Plastic.

- C. LLDPE: Linear Low-Density, Polyethylene Plastic.
- D. PE: Polyethylene Plastic.
- E. PP: Polypropylene Plastic.
- F. PVC: Polyvinyl chloride Plastic.
- G. TPE: Thermoplastic Elastomer.
- H. DI: Ductile-Iron Pipe.

1.05 PROJECT CONDITIONS

- A. When working with sanitary manholes new or existing, Contractor must keep requirements for confined space entries. In all activities, Contractor shall work in a safe manner as required by OSHA and other governing criteria.
 - 1. If work requires interference with any public sewer systems within or outside of Public Rights of Way or Easements, Contractor must obtain prior approval and coordinate with local municipality before commencing work.

1.06 DELIVERY STORAGE AND HANDLING

- A. Contractor is responsible for protecting materials per manufacture's recommendations
 - 1. Do not store plastic, pipe and fittings in direct sunlight.
 - 2. Protect pipe, pipe fittings and seals from dirt and damage. Handle and store pipe, and fittings in accordance with manufacturer's recommendations.
 - 3. Handle cast in place manholes according to manufacturer's written rigging instruction.

PART 2 - PRODUCTS

2.01 PIPE MATERIALS (Refer to Contract Drawings)

- A. Polyvinyl Chloride (PVC) Pipe and Fittings
 - 1. 4 to 15 inch pipe shall conform to ASTM D 3034,
 - 2. Pipe and fittings shall conform to ASTM F 679 for 18-inch to 48-inch pipe.
 - 3. All mainline sewer shall be SDR 26 while service connections under 13 feet deep shall be SDR 35. If service connection is greater than 13 feet pipe shall be SDR 26.
 - 4. All diameters shall use bell and spigot ends for gasketed joints with ASTM F 477 elastomeric seal. The joint design shall meet the requirements of ASTM D 3212.
 - 5. All pipe and fittings shall be suitably marked to provide manufacture's name or trademark, lot or production number, ASTM designation, PVC cell classification, SDR number and nominal diameter.

6. Pipe color shall be green to identify it as a sewer.
7. All pipe shall be made from a PVC resin, compound to provide physical and mechanical properties that equal or exceed cell class 12454 or 1264 as defined in ASTM D 1784.
8. Pipe lubrication products are to be provided by pipe manufacturer or from supplier approved by manufacturer.

B. High Density Polyethylene (HDPE) Pipe and Fittings

1. Pipe shall be dual wall, smooth interior and annular exterior corrugations HP Santite or Equal.
2. to 30-inch pipe shall meet ASTM F2764 with minimum pipe stiffness of 46 psi when tested in accordance with ASTM D2412
3. Pipe shall be joined using a bell and spigot joint meeting the requirements of ASTM F2764. The joint shall be watertight per the requirements of ASTM D3212, with the addition for a 15 psi pressure requirement. Gaskets shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable protective wrap to ensure the gaskets are free from debris.
4. A joint lubricant shall be used on the gasket and bell during assembly.
5. For pipes 12 through 60" diameters shall have reinforced bell with a polymer composite band installed by the manufacturer.
6. Fittings shall conform to ASTM 2764. Bell and spigot connections shall utilize a welded bell and valley or saddle gasket meeting the water tight joint performance requirements of ASTM D3212.
7. Pipe shall be tested for water tightness per ASTM F1417 or ASTM F2487.

2.02 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, and the following:

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water
 - a. Water used for mixing or curing shall be reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable matter or other substances injurious to the finished product.
 - b. Water sources other than the local municipal domestic water supply must be approved by the Owner/Engineer.
 - c. If on-site reclaimed water sources are used, tanks and other appurtenances must be clearly marked with the words "non-potable" water.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Use air-entrained concrete for any exposed concrete.

C. Reinforcement Bars: ASTM A 615, Grade 60 deformed steel.

- D. Manhole Channels and Benches: Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.
 - 1. Channels: Factory or field formed from concrete. Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - a. Invert Slope: 1 percent through manhole.
 - 2. Benches: Concrete, sloped to drain into channel.
 - a. Slope: 8 percent.
- E. Ballast and Pipe Supports: Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

2.03 MANHOLES

- A. Precast concrete manholes shall conform to ASTM C 478.
- B. Ballast: Increase thickness of concrete as required to prevent flotation.
- C. Resilient Pipe Connectors: ASTM C 923 cast or fitted into manhole walls, for each pipe connection. Link Seals or Kor-n-Seal type boots for weathertightness, mortar joints are prohibited.
- D. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and diameter matching manhole frame and cover. Include sealant recommended by ring manufacturer.
- E. Grade Rings: Include two or three reinforced-concrete rings, of maximum 12-inch total thickness, that match 24-inch diameter frame and cover. Rings shall be set in a full bed of mortar.
- F. Steps: Shall be Neenah R-1980-1 cast iron, complying with ASTM A 615/A 615M, ASTM C 478, or ½" reinforcing bar encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into base, riser, top section, and sidewalls with steps at 16 inch intervals on center. No pipes shall enter a manhole in the thru the step area.
- G. Manhole frames and covers: Neenah R-1540 with self-sealing cover. Include indented top design with lettering "Sanitary Sewer" cast into cover. All frames and grates within R/W shall comply with AHJ's requirements.
- H. Manholes shall be installed: at the end of each line; at all changes in grade, size, or alignment; at all intersections; and at distances not greater than 400 feet for sewers 15 inches or less, and 500 feet for sewers 18 inches to 30 inches, except that distances up to 600 feet may be approved in cases where modern cleaning equipment for such spacing is provided.

- I. A drop pipe shall be provided for a sewer entering a manhole at an elevation of 24 inches or more above the manhole invert. Where the differences in elevation between the incoming sewer and the manhole invert is less than 24 inches, the invert should be filleted to prevent solids deposition.
 - 1. Drop manholes should be constructed with an outside drop connection. Inside drop connections when necessary shall be secured to the interior wall of the manhole and provide access for cleaning.
 - 2. Due to the unequal earth pressures that would result from the backfilling operation in the vicinity of the manhole, the entire outside drop connection shall be encased in concrete (12" min.).
- J. The minimum diameter of manholes shall be 48 inches; larger diameters are preferable for large diameter sewers. A minimum access diameter of 24 inches shall be provided.
- K. The flow channels through manholes should be made to conform in shape and slope to that of the sewers.
- L. Structure channels and benches: factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water-cementitious ratio. Include channels and benches in manholes.
 - 1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - 2. Benches: Concrete, sloped to drain into channel, Slope: 8 percent (max.).
- M. Pre-cast manholes shall be coated in the plant, the interior barrel, joint and slab top surface areas of the precast manhole shall be prepared per the manufacture's recommendations. Concrete must be etched with 15% to 20% muriatic acid solution or sandblasted, the surface so prepared shall then be lined with a high build polyamide-cured, 2-component coal tar epoxy coating "Bitumastic No. 300-m as manufactured by Koppers Company, Inc, Pittsburgh, Pennsylvania, 15219, or an approved equal, each meeting military specifications DOD-P-2326A (SH), Type 1, Class 2. The lining compound shall be sprayed two or more coats with a minimum of ten to twelve dry mils (twelve to fourteen wet mils) per coat to obtain a continuous and relatively smooth lining. The total dry film thickness should not be less than 20 mils (0.02 inches). Additional coatings may be necessary within industrial areas, as shown on the plans. All coated surface of manhole shall be free of surface irregularities such as air bubbles, blistering, pinholes porosity in the coating film.
- N. Manholes shall be pre-cast concrete or poured in place concrete type. Manholes shall be water proof on the exterior.
- O. Inlet and outlet pipes shall be joined to the manhole with a gasketed flexible watertight connection or any connection arrangement that allows differential settlement of the pipe and manhole wall to take place. Non-shrink grout is not to be substituted without Engineer approval.
- P. Watertight, bolted manhole covers are to be used wherever the manhole tops may be flooded by street runoff or high water.

2.04 MORTAR

- A. Mortar for flow line directioning in all manholes shall conform to ASTM C 476.

2.05 CLEANOUTS

- A. Gray-iron cleanouts: ASME A112.36.2m, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug. Use units with top-loading classifications according to the following applications:
1. Light Duty: In earth or grass foot-traffic area with metallic locating lid.
 2. Medium Duty: In paved foot-traffic areas.
 3. Heavy Duty: In vehicle-traffic parking lots, drives, service areas. Recess slightly below pavement surface.
 4. Extra-Heavy Duty: In public roads. Recess slightly below pavement surface.
 5. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings in roads and parking areas.
 6. Sewer Pipe Fitting and Riser to Cleanout: In other areas material matching sewer pipe may be utilized
- B. PVC Cleanouts (when approved by Engineer): PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser.
- C. Available Manufacturers
1. Canplas Inc.
 2. IPS Corporation.
 3. NOS Inc.
 4. Zurn Commercial Specialty Plumbing Products; Zurn Plumbing Products Group.
- D. Lid and Frame: Cast iron construction, hinged lid.
- E. Conform to standard details of Authorities Having Jurisdiction (AHJ).

PART 3 - EXECUTION

3.01 PIPE SEWERS

- A. No pipe shall be installed in the trench until excavation has been properly constructed per the Contract Documents to at least two (2) pipe lengths beyond the section of pipe being installed and the bottom of the trench has been properly shaped.
- B. Batter boards, where used, shall be placed into position properly. Boards shall be nominal 1 x 4 inch lumber, planed on all four sides to parallel faces. The boards and all location stakes must be protected from injury or change of location.

- C. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.
- D. Pipe shall be laid so that after the sewer is completed, the interior surface shall conform accurately to the grades and alignments fixed and given in the Contract Documents.
- E. All sewers must be laid accurately to line and grade, with tongue or spigot end downstream.
- F. Install gravity flow, non-pressure pipe for site storm sewer pipes according to the following:
 - 1. Install piping pitched down in the direction of flow.
 - 2. Install PVC sewer pipe according to ASTM D 2321, ASTM D 2774 and ASTM F 1688.
- G. Pipes shall be fitted together and matched so that when laid, they form a sewer with a smooth and uniform invert.
- H. Before laying pipes, a sufficient bed shall be prepared at the grade indicated on the Contract Documents. Backfill shall be placed in accordance with backfill requirements.
- I. A minimum clearance of 6 inches must be maintained between the sewer and all other lines. Sanitary sewers shall not be routed over water lines without approval from the Engineer.
- J. Sanitary sewers shall not be constructed within 10 ft. (outside to outside) parallel to a water line. Where sanitary sewers cross under water lines, the pipe material for the sewer shall be an 18 ft. length of ductile iron pipe or PVC schedule 80 pressure pipe, centered on the water line.
- K. When trenches exceed OSHA requirements, the Contractor shall utilize appropriate trench safety measures.
- L. Pipe deflection shall be checked by passing a deflection gage or mandrel through all completed pipelines. Maximum deflection allowed is 5%.

3.02 MANHOLES

- A. Manholes shall be constructed at locations and depths indicated on the Contract Documents.
- B. Manholes may be constructed of concrete or precast concrete sections and in all types shall be constructed to the dimensions shown on the Contract Documents. Where concrete or precast concrete sections are used, the interior wall shall be thoroughly coated with coal tar epoxy or approved equal.

- C. Joints between precast concrete sections shall be made by uniformly placing gaskets equal on all faces of the lower part of the joint and lowering the upper ring evenly into place to produce uniform bearing and compression on the sealer.
- D. The construction of manholes shall be done as soon as practical after sewer lines into or through the manhole are completed.
- E. All sewers shall be cut neatly at the inside face of the walls of the manhole pointed up with mortar.
- F. After the masonry work has been completed to the proper elevation, the cast iron manhole cover/frame shall be set in a full mortar bed and adjusted to the elevation established on the Contract Documents.
- G. The inverts of the sewer line or several sewer lines entering the manhole at or near the flow line elevation of the manhole shall be shaped and routed across the floor of the manhole using mortar to obtain the proper contour.
- H. When sanitary sewer pipes enter a manhole 2 ft. or greater above the bottom of the manhole, a drop pipe of equal diameter shall be constructed outside the manhole to the bottom of the manhole per the details on the Contract Documents.
- I. All manholes are to be backfilled properly.

3.03 FRAMES, GRATES, RINGS AND COVERS

- A. HD castings shall conform to the types shown on the Contract Documents and shall be clean castings, free from sand or blow holes or other defects. Materials shall be not less than Class 30B gray iron conforming to ASTM A 48.
- B. Surfaces of the castings shall be free from burnt-on sand and shall be reasonably smooth.
- C. Bearing surfaces between manhole rings and covers/frames shall be cast or machined with such precision that uniform bearings shall be provided throughout the perimeter area of contact.

3.04 FIELD

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of project.
 - 1. Submit separate report for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.

- b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter or mandrel test per ASTM D 522.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 3. Replace defective piping using new materials and repeat inspections until defects are within allowances specified. Re-inspect and repeat procedure until results are satisfactory.
 4. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
 5. Do not enclose, cover, or put into service before inspection and approval have taken place.
 6. Test completed piping systems according to requirements of authorities having jurisdiction (AHJ).
 7. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' notice.
 8. Submit separate report for each test.
- B. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction and the following:
 1. Allowable leakage is maximum of 50 gal. /inch of nominal pipe size per mile of pipe, during 24-hour period.
 2. Close openings in system and fill with water.
 3. Purge air and refill with water.
 4. Disconnect water supply
 5. Test and inspect joints for leaks.
 6. Option: Test Ductile-Iron piping according to AWWA C 600, "Hydrostatic Testing" Section. Use test pressure of at least 10 psig.
- C. Leakage Test: Leakage tests shall be performed to verify that leakage outward or inward (exfiltration or infiltration) shall not exceed 200 gallons per inch of pipe diameter per mile per day for any section of the system. This may include appropriate water or low pressure air testing. An exfiltration or infiltration test shall be performed with a minimum positive head of 2 feet. The air test, if used, shall, as a minimum, conform to the test procedure described by ASTM C-828-76T.
- D. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction (AHJ), and the following:
 1. Option: Test plastic gravity sewer piping according to ASTM F 1417.
 2. Leaks and loss in test pressure constitute defects that must be repaired.
 3. Replace leaking piping using new materials and repeat testing until leakage is within allowances specified.
- E. Manhole tests: Test sanitary manholes according to requirements of authorities having jurisdiction (AHJ), and the following:
 1. Option: Vacuum testing:

- a. Install vacuum tester head assembly at top access point of manhole and adjust for proper seal on straight top section of manhole structure. Following manufacturer's instructions and safety precautions, inflate sealing element to recommended maximum inflation pressure; do not over-inflate.
- b. Evacuate manhole with vacuum pump to 10 inches mercury, disconnect pump, and monitor vacuum for time period specified in, Vacuum Test Time Table. Test times for larger manholes are to be in conformance with authority having jurisdiction (AHJ).

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		Minimum Test Times in seconds							
		Diameter, in.							
	30	33	36	42	48	54	60	66	72
Depth (ft.)	Time, in seconds								
<4	6	7	7	9	10	12	13	15	16
6	9	10	11	13	15	18	20	22	25
8	11	12	14	17	20	23	26	29	33
10	14	15	18	21	25	29	33	36	41
12	17	18	21	25	30	35	39	43	49
14	20	21	25	30	35	41	46	51	57
16	22	24	29	34	40	46	52	58	67
18	25	27	32	38	45	52	59	65	73
20	28	30	35	42	50	53	65	72	81
22	31	33	39	46	55	64	72	79	89
24	33	36	42	51	59	64	78	87	97
26	36	39	46	55	64	75	85	94	105
28	39	42	49	59	69	81	91	101	113
30	42	45	53	63	74	87	98	108	121

- c. A manhole passes the test if after 2 minutes and with all valves closed, the vacuum is at least 9 inches of mercury.
2. Option: Perform hydraulic test according to ASTM C 969
3. Leaks and loss in test pressure constitute defects that must be repaired.
4. Replace leaking piping using new materials and repeat testing until leakage is within allowances specified.

END OF SECTION

SECTION 33 40 00 - STORM WATER DRAINAGE PIPING

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. This section includes storm drainage system installation for facilities located outside of the building including the following:
 - 1. Pipe and Fittings
 - 2. Manholes
 - 3. Catch Basins/Curb Inlets
 - 4. Cleanouts
- B. Contractor shall field measure all existing storm sewer tie in points and report discrepancies from the plans to the engineer of record.
- C. Contractor shall record final constructed locations of pipe runs, connections, manholes, catch basins, cleanouts, and invert elevations.
- D. Where applicable, discharge piping from an RPZ connected to a storm sewer shall be equipped with backwater check valve.

1.2 DEFINITIONS

- A. RCP: Reinforced Concrete Pipe
- B. PVC: Polyvinyl Chloride Plastic.
- C. HDPE: High Density Polyethylene.
- D. ASTM: American Society of Testing and Materials.
- E. AASHTO: American Association of State Highway and Transportation Officials.
- F. ODOT: Ohio Department of Transportation Construction and Material Specifications (latest edition)

1.3 SUBMITTALS

- A. Submit shop drawings prior to ordering materials for approval.
- B. Shop drawings: include plans, elevations, inverts, details, and attachments for the following:
 - 1. Storm sewer pipe, fittings and joint material.

2. Pre-cast concrete manholes, catch basins, curb inlets and other structures, including frames, covers and grates; inverts, rims, concrete strength and reinforcement.
 3. Cast-in-place concrete manholes, catch basins, curb inlets and other structures, including frames, covers and grates; inverts, rims, concrete strength and reinforcement.
- C. Design mix reports and calculations: for each class of cast-in-place concrete.
- D. Field test reports: indicate and interpret test results for compliance with performance requirements.

1.4 PERFORMANCE REQUIREMENTS

- A. Gravity-flow, non-pressure-piping pressure ratings: at least equal to system test pressure.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic structures, pipe, and fittings in direct sunlight. Store in accordance with manufactures requirements.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Care shall be taken not to injure the coating or lining of pipe or other materials during the handling of transportation of the materials.
- D. Non-rigid pipe shall be stored to prevent bowing. Pipes with deviations from straight greater than 1/16 inch per foot shall not be used.
- E. Handle and store pipe, precast concrete manholes and other structures according to manufacturer's written rigging, unloading & storage instructions.

1.6 QUALITY ASSURANCE

- A. Comply with the requirements of authorities having jurisdiction and manufacturer's requirements

1.7 PROJECT CONDITIONS

- A. Site information: perform site survey, research public utility records, and verify existing utility locations as required by State Revised Code.
- B. Locate and field measure existing structures and piping to be tied into or closed and abandoned. Report any discrepancies to the engineer for further direction.
- C. Existing utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions, and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Owner not less than two days in advance of proposed utility interruptions.
 2. No utility interruptions are allowed without the Owner's written permission.

3. Contractor is to include known utility interruptions in project schedule.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. All manufacturers are subject to compliance with requirements, specifications, and construction details, and must demonstrate compliance through appropriate test and documentation.

2.2 PIPING MATERIALS

- A. If a specific type of pipe is specified on the drawings, the specified type must be used. All pipes, unless noted, are to use soil tight joints. All pipe and fittings used shall be suitably marked with the manufacture's name or trademark, lot or production number and ASTM designation and also include all requirements from ASTM A746.

- B. If a type of pipe is not specified, one of the following shall be provided:

1. Reinforced Concrete Pipe and Fittings

- a. Reinforced Concrete Pipe and Fittings per ASTM C-76.
- b. Bell and spigot or tongue and groove ends and resilient and gasketed joints per ASTM C 443, rubber gaskets sealant joints with ASTM C-990, bitumen or butyl-rubber sealant.

2. High Density Polyethylene (HDPE) Pipe and Fittings

- a. Pipe shall be dual wall, smooth interior and annular exterior corrugations per ASTM F2648.
- b. to 10-inch pipe shall meet AASHTO M252, Type S or SP
- c. to 60-inch pipe shall meet AASHTO M294, Type S or SP, or ASTM F2306.
- d. Fittings shall conform to AASHTO M252, AASHTO M294, or ASTM F2306. Bell and spigot connections shall utilize a welded bell and valley or saddle gasket meeting the soil tight joint performance requirements of AASHTO M252, AASHTO M294, or ASTM F2306.
- e. Soil tight joints shall be joined using a bell and spigot joint meeting the requirements of AASHTO M252, AASHTO M294, or ASTM F2306. The joint shall be soil-tight and gaskets for pipes 12 through 60-inch, shall meet the requirements of ASTM F477. For pipes 4-10-inch, the joint shall be soil tight using and engaging dimple connection.
- f. Perforated pipe shall consist of AASHTO Class II perforations.

3. Ductile Iron Pipe and Fittings:

- a. Pipe shall conform with AWWA C151/ANSI 21.11, Class 52 with push-on joints
- b. Gaskets per AWWA C111, rubber.

4. Polyvinyl Chloride (PVC) Pipe and Fittings

- a. All pipe and fittings shall conform to ASTM 3034 for 4 to 15-inch pipe with mainline sewer pipe being SDR 26 and service connections under 10 feet in depth (SDR 35) over 10 feet (SDR 26).
- b. All pipe and fittings shall conform to ASTM F-679 for 18-inch and over SDR 26 pipe.
- c. All joints shall be elastomeric gasket type and shall be assembled per manufacturer's recommendations and ASTM D 3212.

5. MANHOLES

C. Pre-Cast Concrete Manholes

1. Manholes shall conform to ASTM C 478, AASHTO M 199, with reinforced concrete (min. $F_c' = 4,000$ psi, air-entrained), of depth indicated, with joint seal between pre cast manhole sections shall be resilient and flexible gasket conforming to ASTM C-443.
2. Diameter: 48 inches inner diameter minimum, unless otherwise indicated on the Contract Drawings.
3. Ballast: Increase thickness of precast concrete sections or add concrete extension to base section, as required to prevent flotation.
4. Base Section: 6-inch minimum thickness for floor slab and 5-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
5. Structure channels and benches: factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water-cementitious ratio. Include channels and benches in manholes.
 - a. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - b. Benches: Concrete, sloped to drain into channel, Slope: 8 percent (max.).
6. Riser Sections: 5-inch minimum thickness, and lengths to provide depth indicated.
7. Top Section: Eccentric-cone type, unless either concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
8. Gaskets: Resilient and flexible gasket conforming to ASTM C 443.
9. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
10. Joint Sealant: ASTM C-442, bitumen or butyl rubber. In addition, to O-Ring joint between manhole sections, a flexible butyl rubber seal, Con Seal, or equal shall be used with a minimum temperature workability of 10 to 130 degrees Fahrenheit.
11. Flexible Sleeve: A watertight flexible sleeve Kor-n-Seal", Press Wedge or equal to be provided at all connections between manholes and pipes.
12. Grade Rings: Include two or three reinforced-concrete rings, of maximum 12-inch total thickness, that match 24-inch diameter frame and cover. Rings shall be set in a full bed of mortar.
13. Steps: Manufactured from deformed, 1/2-inch steel reinforcement rod (grade 60) complying with ASTM A 615/A 615M, ASTM C 478, and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into base, riser, top section, and sidewalls with steps at 16 inch intervals on center. No pipes shall enter a manhole in the thru the step area.

14. Manhole frames and covers: ASTM A 536, grade 60-40-18, Ductile-Iron castings designed for heavy-duty service. Include 24-inch inside diameter by 7-to 9-inch riser with 4-inch minimum width flange, and 24-inch diameter cover. Include indented top design with lettering "Storm Sewer" cast into cover. All frames and grates within R/W shall comply with AHJ's requirements.
15. Lift holes shall be provided in each section for handling. Seal all lift holes with approved concrete plugs.

D. Cast-in Place Manholes

1. Cast-in-place concrete manholes: constructed of reinforced-concrete bottom, walls, and top; designed according to ASTM C 890 for A-16, heavy-traffic, and structural loading; of depth, shape, dimensions, and appurtenances indicated.
2. Ballast: Increase thickness of precast concrete sections or add concrete extension to base section, as required to prevent flotation.
3. Concrete:
 - a. Cement: ASTM C 150, Type II.
 - b. Fine Aggregate: ASTM C 33, sand.
 - c. Coarse Aggregate: ASTM C 33, crushed gravel.
 - d. Water: Potable.
4. Portland cement design mix: 4000 psi minimum, with 0.45 maximum water-cementitious ratio.
5. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
6. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.
7. Structure channels and benches:
 - a. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - b. Benches: Concrete, sloped to drain into channel, Slope: 8 percent (max.).
8. Grade Rings: Include two or three reinforced-concrete rings, of maximum 12-inch total thickness, that match 24-inch diameter frame and cover. Rings shall be set in a full bed of mortar.
9. Steps: Manufactured from deformed, 1/2-inch steel reinforcement rod (grade 60) complying with ASTM A 615/A 615M, ASTM C 478, and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into base, riser, top section, and sidewalls with steps at 16 inch intervals on center. No pipes shall enter a manhole in the thru the step area.
10. Manhole frames and covers: ASTM A 536, grade 60-40-18, Ductile-Iron castings designed for heavy-duty service. Include 24-inch inside diameter by 7-to 9-inch riser with 4-inch minimum width flange, and 24-inch diameter cover. Include indented top design with lettering "Storm Sewer" cast into cover. All frames and grates within R/W shall comply with AHJ's requirements. Manhole frames shall be set in a full bed of mortar.

2.3 CATCH BASINS

A. Pre-Cast Concrete Catch Basin / Curb Inlets

1. Catch Basin/Curb Inlets shall conform to ASTM C 478, AASHTO M 199, with reinforced concrete (min. $F_c' = 4,000$ psi, air-entrained), of depth indicated, with joint seal between pre cast manhole sections shall be resilient and flexible gasket conforming to ASTM C-443.
2. Dimensions as indicated on the Contract Drawings.
3. Ballast: Increase thickness of precast concrete sections or add concrete extension to base section, as required to prevent flotation.
4. Base Section: 6-inch minimum thickness for floor slab and 6-inch minimum thickness for walls for structures not under pavement and 8-inch for structures under pavement.
5. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
6. Gaskets: Resilient and flexible gasket conforming to ASTM C 443.
7. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to catch basin.
8. Joint Sealant: ASTM C-442, bitumen or butyl rubber. In addition, to O-Ring joint between catch basin sections, a flexible butyl rubber seal, Con Seal, or equal shall be used with a minimum temperature workability of 10 to 130 degrees Fahrenheit.
9. Flexible Sleeve: A watertight flexible sleeve Kor-n-Seal", Press Wedge or equal to be provided at all connections between manholes and pipes.
10. Steps: Manufactured from deformed, 1/2-inch steel reinforcement rod (grade 60) complying with ASTM A 615/A 615M, ASTM C 478, and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 16 inch intervals on center. No pipes shall enter a catch basin in the thru the step area.
11. Catch Basin/Curb Inlet Frames and Grates: ASTM A 536, grade 60-40-18, ductile iron designed for heavy-duty service. Size: 24 by 24 inches minimum, unless otherwise indicated on construction detail. Frames shall be set in a full bed of mortar.
 - a. Grate Free Area approximately 50 percent, unless otherwise indicated.
 - b. Catch basin, area and yard drain covers in accessible ways shall be ADA compliant and bicycle wheel proof. Covers shall also be safe for shoes with narrow heels (1/4" gap maximum).

2.4 IMPACT MODIFIED COPOLYMER POLYPROPYLENE MANHOLES / CATCH BASINS

- A. Impact modified copolymer polypropylene manhole/inlets meeting the material requirements of ASTM F2764. Eccentric cones shall be manufactured from polyethylene material meeting ASTM D3360 cell class 213320C.
- B. The joint shall conform to ASTM D3212 using flexible elastomeric seals.
- C. Elastomeric seals used for polyethylene cone and pipe connectors to the structure shall conform to ASTM F477.

- D. Provide a watertight connection for pipes entering the manhole/catch basin and provide adapters as specified by the manufacturer.
- E. Frame and Grate shall be 30-inch in diameter and conform to ASTM A536 grade 70-50-05 and painted black.
- F. No brick or concrete block shall be used to set frame and grate to grade.
- G. All grates shall be set in a 3'x3'x8" concrete pad

2.5 CLEANOUTS

A. Gray-iron cleanouts:

- 1. ASME A112.36.2m, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug. Use units with top-loading classifications according to the following applications:
 - a. Light Duty: In earth or grass foot-traffic areas.
 - b. Medium Duty: In paved foot-traffic areas.
 - c. Heavy Duty: In vehicle-traffic parking lots, drives, service areas. Recess slightly below pavement surface.
 - d. Extra-Heavy Duty: In public roads. Recess slightly below pavement surface.
 - e. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

B. PVC Cleanouts (when approved by Engineer):

- 1. PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to clean out of same material as sewer piping.
 - a. Light Duty: In earth or grass foot-traffic areas.
 - b. Medium Duty: In paved foot-traffic areas.
 - c. Heavy Duty: In vehicle-traffic parking lots, drives, service areas. Last section of pipe at surface shall be cast iron cut to field measurement ANSI Class 25. Set Cleanout casting in 3'-0" square, 8-inch thick 4,000 psi concrete. Casting shall be a cast iron disc or cap with magnetic element imbedded and mastic sealed.

C. Lid and Frame: Cast iron construction, hinged lid.

2.6 PIPE SUPPORTS

A. Ballast and pipe supports: Portland cement design mix, 3,000 psi minimum, with 0.58 maximum water-cementitious ratio.

- 1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
- 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Division 31.

3.2 INSTALLATION, GENERAL

- A. General locations and arrangements: drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, and per the requirements.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.
- C. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated on the Contract Drawings.
- D. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Install gravity flow, non-pressure pipe for site storm sewer pipes according to the following:
 - 1. Install piping pitched down in the direction of flow.
 - 2. Install RCP sewer pipe in accordance with ASTM C 1479.
 - 3. Install HDPE sewer pipe in accordance with ASTM D2321.
 - 4. Install PVC sewer pipe according to ASTM D 232, ASTM D 2774 and ASTM F 1688.
 - 5. Install ductile iron pipe per AWWA C6000.
- F. Install gravity-flow piping service connection to buildings storm drains or downspouts, of sizes and in locations as indicated. Terminate piping as indicated Contract Drawings.
- G. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.
- H. Comply with manufacturer's requirements for installation, handling, and storage.
- I. Utilize magnetic marking tape for storm sewers - Install [24"] below finished grade.

3.3 PIPE JOINT CONSTRUCTION AND INSTALLATION

- A. General: Join and install pipe and fittings according to installations indicated and pipe manufacturer's specifications.

1. Before joining pipe with a coupling or bell end, all surfaces of the portions of the pipe to be joined and all surfaces of factory made joining material shall be clean and dry. Lubricants, primers, adhesives, solvents bolts, etc. shall have been manufactured specifically for their intended use and shall be used as recommended by the pipe and/or pipe joint manufacturer. The jointing materials shall be fitted and adjusted or applied in such a manner to obtain a close fitting joint and to obtain and the degree of water tightness required.
 2. Where joining pipes of different materials is required or approved, this works shall be done utilizing special adapters and couplers manufactured specifically for this purpose. The adapters and couplers shall be installed and securely attached to both pipe barrels according to manufactures recommendations.
 3. As soon as possible after a joint is made, sufficient backfill materials shall be placed along each side of the pipe to support the pipe in its final position.
 4. Where a pipe stub or run of pipe is to be temporality terminated for future expansion, the end of the pipe shall be sealed using and approved removable stopper.
 5. Install PE film, pipe encasement over hubless cast-iron soil pipe and fittings according to ASTM A 674 or AWWA C105.
 6. Handle, store, install and backfill all pipe in strict accordance with manufacturer's recommendations.
- B. Install with top surfaces of components, except piping, flush with finished surface.
- C. PVC sewer pipe and fittings as follows:
1. Join pipe and gasketed fittings with gaskets according to ASTM F 477.
 2. Install according to ASTM D 2321.
- D. Concrete pipe and fittings: install according to ACPA'S "Concrete Pipe Installation Manual."

3.4 MANHOLE INSTALLATION

- A. General: install manholes, complete with appurtenances and as required by the City of Streetsboro and ODOT.
- B. Form continuous concrete channels and benches between inlets and outlet.
- C. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere, unless otherwise indicated.
- D. Install precast concrete manhole sections with gaskets according to ASTM C 891.

3.5 CATCH-BASIN INSTALLATION

- A. Construct catch basins to sizes and shapes indicated as shown on the plans.
- B. Set frames and grates to elevations indicated.
- C. Engineered PVC Manholes shall be installed per ASTM D2321.

3.6 STORM DRAINAGE INLET AND OUTLET INSTALLATION

- A. Construct inlet head walls, aprons, and sides of reinforced concrete, as required by City of Streetsboro and ODOT requirements.
- B. Construct riprap of stone, as indicated. Install with geotextile fabric, per City of Streetsboro and ODOT.
- C. Install outlets that spill onto grade, anchored with concrete, where indicated.
- D. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.
- E. Construct energy dissipaters at outlets, as indicated.
- F. Engineered PVC catch basins shall be installed per ASTM D2321.

3.7 TAP CONNECTIONS

- A. Make connections to existing piping and underground structures so finished work complies as nearly as practical with requirements specified for new work.
- B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 4000 psi.
- C. Make branch connections from side into existing piping. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 4000 psi.
- D. Make branch connections from side into existing piping, or to underground structures by cutting opening into existing unit large enough to allow 3 inches of non-shrink grout to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall, unless otherwise indicated. On outside of pipe or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.
 - 1. Use concrete that will attain minimum 28-day compressive strength of 4,000 psi, unless otherwise indicated.
 - 2. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
- E. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.8 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

- A. Abandoned piping: close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:

1. Close open ends of piping with at least 8-inch thick, brick masonry or concrete bulkheads.
2. Close open ends of piping with threaded metal caps, plastic plugs, concrete, or other acceptable methods suitable for size and type of material being closed. Usage of wood plugs is prohibited.
3. All storm pipes to be abandoned are to be filled with low strength mortar, concrete, or non-shrink grout unless noted otherwise.

B. Abandoned structures: excavate around structure as required and use one procedure below:

1. Remove structure and close open ends of remaining piping
2. Remove top of structure down to at least 36 inches below final grade.
3. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt.
4. Fill to top with concrete, or Low Strength Mortar (LSM).
5. Backfill to grade according to Section 312333.
6. Existing catch basins that are to be abandoned in place shall be filled with low strength mortar (LSM).

3.9 FIELD QUALITY CONTROL

C. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.

1. In large, accessible piping, brushes and brooms may be used for cleaning.
2. Place plug in end of incomplete piping at end of day and when work stops.
3. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.

D. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of project.

1. Submit separate reports for each system inspection.
2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from, or around piping.
3. Replace defective piping using new materials and repeat inspections until defects are within allowances specified.
4. Re-inspect and repeat procedure until results are satisfactory. Provide owner and/or construction manager that the storm sewer piping system has been installed with no defects (as mentioned above).

END OF SECTION 33 40 00

SECTION 33 41 16 - SUBDRAINAGE PIPING

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Work included in this section relates to all pipe, fittings, materials, and appurtenances related to underground subdrainage.

1.2 SUBMITTALS

- A. Submit shop drawings prior to ordering materials for review.
- B. Provide shop drawings for the following:
 - 1. Underdrain pipe
 - 2. Impermeable liner

PART 2 - PRODUCTS

2.1 PERFORATED-WALL PIPES AND FITTINGS

- A. Pipe materials in this article have perforated walls and typically are joined with loose joints.
- B. Perforated PE pipe and fittings:
- C. Perforated PVC SDR 35 sewer pipe and fittings: ASTM D 2729, gasketed bell-and-spigot ends.
- D. Solid wall PVC pipe, ASTM D 3034
- E. Solid wall PE pipe, AASHTO M252, or AASHTO M294, type S

2.2 SOIL AND GRANULAR MATERIALS

- A. Materials are specified in Section 31 23 33.

2.3 GEOTEXTILE FABRIC

- A. Materials are specified in Section 31 32 19

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and areas for suitable conditions where subdrainage systems are to be installed.

- B. If subdrainage is required for landscaping, locate and mark existing utilities, underground structures, and aboveground obstructions before beginning installation and avoid disruption and damage of services.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Excavating, earthwork, trenching, and backfilling are specified in Division 31.

3.2 FOUNDATION, PAVEMENT AND CURB DRAINAGE INSTALLATION (where applicable).

- A. Refer to plan details.
- B. Where applicable, tie foundation drains with PVC or HDPE pipe (or equal) using positive slope (0.5% min.) to nearby storm sewers or storm structure impervious
- C. Place impervious fill material on sub-grade adjacent to bottom of footing after concrete footing forms have been removed. Place and compact impervious fill to dimensions indicated, but not less than 6 inches (150 mm) deep and 12 inches (300 mm) wide.
- D. Install flat-style non-woven geotextile filter fabric in trench and overlap trench sides.
- E. Place supporting layer of drainage course over compacted sub-grade and geotextile filter fabric, to compacted depth of not less than 4 inches (100 mm).
- F. Where shown on plan details encase pipe with sock-style geotextile filter fabric before installing pipe. Connect sock sections per manufactures requirements.
- G. Add drainage course to width of at least 6 inches (150 mm) on side away from wall and to top of pipe to perform tests.
- H. After satisfactory testing, cover drainage piping to width of at least 6 inches (150 mm) on side away from footing and above top of pipe to within 12 inches (300 mm) of finish grade.
- I. Install drainage course and wrap top of drainage course with flat-style non-woven geotextile filter fabric overlapping edges at least 4 inches (100 mm).
- J. Place backfill material over compacted drainage course. Place material in loose-depth layers not exceeding 6 inches (150 mm). Thoroughly compact each layer. Final backfill to finish elevations and slope away from building where applicable.

3.3 LANDSCAPING DRAINAGE INSTALLATION (Where applicable. Refer to Landscape Drawings.)

- A. Provide trench width to allow installation of drainage conduit. Grade bottom of trench excavations to required slope, and compact to firm, solid bed for drainage system.
- B. Lay flat-style non-woven geotextile filter fabric in trench and overlap trench sides (min 4 inches).
- C. Place supporting layer of drainage course over compacted subgrade and geotextile filter fabric, to compacted depth of not less than 4 inches (100 mm).

- D. Install drainage conduits as indicated in part 3 "piping installation" article for landscaping subdrainage with horizontal distance of at least 6 inches (150 mm) between conduit and trench walls. Wrap drainage conduits without integral geotextile filter fabric with flat-style geotextile filter fabric before installation. Connect fabric sections with tape.
- E. Add drainage course to top of drainage conduits.
- F. After satisfactory testing, cover drainage conduit to within 12 inches (300 mm) of finish grade.
- G. Install drainage course and wrap top of drainage course with flat-style geotextile filter fabric.
- H. Place layer of non-woven geotextile filter fabric over top of drainage course, overlapping edges at least 4 inches (100 mm).
- I. Fill to grade: place satisfactory soil fill material over drainage course. Place material in loose-depth layers not exceeding 6 inches (150 mm). Thoroughly compact each layer. Fill to finish grade.

3.4 PIPING INSTALLATION

- A. Show relationships of piping and other materials on drawings.
- B. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.
- C. Miscellaneous (where applicable):
 - 1. Underslab subdrainage: install piping level.
 - 2. Foundation subdrainage: Install piping level and with a minimum cover of 36 inches unless otherwise indicated.
 - 3. Retaining-wall subdrainage: when water discharges at end of wall into stormwater piping system, install piping level and with a minimum cover of 36 inches unless otherwise indicated.
 - 4. Landscaping subdrainage: install piping pitched down in direction of flow, at a minimum slope of 0.5 percent and with a minimum cover of 36 inches unless otherwise indicated.
 - 5. Lay perforated pipe with perforations facing down.
 - 6. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.
- D. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.

- E. Install thermoplastic piping according to ASTM D 2321.

3.5 PIPE JOINT CONSTRUCTION

- A. Join perforated pipe and fittings with couplings according to ASTM D 3212 with loose banded, coupled, or push-on joints.
- B. Join perforated PVC sewer pipe and fittings according to ASTM D 3212 with loose bell-and-spigot, push-on joints.
- C. Special pipe couplings: join piping made of different materials and dimensions with special couplings made for this application. Use couplings that are compatible with and fit materials and dimensions of both pipes.

3.6 BACKWATER VALVE INSTALLATION (Where applicable)

- A. Install horizontal backwater valves in header piping downstream from perforated subdrainage piping.
- B. Backwater valves must be accessible for maintenance. Detail backwater valves and manholes or pits if backwater valve's check valve cannot be reached from the surface.
- C. Install horizontal backwater valves in piping in manholes or pits where indicated.

3.7 CLEANOUT INSTALLATION

- A. Where applicable, cleanouts for foundation, retaining-wall and landscaping subdrainage:
 - 1. Install cleanouts from piping to grade. Locate cleanouts at beginning of piping run and at changes in direction. Install fittings so cleanouts open in direction of flow in piping.
 - 2. In vehicular-traffic areas, use NPS 4 (DN 100) cast-iron soil pipe and fittings for piping branch fittings and riser extensions to cleanout. Set cleanout frames and covers in a cast-in-place concrete anchor, [18 by 18 by 12 inches (450 by 450 by 300 mm)] deep. Set top of cleanout flush with grade.
 - 3. In non-vehicular-traffic areas, use NPS 4 (DN 100) cast-iron pipe and fittings for piping branch fittings and riser extensions to cleanout. Where applicable, set cleanout frames and covers in a cast-in-place concrete anchor, 12 by 12 by 4 inches (300 by 300 by 100 mm) deep. Set top of cleanout 1 inch (25 mm) above grade.
 - 4. Comply with requirements for concrete specified. Use $F_c' = 3000$ psi concrete. Use air entrainment when concrete is exposed to freeze/thaw conditions.
- B. Cleanouts for underslab subdrainage:
 - 1. Install cleanouts and riser extensions from piping to top of slab. Locate cleanouts at beginning of piping run and at changes in direction. Install fittings so cleanouts open in direction of flow in piping.

2. Use NPS 4 (DN 100) cast-iron soil pipe and fittings for piping branch fittings and riser extensions to cleanout flush with top of slab

3.8 CONNECTIONS

- A. Contract Documents indicate general arrangement of piping, fittings, and specialties.
- B. Connect low elevations of subdrainage system to building's solid-wall-piping storm drainage system.
- C. Where required, connect low elevations of foundation and underslab subdrainage to stormwater sump pumps.

3.9 FIELD QUALITY CONTROL

- A. Tests and inspections:
 1. After installing drainage course to top of piping, test drain piping with water to ensure free flow before backfilling.
 2. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.
- B. Drain piping will be considered defective if it does not pass tests and inspections.
- C. If piping does not pass inspections and tests, the Contractor is to correct issues at no extra cost to the Owner.
- D. Prepare test and inspection reports.

3.10 CLEANING

- A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

END OF SECTION 33 41 16

WATER DEPARTMENT SERVICE SHOP ADDITION & RENOVATION

CITY OF CANTON
2664 HARRISBURG RD. NE CANTON, OH 44705
ISSUED FOR BID: FEBRUARY 28, 2024

MOTTER & MEADOWS

ARCHITECTS

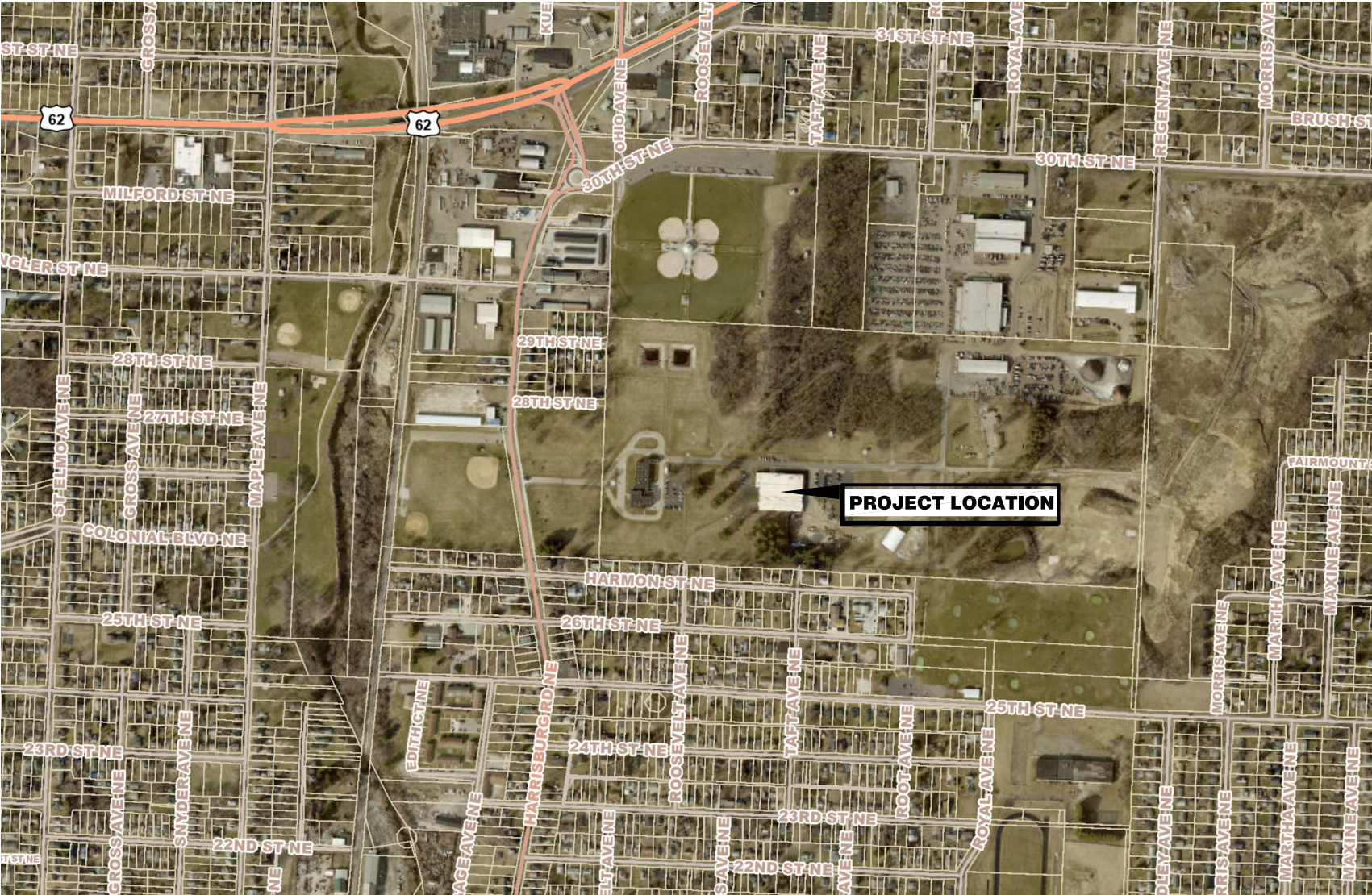
600 MARKET AVENUE NORTH
CANTON, OHIO 44702
PHONE: (330) 454-6165

CIVIL ENGINEER: KARPINSKI ENGINEERING
STRUCTURAL ENGINEER: BARBER & HOFFMAN INC
MECHANICAL & PLUMBING ENGINEER: HEI ENGINEERING GROUP, INC
ELECTRICAL ENGINEER: MJK ELECTRICAL ENGINEERING, LLC

VICINITY MAP / AREA OF WORK LOCATION PLAN

ABBREVIATIONS & SYMBOLS

DRAWING INDEX



ACOUS.	ACOUSTICAL	ROOM NAME
A.F.F.	ABOVE FINISH FLOOR	ROOM
ALUM.	ALUMINUM	ROOM NAME & NUMBER
BRG.	BEARING	DOOR
CLG.	CEILING	DOOR NUMBER
CL.	CENTERLINE	WALL TYPE
COL.	COLUMN	ELEVATION REFERENCE
CONC.	CONCRETE	SECTION CUT REFERENCE
CONT.	CONTINUOUS	BUILDING SECTION REFERENCE
DWGS.	DRAWINGS	
EA.	EACH	
ELEV.	ELEVATION (ALSO 'EL')	
EXIST.	EXISTING (ALSO 'EXG')	
F.D.	FLOOR DRAIN	
FTG.	FOOTING	
F.V.	FIELD VERIFY	
GALV.	GALVANIZED	
G.C.	GENERAL CONTRACTOR	
GYP.	GYPHUM	
H.M.	HOLLOW METAL	
HORIZ.	HORIZONTAL	
INSUL.	INSULATION	
MANFR.	MANUFACTURER (ALSO 'MFR')	
MFG.	MANUFACTURING	
MAX.	MAXIMUM	
MTL.	METAL	
MIN.	MINIMUM	
N.T.S.	NOT TO SCALE	
O.C.	ON CENTER	
±	PLUS OR MINUS	
REINF.	REINFORCING	
R.D.	ROOF DRAIN	
STRUC.	STRUCTURAL	
SUSP.	SUSPENDED	
T.O.F.	TOP OF FOOTING	
T.O.S.	TOP OF STEEL	
TYP.	TYPICAL	
VERT.	VERTICAL	
W/	WITH	
WD.	WOOD	

CIVIL	PLUMBING
C-001 GENERAL NOTES	P-1.1 EXIST. ADMIN. - SANITARY DEMOLITION
C-100 EXISTING CONDITIONS & DEMOLITION PLAN	P-1.2 EXIST. SERVICE SHOP - SANITARY DEMOLITION
C-200 SITE LAYOUT PLAN	P-1.3 NEW ADDITION - SANITARY DEMOLITION
C-300 UTILITY PLAN	P-1.4 EXIST. ADMINISTRATION - PLUMBING WATER AND GAS PIPING DEMOLITION
C-400 GRADING PLAN	P-1.5 EXIST. SERVICE SHOP - PLUMBING WATER AND GAS PIPING DEMOLITION
C-500 SWPPP PLAN	P-2.1 EXIST. ADMINISTRATION - PLUMBING SANITARY
D-100 SITE DETAILS	P-2.2 EXIST. SERVICE SHOP - PLUMBING SANITARY
D-200 SITE DETAILS	P-2.3 NEW ADDITION - PLUMBING SANITARY
D-300 SWPPP DETAILS	P-2.4 EXIST. ADMIN - PLUMBING WATER & GAS PIPING
D-400 SWPPP DETAILS	P-2.5 EXIST. SERVICE SHOP - PLUMBING WATER & GAS PIPING
D-500 SWPPP DETAILS	P-2.6 NEW ADDITION - GAS PIPING PLUMBING
	P-3.1 SANITARY ISOMETRICS
	P-3.2 PLUMBING DETAILS
	P-3.3 PLUMBING SCHEDULES, NOTES & LEGENDS
ARCHITECTURAL	FIRE PROTECTION
A-1.1 KEY SITE PLAN; DETAIL SITE PLAN	FP-2.1 EXIST. ADMINISTRATION - FIRE PROTECTION
A-1.2 SITE ENTRANCE SIGN, BRONZE PLAQUE	FP-2.2 EXIST. SERVICE SHOP - FIRE PROTECTION
OP-1.1 CONSTRUCTION PHASING	FP-2.3 NEW ADDITION - FIRE PROTECTION
D-1.1 EXIST. ADMIN. - PARTIAL DEMOLITION PLAN	
D-1.2 EXIST. SERVICE SHOP - PARTIAL DEMOLITION PLAN	HVAC
A-2.1 PROJECT DATA; EXIST. ADMIN. - PARTIAL FLOOR PLAN (AREA OF RENOVATION)	H-1.1 FLOOR PLAN - HVAC DEMOLITION
A-2.2 EXIST. SERVICE SHOP - PARTIAL FLOOR PLAN (AREA OF RENOVATION)	H-1.2 PARTIAL FLOOR PLAN - HVAC
A-2.3 NEW ADDITION - PARTIAL FLOOR PLAN	H-2.1 PARTIAL FLOOR PLAN - HVAC
A-2.4 REFLECTED CEILING PLAN	H-2.2 PARTIAL FLOOR PLAN - HVAC
A-2.5 NEW ADDITION ROOF PLAN	H-2.3 PARTIAL FLOOR PLAN - HVAC
A-2.6 EXISTING ROOF PLAN - ROOF REPLACEMENT	H-3.1 HVAC SCHEDULES
A-3.1 NEW ADDITION - EXTERIOR ELEVATIONS	H-3.2 HVAC DETAILS
A-3.2 EXISTING EXTERIOR ELEVATIONS; WINDOW TYPES	H-3.3 HVAC DETAILS
A-4.1 BUILDING SECTION; RAMP DETAILS	
A-5.1 WALL SECTIONS	ELECTRICAL
A-6.1 INTERIOR ELEVATIONS; SCHEDULES	E-1.1 SITE ELECTRICAL PLAN
STRUCTURAL	E-1.2 LIGHTING PLAN - EXIST. ADMINISTRATION
S-0.1 GENERAL NOTES	E-1.3 LIGHTING PLAN - EXIST. SERVICE SHOP
S-0.2 GENERAL NOTES	E-1.4 LIGHTING PLAN - NEW ADDITION
S-0.3 SPECIAL INSPECTIONS	E-2.1 POWER PLAN - EXIST. ADMINISTRATION
S-0.4 SPECIAL INSPECTIONS	E-2.2 POWER PLAN - EXIST. SERVICE SHOP
S-1.1 FOUNDATION PLAN - ADDITION	E-2.3 POWER PLAN - NEW ADDITION
S-1.1A FOUNDATION PLAN - EXISTING BUILDING	E-3.1 MECH. ELECTRICAL PLAN - EXIST. ADMINISTRATION
S-1.2 FRAMING PLAN AT ELEVATION 8'-8"	E-3.2 MECH. ELECTRICAL PLAN - EXIST. SERVICE SHOP
S-1.3 ROOF FRAMING PLAN - ADDITION	E-3.3 MECH. ELECTRICAL PLAN - NEW ADDITION
S-1.3A ROOF FRAMING PLAN - EXISTING BUILDING	E-4.1 SYSTEMS PLAN - EXIST. ADMINISTRATION
S-1.4 RAMP FOUNDATION PLAN & SECTIONS	E-4.2 SYSTEMS PLAN - EXIST. SERVICE SHOP
S-1.5 EXTERIOR FRAMING ELEVATIONS	E-4.3 SYSTEMS PLAN - NEW ADDITION
S-2.1 BRACING ELEVATIONS & DETAILS	E-5.1 DEMO PLAN - EXIST. ADMINISTRATION
S-2.2 SECTIONS	E-5.2 DEMO PLAN - EXIST. SERVICE SHOP
S-3.1 TYPICAL DETAILS	E-6.1 POWER DISTRIBUTION DIAGRAMS
S-3.2 TYPICAL DETAILS	E-6.2 PANEL SCHEDULES
S-3.3 REPAIR DETAILS	

GENERAL NOTES

1.

SCOPE OF WORK

THE FOLLOWING IS INTENDED TO CONVEY A GENERAL DESCRIPTION OF THE WORK TO BE PERFORMED FOR THIS PROJECT:

THE CONTRACTOR'S RESPONSIBILITIES INCLUDE, BUT ARE NOT LIMITED TO, CONSTRUCTION PROCEDURES, MATERIALS, INSTALLATION SEQUENCE, AND COORDINATION WITH THE OWNER.

THE CONTRACTOR SHALL SECURE AND PAY FOR ANY AND ALL LICENSES, GOVERNMENT FEES, AND PERMITS THAT MAY BE REQUIRED TO PROPERLY EXECUTE AND COMPLETE THE WORK. COMPLY WITH ALL APPLICABLE CODES, RULES, ORDINANCES AND OTHER LEGAL REQUIREMENTS.

CONTRACTOR SHALL IMMEDIATELY LOCATE ALL REFERENCE POINTS, LAYOUT WORK, AND BE RESPONSIBLE FOR ALL MEASUREMENTS AND OTHER WORK TO BE EXECUTED UNDER THE CONTRACT. VERIFY ALL FIGURES SHOWN ON THE PLANS, VERIFY ALL DIMENSIONS OF ANY EXISTING AND NEW WORK, BE RESPONSIBLE FOR THEIR ACCURACY AND SUBMIT ANY DIFFERENCES FOUND TO THE OWNER BEFORE PROCEEDING WITH THE WORK. NO EXTRA COMPENSATION WILL BE PERMITTED BECAUSE OF DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND MEASUREMENTS INDICATED ON THE DRAWINGS.
2.

STANDARDS & SPECIFICATIONS

CONTRACTOR IS RESPONSIBLE FOR DAMAGE TO ANY EXISTING ITEM AND / OR MATERIAL INSIDE OR OUTSIDE CONTRACT LIMIT / PROPERTY LINE DUE TO CONSTRUCTION. ALL WORK MUST BE IN ACCORDANCE WITH LOCAL AND / OR STATE CODES AND REGULATIONS. CONTRACTOR IS TO COMPLY WITH ODOT ITEM 107.10. WORK IS TO BE SATISFACTORY TO THE PROPERTY OWNER.

ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH SPECIFICATIONS OF THE COUNTY, AND THE LATEST EDITION OF THE OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATIONS. IN THE CASE OF A CONFLICT BETWEEN CITY, COUNTY AND ODOT REQUIREMENTS, THE CITY REQUIREMENTS WILL TAKE PRECEDENCE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
3.

PLAN DISCREPANCIES

ANY DISCREPANCIES FROM THE PLAN INFORMATION SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY SO THAT APPROPRIATE ADJUSTMENTS IN ALIGNMENT AND / OR GRADE MAY BE MADE PRIOR TO THE START OF CONSTRUCTION.

FAILURE BY THE CONTRACTOR TO VERIFY AND / OR DETERMINE EXISTING INFORMATION AS INDICATED WILL RESULT IN THE CONTRACTOR BEING RESPONSIBLE FOR ANY CHANGES NECESSARY TO COMPLETE THE WORK SPECIFIED WITHOUT ADDITIONAL COMPENSATION.
4.

PLAN MODIFICATION

ANY MODIFICATIONS TO THE NOTES, OR CHANGES TO THE WORK AS SHOWN ON THESE PLANS MUST HAVE PRIOR WRITTEN APPROVAL OF THE ENGINEER.
5.

SAFETY

IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO COMPLY WITH ALL FEDERAL, STATE AND LOCAL SAFETY REQUIREMENTS, TOGETHER WITH EXERCISING PRECAUTIONS AT ALL TIMES FOR THE PROTECTION OF THE RESIDENTS (INCLUDING EMPLOYEES), WORKERS, GENERAL PUBLIC AND PROPERTY. IT IS ALSO THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INITIATE, MAINTAIN AND SUPERVISE ALL SAFETY REQUIREMENTS, PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK.

THE CONTRACTOR SHALL PROPERLY SUPPORT AND / OR MAINTAIN ALL EXCAVATIONS PER APPLICABLE SAFETY REQUIREMENTS AND COMPLY WITH ALL OSHA REGULATIONS. PRIOR TO COMMENCING CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER OF THE PROJECT'S ASSIGNED "COMPETENT PERSON" IN OSHA EXCAVATION STANDARDS.

PUBLIC STREETS SHALL BE KEPT CLEAN AND FREE OF DEBRIS (MUD, STONE, ETC.) AT ALL TIMES.

THE CONSTRUCTION MANAGER SHALL ALERT ALL LOCAL EMERGENCY AGENCIES (FIRE, POLICE, AMBULANCE, ETC.) OF THE NATURE OF THE PROPOSED PROJECT PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY. ACCESS FOR EMERGENCY VEHICLES SHALL BE MAINTAINED AT ALL TIMES.
6.

BASE MAPPING

SURVEY INFORMATION HAS BEEN PROVIDED BY THE OWNER AND THE SURVEY WAS PERFORMED BY DIEBEL SURVEYING. ALL BENCHMARKS AND TOPOGRAPHY SHOULD BE FIELD VERIFIED BY THE CONTRACTOR. BENCHMARKS SHOWN ON PLAN ESTABLISHED BY OR FOUND BY DIEBEL SURVEYING. CONDITION OF BENCHMARK MUST BE VERIFIED PRIOR TO CONSTRUCTION.
7.

EXISTING UTILITIES

VIEW THE SITE AND COORDINATE WITH THE OWNER REGARDING LOCATION OF EXISTING FACILITIES AND ANY POSSIBLE UTILITY SERVICE INTERRUPTION OR RELOCATION. THE CONTRACTOR'S RESPONSIBILITIES INCLUDE, BUT ARE NOT LIMITED TO, THE INVESTIGATION, VERIFICATION OF EXISTING UTILITY DIMENSIONS AND LOCATION, SUPPORT, PROTECTION AND RESTORATION OF ALL EXISTING UTILITIES AND APPURTENANCES WHETHER SHOWN ON THESE PLANS OR NOT.

THE CONTRACTOR SHALL NOTIFY THE OHIO UTILITY PROTECTION SERVICE (OUPS) AT 1-800-362-2764, THE CITY ENGINEER, AND ALL PRIVATE UTILITY OWNERS A MINIMUM OF 48 HOURS PRIOR TO ANY EARTH DISTURBING ACTIVITY.

ALL UTILITY INFORMATION SHOWN ON THESE PLANS IS BASED UPON THE SURVEY COMPLETED BY DIEBEL SURVEYING AND RECORD DRAWINGS, AND IS PROVIDED AS A REFERENCE ONLY. IT IS BELIEVED THAT THESE LOCATIONS ARE ESSENTIALLY CORRECT. HOWEVER, THE OWNER AND ENGINEER DO NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THESE EXISTING UTILITIES. CONTRACTOR MAY DIG TEST PITS AT THEIR OWN EXPENSE.

ALL STORM AND SANITARY LINES THAT ARE TO BE REUSED, ARE TO BE THOROUGHLY CLEANED, FLUSHED, AND TELEVIEWED. SUBMIT VIDEO TO ENGINEER FOR APPROVAL OF EXISTING PIPING CONDITIONS.
8.

EXISTING MONUMENTATION

THE CONTRACTOR SHALL PRESERVE ALL CORNERSTONES, IRON PINS, CONCRETE MONUMENTS AND / OR ANY TYPE OF LAND MONUMENT. ALL MONUMENTS IN THE PROXIMITY OF THE WORK SHALL BE REFERENCED. THE CONTRACTOR SHALL REPLACE / RESET ANY DISTURBED OR DAMAGED MONUMENTS, AND SHALL FURNISH A CERTIFICATION BY A REGISTERED SURVEYOR THAT THE MONUMENTS HAVE BEEN RESTORED TO THEIR ORIGINAL STATE.
9.

DEWATERING OPERATIONS

WHEN DEEMED NECESSARY, THE CONTRACTOR MAY PLAN AND INSTALL DEWATERING EQUIPMENT PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS AND PLANS FOR THE INSTALLATION AND SUBSEQUENT REMOVAL OF DEWATERING EQUIPMENT AS MAY BE NECESSARY PER STATE AND LOCAL GOVERNING AGENCIES.
10.

INSPECTION

ALL WORK REQUIRED FOR THIS IMPROVEMENT PLAN SHALL BE SUBJECT TO INSPECTION BY THE CITY OR THEIR DESIGNATED REPRESENTATIVE. THE CONTRACTOR SHALL GIVE A 48 HOUR NOTICE BEFORE STARTING ANY WORK ON THIS PROJECT AND SHALL KEEP THE CITY AND THE CONSTRUCTION MANAGER INFORMED OF HIS / HER CONSTRUCTION SCHEDULE. NO WORK SHALL BE PERFORMED AND / OR BURIED UNLESS AN AUTHORIZED INSPECTOR IS PRESENT.
11.

CONSTRUCTION NOISE

CONSTRUCTION NOISE ASSOCIATED WITH ANY IMPROVEMENT PROJECT, SHALL BE LIMITED TO LEVELS COMMENSURABLE WITH ADJOINING LAND AND THEIR ASSOCIATED USAGE AS DETERMINED BY THE CITY ENGINEER. IN ORDER TO MINIMIZE ANY ADVERSE CONSTRUCTION NOISE IMPACTS, ANY POWER-OPERATED CONSTRUCTION-TYPE DEVICE SHALL NOT BE OPERATED BETWEEN THE HOURS OF 7:00 P.M. AND 8:00 A.M., UNLESS AUTHORIZED BY THE CONSTRUCTION MANAGER AND CITY ENGINEER.

CONSTRUCTION HOURS AND ACCEPTABLE NOISE LEVELS ARE TO BE APPROVED BY THE OWNER.
12.

DUST CONTROL

THE CONTRACTOR SHALL FURNISH AND APPLY WATER AND CALCIUM CHLORIDE FOR DUST CONTROL AS DIRECTED BY THE CONSTRUCTION MANAGER AND / OR CITY ENGINEER. SUFFICIENT QUANTITIES OF CALCIUM CHLORIDE SHALL BE STORED ON THE JOB SITE AT ALL TIMES TO BE USED FOR DUST CONTROL.
13.

MAINTENANCE OF TRAFFIC

THE CONTRACTOR IS TO MAINTAIN ACCESS TO THE FACILITY AT ALL TIMES. THE CONTRACTOR MUST SUBMIT A MAINTENANCE OF TRAFFIC PLAN TO THE OWNER AND CITY (IF APPLICABLE) FOR APPROVAL PRIOR TO THE START OF CONSTRUCTION.

USE SIGNS, BARRICADES, FLAGMEN OR GUARDS AS REQUIRED DURING CONSTRUCTION ACTIVITIES TO ENSURE THE SAFETY FOR ALL VEHICULAR AND PEDESTRIAN TRAFFIC. NO UNMANNED EXCAVATION SHALL BE LEFT UNPROTECTED. ALL TEMPORARY TRAFFIC CONTROL / FLAGGING ARE TO BE IN ACCORDANCE WITH ODOT ITEM 614, AS WELL AS OHIO REVISED CODE SECTION 4571.09.
14.

DIMENSION

ALL DIMENSIONS ARE TO EDGE OF PAVEMENT, FACE OF CURB, AND FACE OF BUILDING, UNLESS OTHERWISE NOTED.

CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND REGULATIONS AND RELATIONS TO OTHER WORK BEFORE FABRICATION AND / OR INSTALLATION. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT OF WORK.
15.

CONSTRUCTION AREA

CONFINE OPERATIONS TO AREAS BEING CONSTRUCTED OR REPAIRED. DO NOT UNREASONABLY ENCUMBER THE SITE WITH MATERIALS OR EQUIPMENT. COORDINATE ALL CONSTRUCTION ACTIVITIES WITH THE CONSTRUCTION MANAGER AND OWNER.

TAKE ALL PRECAUTIONS TO PREVENT INTERFERENCE WITH NORMAL OPERATIONS OF THE OWNER. DO NOT BLOCK OR INTERFERE WITH REQUIRED LEGAL EXITING.

THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER THAT LOCAL TRAFFIC SHALL HAVE ACCESS THROUGHOUT THE PROJECT IN A MANNER APPROVED BY THE CITY ENGINEER.

NO TRENCH OR EXCAVATION SHALL BE LEFT OPEN OVERNIGHT. OPEN AREAS ARE TO BE BACKFILLED OR STEEL PLATED. IN CASE OF INCLEMENT WEATHER OR OTHER REASONS, THE TRENCH SHALL BE BACKFILLED OR STEEL PLATED AT THE DIRECTION OF THE ENGINEER OR THE AUTHORITY HAVING JURISDICTION. NO TRENCH MAY BE BACKFILLED WITHOUT INSTALLED UTILITIES BEING REVIEWED BY ASSOCIATED INSPECTOR(S).

THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING THE SITE CLEAN AT ALL TIMES. TAKE RESPONSIBILITY FOR FINAL CLEANING, AND REMOVAL OF ALL TOOLS, EQUIPMENT AND SURPLUS MATERIALS FROM THE SITE AT COMPLETION OF THE WORK. DO NOT STOCKPILE ANY EXCESS CUT MATERIAL THAT IS NOT TO BE USED FOR ON-SITE FILL. HAUL AWAY AND PROPERLY DISPOSE OF ALL EXCESS CUT MATERIAL AT NO ADDITIONAL EXPENSE TO THE OWNER.

16.

GENERAL

THE CONTRACTOR SHALL FURNISH A CERTIFICATE FROM A REGISTERED PROFESSIONAL SURVEYOR STATING THAT ALL HORIZONTAL AND VERTICAL CONTROL MONUMENTS AFFECTED BY THE PROJECT WERE REMOVED AND REPLACED TO THEIR ORIGINAL REFERENCE LOCATIONS AND ELEVATIONS.

ALL ROAD SURFACES, UTILITIES, BUILDINGS, STRUCTURES, SITE CONDITIONS, OR RIGHT-OF-WAYS DISTURBED BY CONSTRUCTION OF ANY PART OF THIS IMPROVEMENT ARE TO BE RESTORED COMPLETELY TO THE BEFORE CONSTRUCTION CONDITION. ALL ITEMS ARE INCLUDED IN THE PAY ITEMS.

ALL EXISTING SITE PAVEMENT MATERIAL REMOVED AS PART OF THIS IMPROVEMENT SHALL BE DISPOSED OF OFF SITE BY THE CONTRACTOR.

ALL DISTURBED SIGNS, GUARDRAIL, MAIL AND / OR PAPER BOXES, DRIVES AND DRIVE CULVERTS SHALL BE REPAIRED AND / OR REPLACED AS DIRECTED BY THE ENGINEER.

ALL DISTURBED AND / OR DAMAGED STORM SEWER PIPES, STORM SEWER APPURTENANCES, PAVEMENTS, BERMS AND DITCHES SHALL BE REPAIRED AND / OR REPLACED AS DIRECTED BY THE ENGINEER.

ANY DEFECTS IN CONSTRUCTION INCLUDING MATERIALS OR WORKMANSHIP SHALL BE REPLACED OR CORRECTED BY REMOVAL AND REPLACEMENT OR OTHER APPROVED METHOD PRIOR TO ACCEPTANCE BY THE ENGINEER AT NO ADDITIONAL COST TO THE OWNER.

THE CONTRACTOR SHALL REVIEW THE GEOTECHNICAL REPORT AND PERFORM SUB-GRADE PREPARATION WORK ACCORDING TO THE GEOTECHNICAL ENGINEER'S REQUIREMENTS AND FIELD DIRECTION. ACTUAL FIELD CONDITIONS MAY REQUIRE DECISIONS ON MATERIAL HANDLING AND USAGE. THE CONTRACTOR SHALL CONTINUALLY MONITOR AND MAINTAIN OVERALL SITE BALANCE AND COORDINATE ANY REVISIONS WITH THE OWNER AND ENGINEER. ANY EXCESS TOPSOIL OR ORGANIC MATERIAL MAY BE SPOILED ON-SITE IF APPROVED BY THE OWNER.

BEFORE ACCEPTANCE OF THE SUB-GRADE BY THE ENGINEER, PROOF-ROLLING SHALL BE REQUIRED ON ALL AREAS TO BE PAVED PER ODOT ITEM 204.06 CMS (LATEST EDITION). IN ADDITION, FOR ANY FILL IN EXCESS OF TWO (2) FEET, NUCLEAR COMPACTION TESTS SHALL BE PERFORMED BY AN APPROVED ODOT COMPANY AS PER ODOT ITEM 203. THESE TESTS SHALL BE APPROVED BY THE ENGINEER BEFORE ANY PAVEMENT CONSTRUCTION.

FOR ODOT ITEMS 301 - ASPHALT CONCRETE BASE, 304 - AGGREGATE BASE, 441 - ASPHALT CONCRETE, 451 - REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT, AND 452 - NON-REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT, THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A JOB MIX FORMULA FOR REVIEW AND APPROVAL PRIOR TO THE PRE-CONSTRUCTION MEETING. ALL MATERIALS USED MUST BE OBTAINED FROM A SOURCE APPROVED BY ODOT.

THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS TO PERFORM THE WORK SPECIFIED IN THE CONTRACT DOCUMENTS.

CIVIL SYMBOL LEGEND		
DESCRIPTION	EXISTING	PROPOSED
BUILDING		
SIGN		
TREE OR SHRUB		
SANITARY & STORM MANHOLE		
CATCH BASIN / CURB INLET		
CLEANOUT		
WOOD LIGHT POLE		

CIVIL LINE TYPE LEGEND		
DESCRIPTION	EXISTING	PROPOSED
APPROXIMATE LIMIT OF CONST.	— LOCN —	— LOCN —
CABLE TELEVISION (UG)	— CATV —	— CATV —
CENTER LINE	— C —	— C —
COMBINATION SEWER LINE	— COMB —	— COMB —
COMMUNICATION LINE (UG)	— COMM —	— COMM —
CONTOUR (MAJOR)	— XXX —	— XXX —
CONTOUR (MINOR)	— XXX —	— XXX —
FENCE	— X —	— X —
FILTER SOCK	— FS —	— FS —
FIRE LINE	— F —	— F —
FORCE MAIN	— FM —	— FM —
GAS LINE	— G —	— G —
IRRIGATION	— IRRG —	— IRRG —
ORANGE CONSTRUCTION FENCE	— OCF —	— OCF —
POWER LINE (OVH)	— OH —	— OH —
POWER LINE (UG)	— E —	— E —
PROPERTY LINE	— P —	— P —
RIGHT-OF-WAY LINE	— R/W —	— R / W —
LEASE LINE	— LL —	— LL —
SILT FENCE	— SF —	— SF —
STEAM LINE	— STEAM —	— STEAM —
STORM LINE	— ST —	— ST —
SANITARY LINE	— SAN —	— SAN —
WATER LINE	— W —	— W —

REVISIONS:

600 MARKET AVENUE NORTH

CANTON OHIO 44702

MOTTED MEADOWS

ARCHITECTS

GARAGE ADDITION

WATER DEPARTMENT SERVICE CENTER

2664 HARRISBURG RD. NE

CANTON, OHIO

STATE OF OHIO

DAVID I. PATTERSON

11150

REGISTERED ARCHITECT

DAVID I. PATTERSON

LICENSE #11150

EXPIRATION DATE

12-31-2025

THIS DWG :

GENERAL

NOTES

COMM

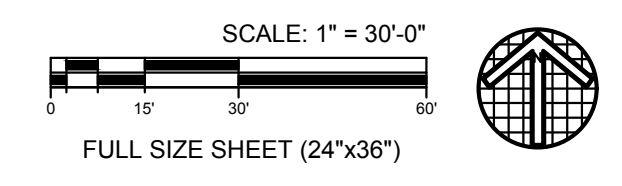
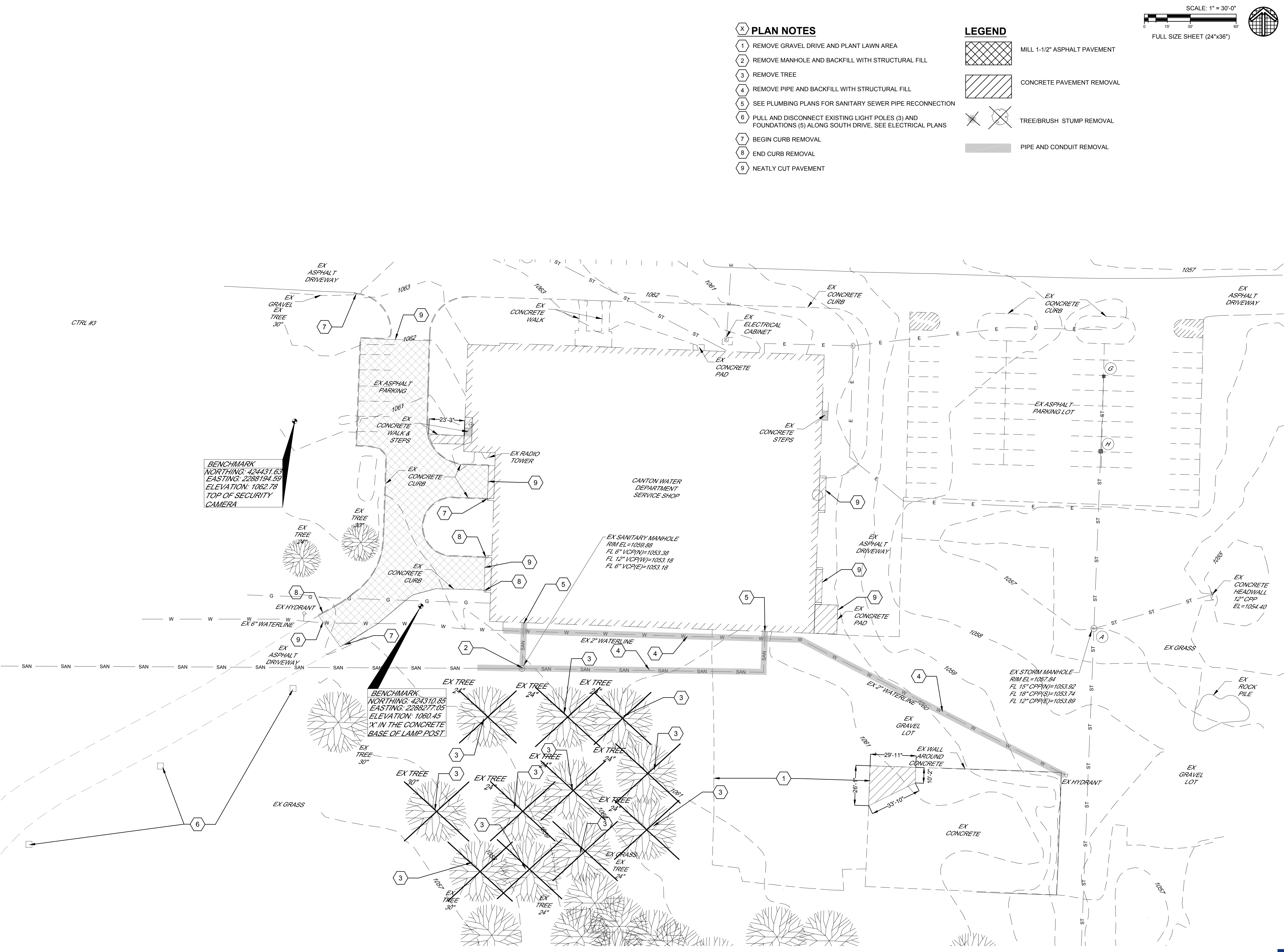
21161-B

DATE

02-01-2024

DWG

C-001



- PLAN NOTES**
- 1 REMOVE GRAVEL DRIVE AND PLANT LAWN AREA
 - 2 REMOVE MANHOLE AND BACKFILL WITH STRUCTURAL FILL
 - 3 REMOVE TREE
 - 4 REMOVE PIPE AND BACKFILL WITH STRUCTURAL FILL
 - 5 SEE PLUMBING PLANS FOR SANITARY SEWER PIPE RECONNECTION
 - 6 PULL AND DISCONNECT EXISTING LIGHT POLES (3) AND FOUNDATIONS (5) ALONG SOUTH DRIVE, SEE ELECTRICAL PLANS
 - 7 BEGIN CURB REMOVAL
 - 8 END CURB REMOVAL
 - 9 NEATLY CUT PAVEMENT
- LEGEND**
- MILL 1-1/2" ASPHALT PAVEMENT
 - CONCRETE PAVEMENT REMOVAL
 - TREE/BRUSH STUMP REMOVAL
 - PIPE AND CONDUIT REMOVAL

REVISIONS:

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
CANTON, OHIO
2664 HARRISBURG RD. NE

DAVID L. PATTERSON
11150
DAVID L. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
EXISTING
CONDITIONS &
DEMOLITION
PLAN

COMM 21161-B
DATE 02-01-2024

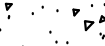
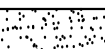
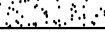

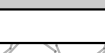
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DEMOLITION PLAN

- 1 NEW ADA RAMP WITH HANDRAILS, SEE GRADING PLAN SHEET C-400
- 2 5' X 5' LANDING AND FROST STOOP AT ALL DOORS, SEE STRUCTURAL DETAILS FOR FROST STOOP
- 3 SEAL ALL JOINTS
- 4 PROPOSED BOLLARDS (TOTAL OF 8)
INSTALL AT CORNER OF GARAGE DOORS
- 5 5' WIDE CONCRETE SIDEWALK
- 6 RETAINING WALL, SEE STRUCTURAL PLANS FOR SECTION
- 7 NEW CONCRETE APRON AT DRIVE THROUGH OPENINGS
- 8 INSTALL EXPANSION JOINT ALONG BUILDING AND CONCRETE PAVEMENT
- 9 SEE RAMP DETAIL ON SHEET A-4.1
- 10 NEW ENTRANCE SIGN
- 11 BLEND NEW GRAVEL INTO EXISTING GRAVEL AS REQUIRED FOR SMOOTH TRANSITION
- 12 BEGIN NEW 6" CURB
- 13 END NEW 6" CURB

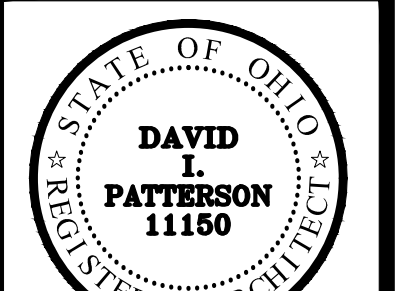


- | | |
|---|---|
|  | 8" REINFORCED CONCRETE APRON |
|  | 6" CONCRETE SIDEWALK |
|  | HEAVY DUTY ASPHALT PAVEMENT |
|  | GRAVEL PAVEMENT |
|  | 1-1/2" ASPHALT PAVEMENT OVER MILLED SURFACE |

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO

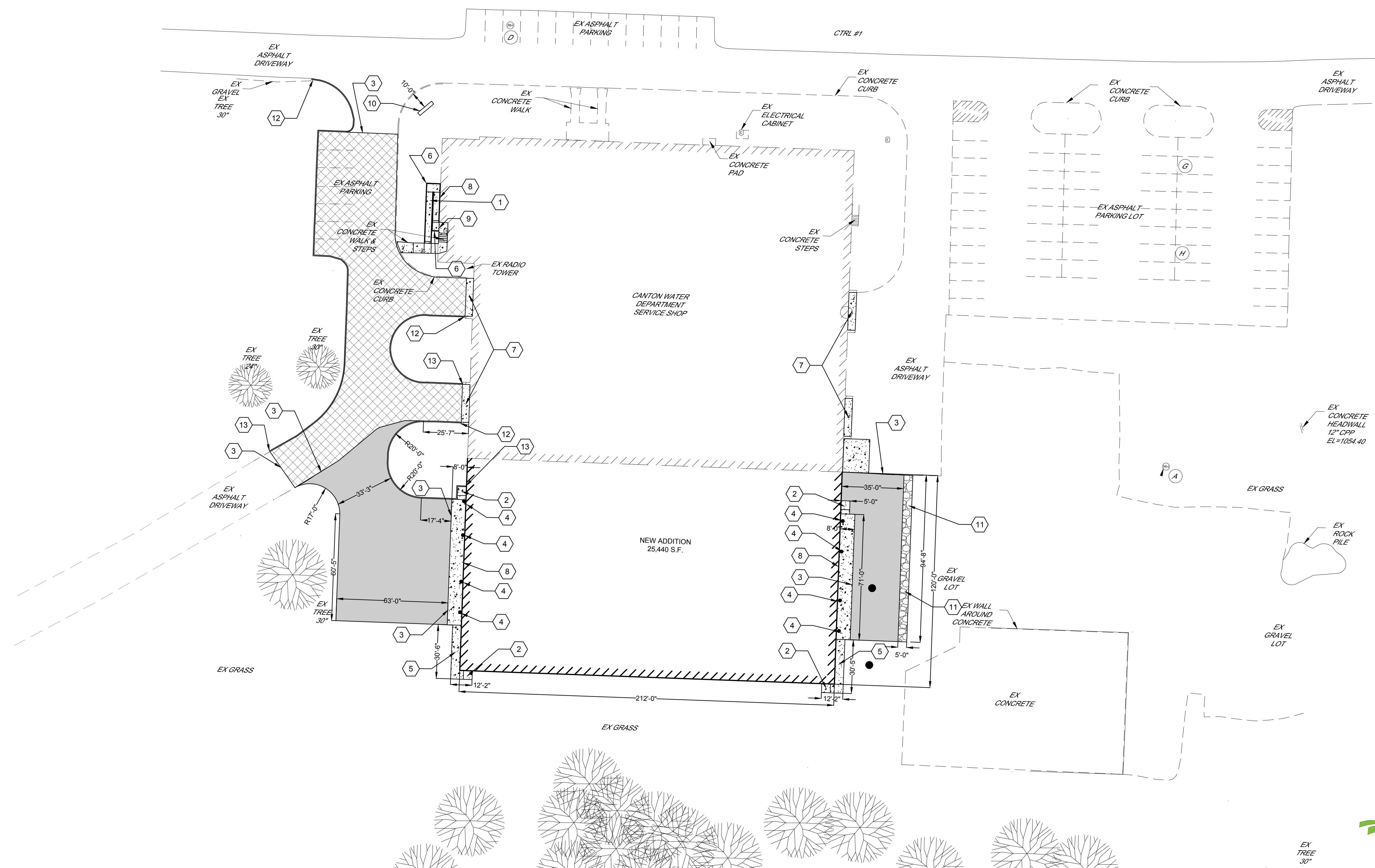


DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
SITE LAYOUT
PLAN

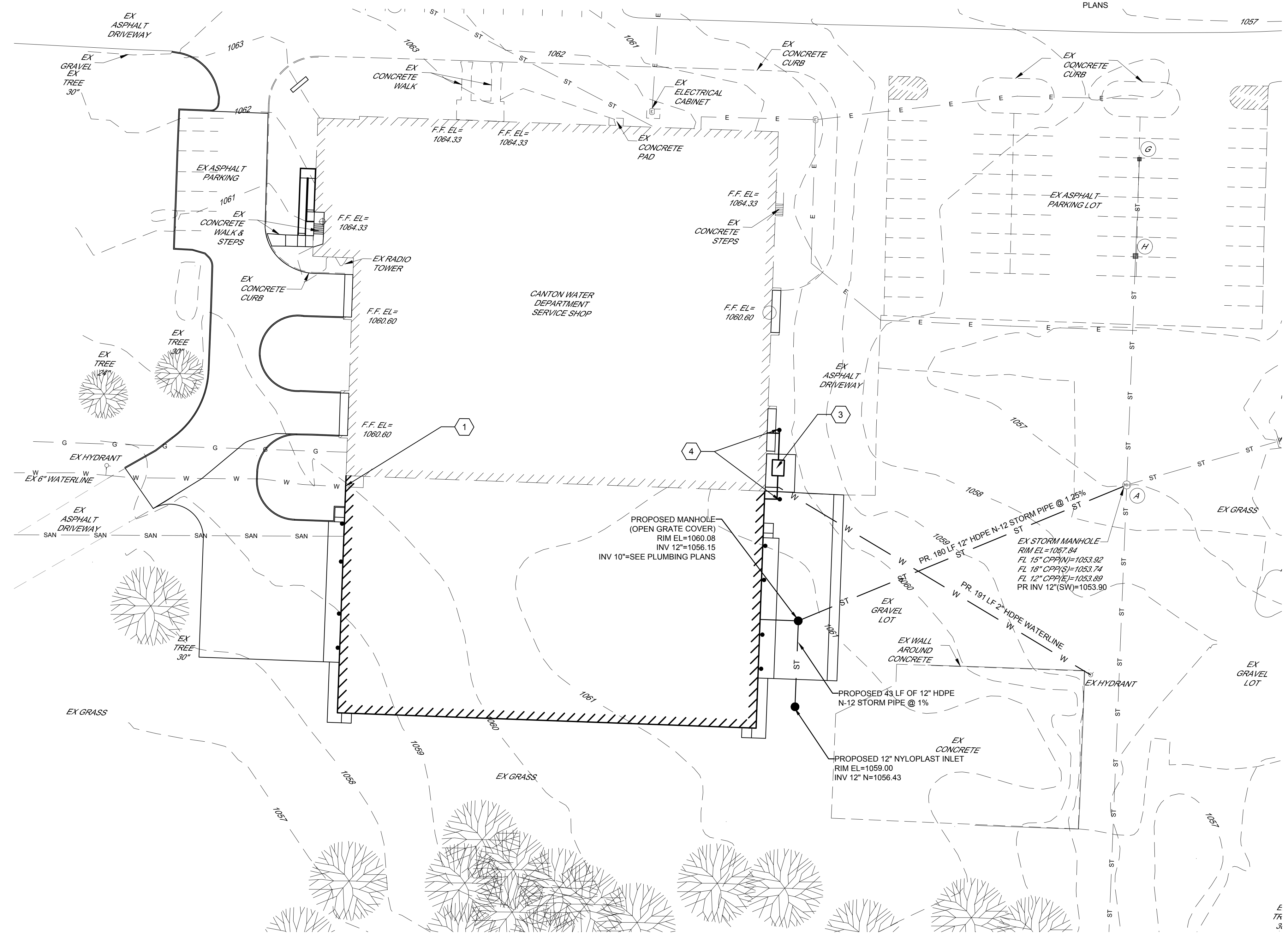
COMM	21161-B
DATE	02-01-2024

DWG
C-200



SITE LAYOUT PLAN

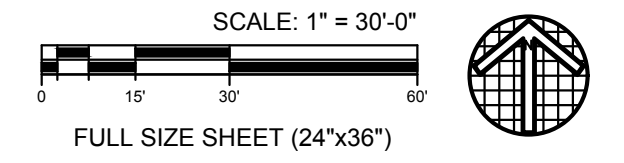




UTILITY PLAN

PLAN NOTES

- 1 STEP FOUNDATION BELOW EXISTING WATER CONNECTION. SEE STRUCTURAL PLANS
- 2 RECONNECT SANITARY SEWER WITH WYE TO EXISTING PIPE. USE FERNCO FITTINGS AND CONCRETE ENCASE SEWER PIPE CONNECTION
- 3 SEE PLUMBING PLAN FOR OIL INTERCEPTOR. PRIOR TO ORDERING OIL INTERCEPTOR, FIELD VERIFY DEPTH OF EXISTING SANITARY SEWER AT NEW WYE CONNECTION AND REPORT TO ENGINEER. ADJUST RIM/INVERT OF OIL INTERCEPTOR AND CLEANOUT BASED ON 1.00% MINIMUM SLOPE FROM THE CONNECTION TO THE EXISTING MAIN.
- 4 INSTALL CLEANOUT AT END OF EXISTING SANITARY CONNECTION. PROVIDE FERNCO FITTING AND CONCRETE ENCASE PIPE, SEE PLUMBING PLANS



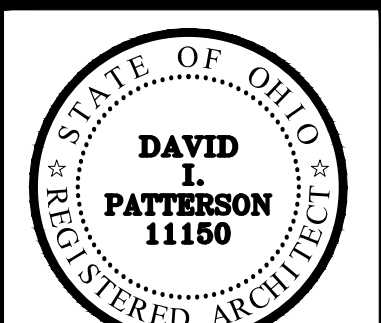
PIPE MATERIAL NOTES

1. STORM SEWER: ADS N-12 WATER TIGHT ASTM D3212 PIPE
2. UNDERDRAIN - 6\"/>

MOTTED MEADOWS
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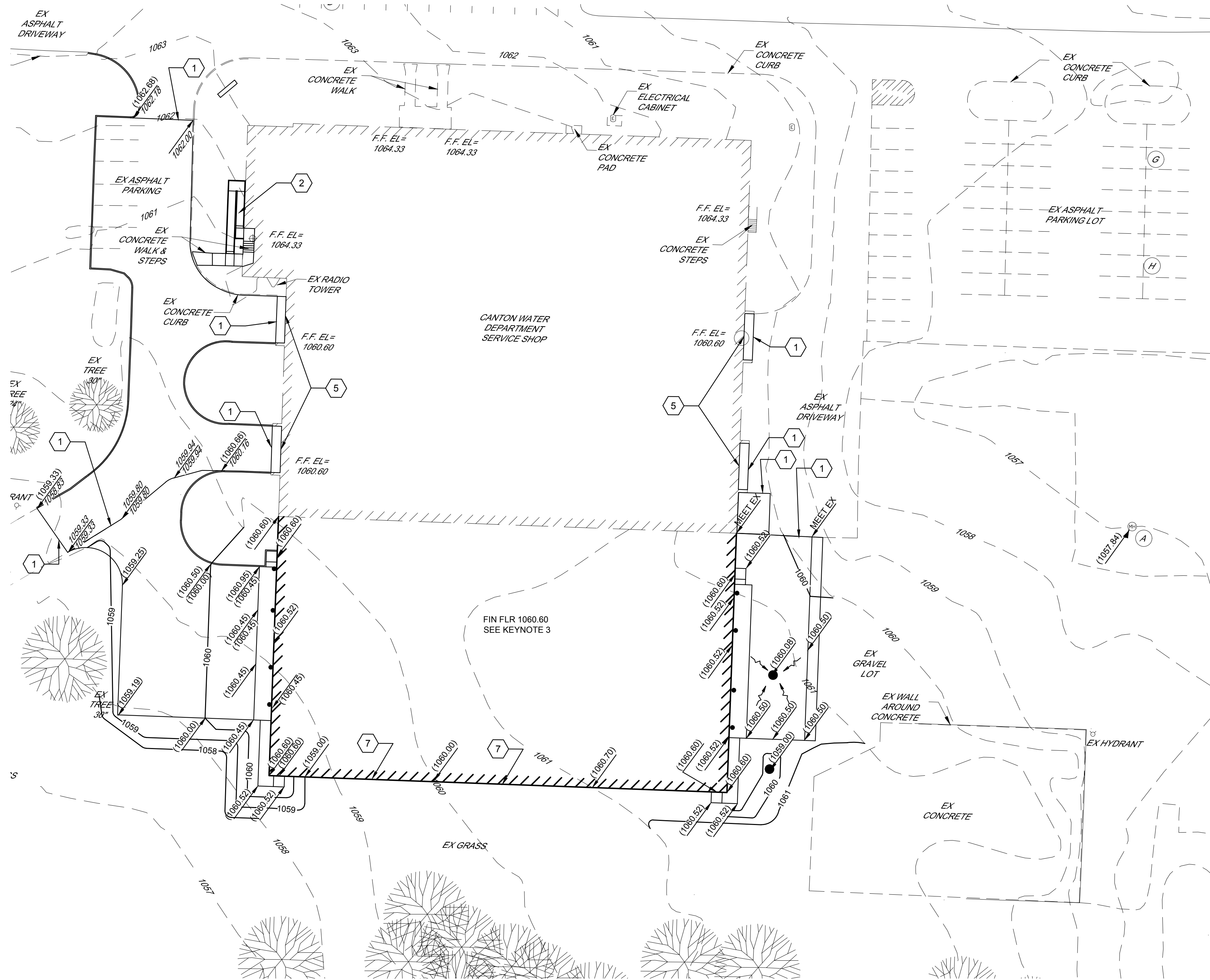
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THIS DWG :
UTILITY
PLAN

COMM 21161-B
DATE 02-01-2024

DWG
C-300

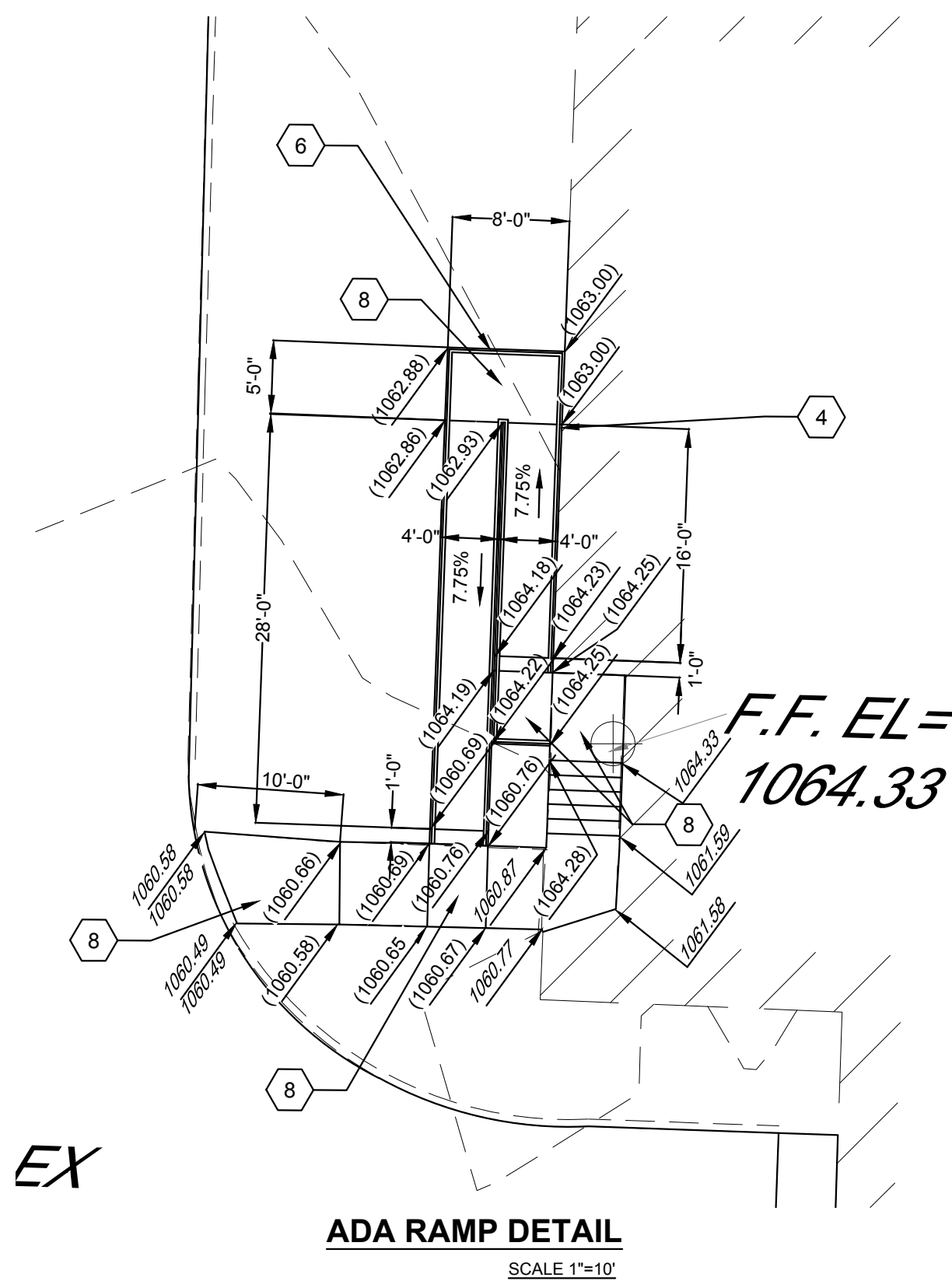
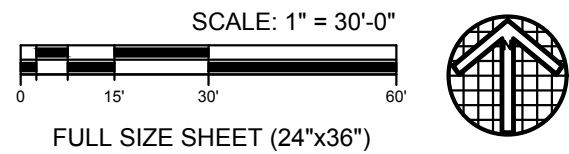




GRADING PLAN

PLAN NOTES

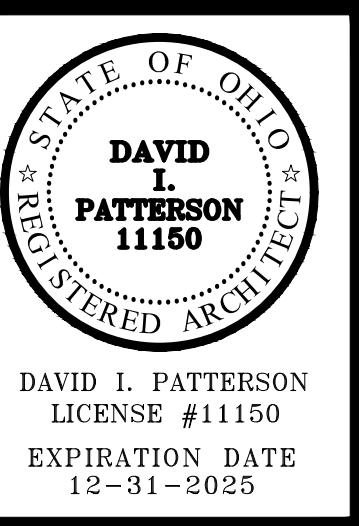
- 1 MATCH NEW PAVEMENT GRADE TO EXISTING PAVEMENT GRADE
- 2 NEW ADA RAMP. MAX 1:12 SLOPE. SEE DETAIL ON ARCHITECTURAL PLANS
- 3 MATCH EXISTING BUILDING FINISH FLOOR
- 4 INSTALL EXPANSION JOINT ALONG BUILDING
- 5 BENCHMARK 1060.60 FINISH FLOOR AT DOOR
- 6 RETAINING WALL, SEE STRUCTURAL PLANS
- 7 STEP FOUNDATION BELOW GRADE, SEE STRUCTURAL PLANS
- 8 CROSS SLOPE SHALL NOT EXCEED 2.00% IN ANY DIRECTION



MOTT & MEADOWS
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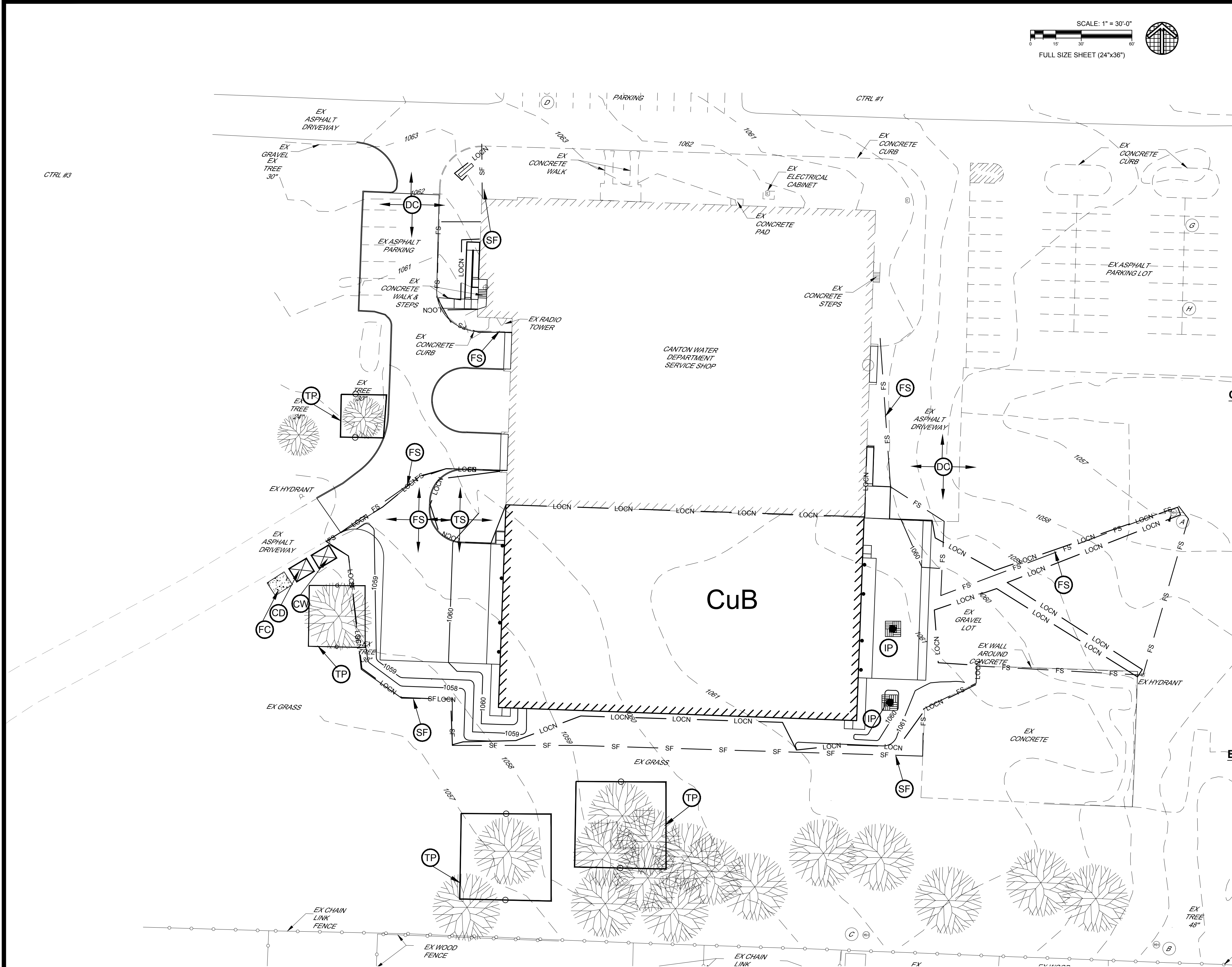


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GRADING
PLAN

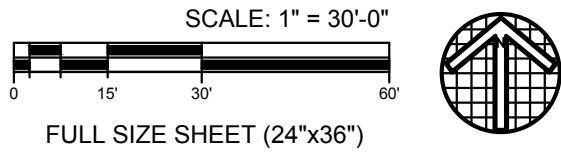
COMM 21161-B
DATE 02-01-2024

DWG
C-400





SWPPP PLAN



SWPPP LEGEND		BMPs UTILIZED ON THIS PROJECT "X"
	IP STORM DRAIN INLET PROTECTION	X
	TS TEMPORARY SEEDING	X
	PS PERMANENT SEEDING	X
	DC DUST CONTROL	X
	CW CONCRETE WASHOUT	X
	CF 8'-0" CHAIN-LINK FENCE	
	FS FILTER SOCK	X
	SF SILT FENCE	X
	CD COVERED AND LEAK PROOF CONSTRUCTION DEBRIS DUMPSTER	X
	FC FUEL CONTAINMENT DYKE AND CHEMICAL STORAGE/MIXING AREA	X
	CE CONSTRUCTION ENTRANCE MAY USE EX ASPHALT IN PLACE	
	TP TREE PROTECTION	X
	LOCN LIMITS OF EARTH DISTURBANCE (0.98 ACRES)	X

CuB SOIL TYPE - CHILI-URBAN LAND COMPLEX, UNDULATING

CONSTRUCTION SEQUENCE

- PRE-CONSTRUCTION MEETING PRIOR TO INITIAL DISTURBANCE OF SOILS ASSOCIATED WITH CLEARING, GRUBBING, GRADING PLACEMENT OF FILL, EXCAVATING AND/OR OTHER CONSTRUCTION ACTIVITIES. NOTIFICATION SHALL BE MADE TO THE CITY OF CANTON NO LATER THAN THREE DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
- ESTABLISH CONSTRUCTION OFFICE ON SITE. ESTABLISH TEMPORARY POWER AND TELEPHONE SERVICE. ALL TEMPORARY UTILITY SERVICES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- STAKEOUT LIMITS OF DISTURBANCE.
- INSTALL INLET PROTECTION OF ANY EXISTING CATCH BASINS IMMEDIATELY DOWNSTREAM FROM SITE.
- INSTALL ALL PERIMETER SILT FENCE (OR FILTER SOCK) WHERE SHOWN ON PLANS.
- MAINTAIN TEMPORARY CONTROLS UNTIL REMOVAL IS WARRANTED DUE TO PROGRESSION OF WORK. CONSTRUCTION BMPs SHALL BE IN PLACE PRIOR TO THE START OF CONSTRUCTION ACTIVITIES.
- STRIP TOPSOIL AND BEGIN EARTHWORK OPERATIONS. CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE OWNER OF LOCATION AND EROSION SEDIMENTATION CONTROL MEASURES IMPLEMENTED AT BORROW OR SPOIL SITE OF IMPORT/EXPORT MATERIAL.
- ALL SEWER CONSTRUCTION MAY BEGIN IMMEDIATELY FOLLOWING ESTABLISHMENT OF GRADE AND PERMISSION OF THE OWNER.
- STABILIZE ALL UTILITY TRENCHES AT THE END OF EACH WORKDAY BY MEANS OF GRAVEL BACKFILL TO SURFACE, RE-PAVING, MULCHING.
- STABILIZE ALL DISTURBED AREAS WITH TOPSOIL, PERMANENT SEED AND MULCHING IMMEDIATELY UPON REACHING FINAL GRADE.
- INSTALL PAVEMENT AND BUILDING.
- COMPLETE SITE WORK, PAVEMENT MARKING, FINAL LANDSCAPING AND CLEANUP.
- RESEED AND REDRESS ANY AREAS THAT MAY REQUIRE ATTENTION IMMEDIATELY. NOTE THAT LAWN AREAS WILL NOT BE DEEMED STABLE UNTIL A UNIFORM 80% COVERAGE IS ACHIEVED.
- ALL EROSION MEASURES SHALL REMAIN IN PLACE UNTIL THE SITE IS STABILIZED. ALL AREAS OF VEGETATIVE SURFACE STABILIZATION, WHETHER TEMPORARY OR PERMANENT, SHALL BE CONSIDERED TO BE IN PLACE AND FUNCTIONAL WHEN THE REQUIRED UNIFORM RATE OF COVERAGE (80%) IS OBTAINED.
- IF FOR ANY REASON THE PROJECT IS SUSPENDED, THE CONTRACTOR SHALL ENSURE THAT ALL INSTALLED EROSION MEASURES ARE FUNCTIONING AND PROPERLY MAINTAINED DURING THIS PERIOD, AND THAT ALL DISTURBED SOILS ARE SEEDED AND MULCHED WITH TEMPORARY SEED MIXTURE.

EROSION AND SEDIMENT CONTROL NOTES:

- THE SMALLEST PRACTICAL AREA OF LAND SHOULD BE EXPOSED AT ANY ONE TIME DURING DEVELOPMENT.
- WHEN LAND IS EXPOSED DURING DEVELOPMENT, THE EXPOSURE SHOULD BE KEPT TO THE SHORTEST PRACTICAL PERIOD OF TIME.
- TEMPORARY VEGETATION SHALL BE USED TO PROTECT HIGH EROSION POTENTIAL OR OTHER CRITICAL AREAS EXPOSED DURING DEVELOPMENT. WHEREVER FEASIBLE, NATURAL VEGETATION SHOULD BE RETAINED AND PROTECTED.
- THE CONTRACTOR IS TO REFER TO THIS PLAN AND THE E&S PLAN, NOTES, AND DETAILS.
- TEMPORARY SEEDING IS SPECIFIED UNTIL CONSTRUCTION OF FINAL IMPROVEMENTS COMMENCES.
- THE CONTRACTOR IS TO INSTALL AND MAINTAIN THE E&S CONTROLS THROUGHOUT THE CONSTRUCTION PERIOD AND UNTIL THE SITE IS FULLY STABILIZED.
- THE CONTRACTOR IS RESPONSIBLE TO REMOVE THE TEMPORARY E&S CONTROLS ONCE THE SITE IS FULLY STABILIZED.
- CONTRACTOR IS TO MAINTAIN A LOG DOCUMENTING GRADING AND STABILIZATION ACTIVITIES AS WELL AS AMENDMENTS TO THE SWPP. PER GENERAL PERMIT REQUIREMENTS. SWPS INSPECTION REPORTS SHALL BE KEPT ON SITE WITH THE SWPPS AND READILY ACCESSIBLE DURING NORMAL WORKING HOURS.
- CONTRACTOR IS TO UTILIZE EXISTING PAVEMENT FOR CONSTRUCTION ENTRANCE PER THEIR MEANS AND METHODS.
- APPLICANT SHALL MAINTAIN COMPLIANCE WITH OHIO EPA'S GENERAL STOMATA NODES PERMIT PROGRAMS.
- APPLICANT SHALL MAINTAIN COMPLIANCE WITH CITY OF CANTON AND STATE OF OHIO'S AIR QUALITY REGULATIONS APPLICABLE IN THE CANTON MUNICIPAL CODE AND THE OHIO ADMINISTRATIVE CODE INCLUDING, BUT NOT LIMITED TO THE ASBESTOS AND THE ANTI-NOISE LAWS.
- ALL WASTE WILL COMPLY WITH APPLICABLE STATE OR LOCAL WASTE DISPOSAL REQUIREMENTS AND PROVISIONS FOR SANITARY WASTES AND CONSTRUCTION AND DEMOLITION DEBRIS. OPEN BURNING IS PROHIBITED.
- NO DIFFERENCES IN SOIL ON SITE SO NO SOIL BOUNDARY LINES ARE SHOWN ON PLANS.

REVISIONS:

MOTTED MEADOWS ARCHITECTS
GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO

600 MARKET AVENUE NORTH CANTON OHIO 44702

STATE OF OHIO
DAVID L. PATTERSON
11150
REGISTERED ARCHITECT

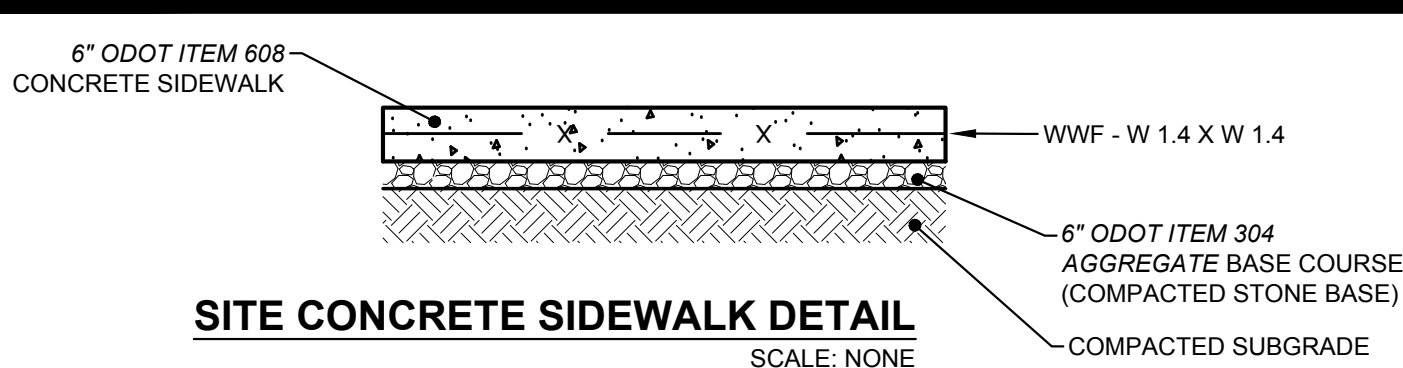
DAVID L. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :

COMM 21161-B
DATE 02-01-2024

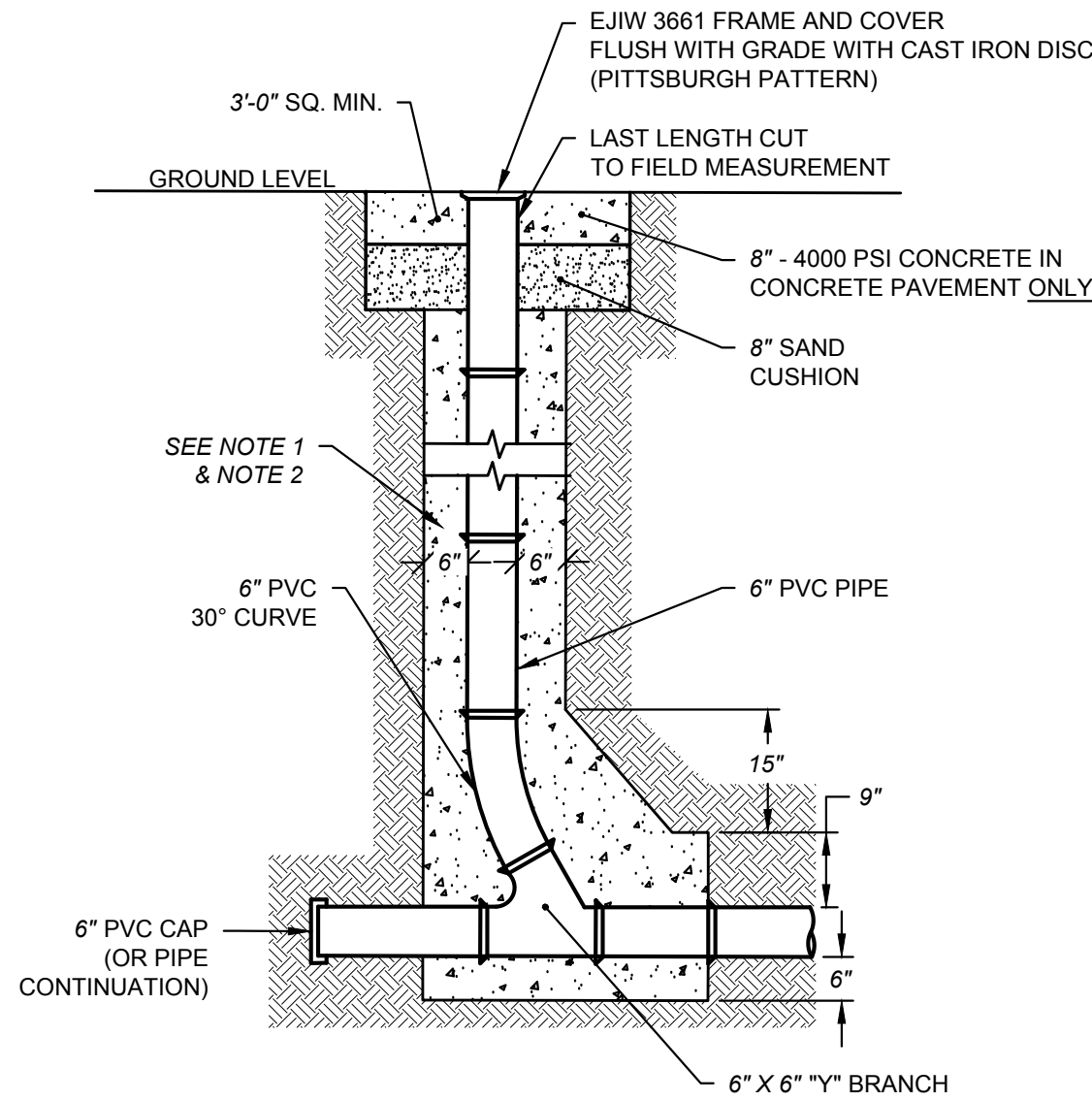
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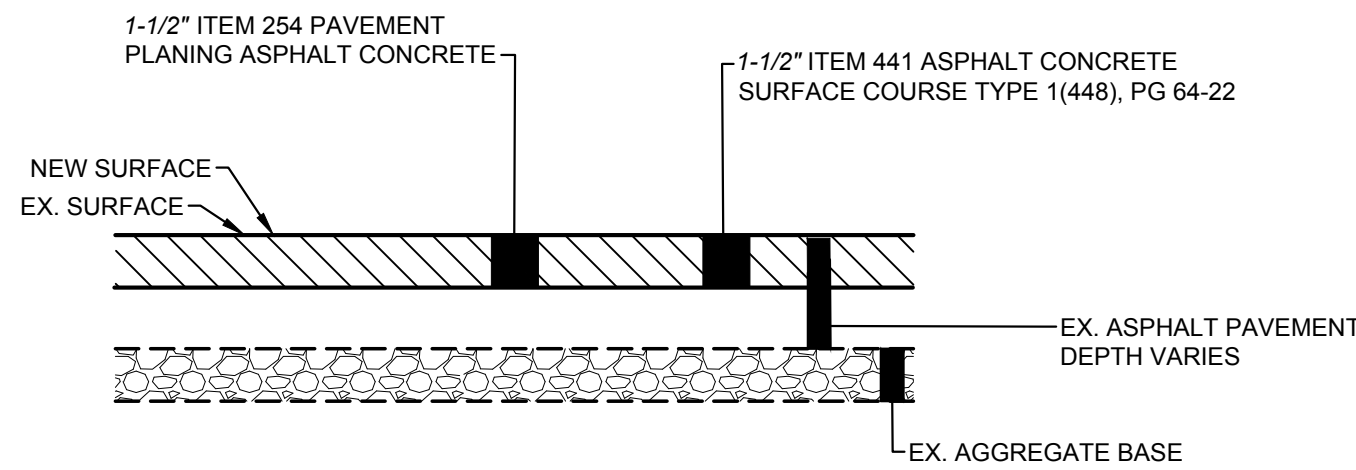
NOTES:

- ALL CONCRETE IS TO BE AIR-ENTRAINED 4000 PSI (NO FLY ASH) , UNLESS OTHERWISE DIRECTED BY ENGINEER.
- SLOPE SURFACE TO DRAIN (MIN 1% MAX 2% CROSS-SLOPE).
- 1/2" PREFORMED JOINT MATERIAL, CONTINUOUS STRIP SHALL BE INSTALLED EVERY 30' AND / OR BETWEEN SIDEWALK AND ANY FIXED STRUCTURE EXTENDING THE FULL DEPTH OF THE SIDEWALK.
- SIDEWALK JOINTS SHALL BE DIVIDED INTO EQUALLY SPACED BLOCKS, BUT NOT GREATER THAN 10' O.C. (I.E. 5' INTERVALS FOR 5' WIDE SIDEWALKS). JOINTS SHALL BE HAND TOOLED OR SAW CUT TO A DEPTH OF 1/4" OF THE SLAB THICKNESS.
- MATERIAL PLACING, FINISHING, AND JOINTING PER DETAILS AND SPECIFICATIONS
- CONCRETE WALK IS TO HAVE MEDIUM BROOM FINISH PERPENDICULAR TO TRAFFIC FLOW, RUB OUT ALL TOOL MARKS.



NOTES:

- CONCRETE (4000 PSI) ENCASEMENT FOR CLEANOUT IS OPTIONAL WITHIN LANDSCAPE, CONSULT ENGINEER BEFORE PROCEEDING.
- CONCRETE (4000 PSI) ENCASEMENT FOR CLEANOUT IS REQUIRED WHEN SUBJECT TO TRAFFIC.
- 8" CLEANOUT SHALL BE USED FOR 8" SEWER AND LARGER.
- SMALLER SIZE SEWERS AND LAMP HOLES SHALL HAVE SAME SIZE PIPE.
- CLEANOUT TO HAVE A WATERTIGHT CAP ON RISER.
- RISER IS TO BE TERMINATED JUST BELOW GRADE. USE C.I. LAMPHOLE FRAME AND COVER WHEN SUBJECT TO TRAFFIC.
- INSTALL CLEANOUTS ON ALL STORM & SANITARY LINES LEAVING THE BUILDING. LOCATIONS TO BE FIELD DETERMINED.

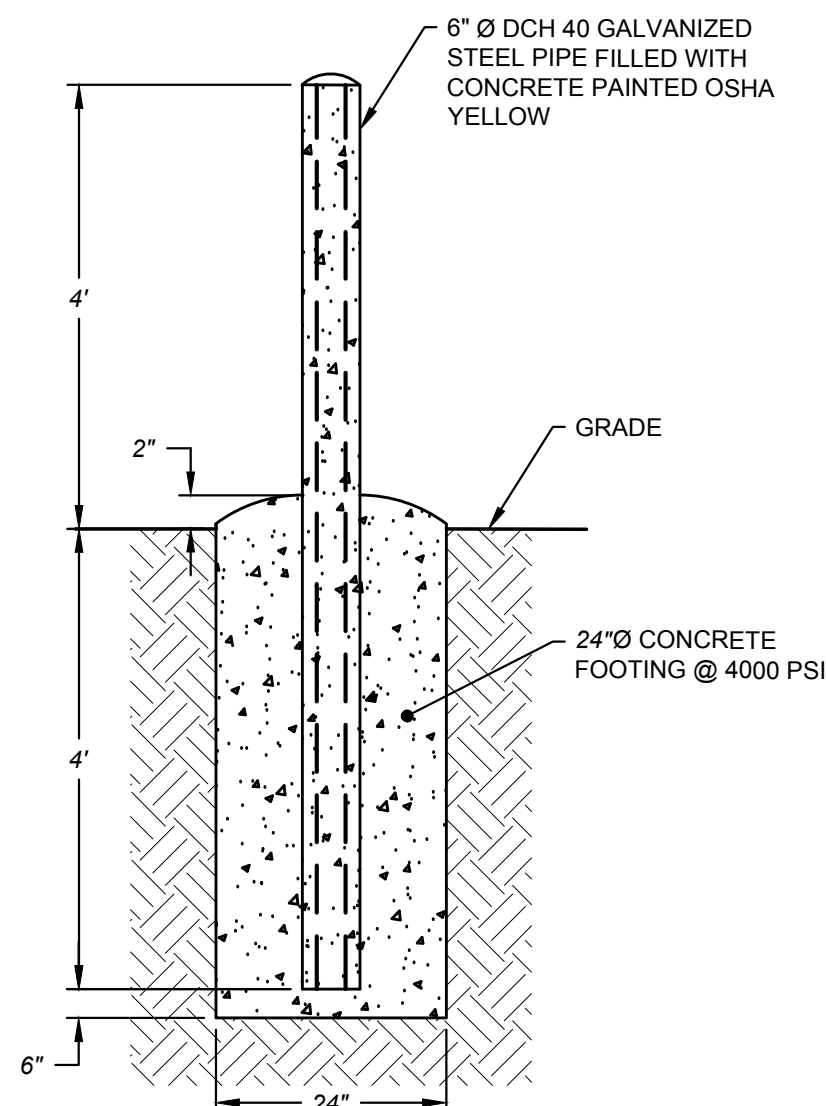


NOTES:

- ALL THICKNESSES SHOWN ARE COMPACTED IN PLACE.
- TACK COAT TO BE APPLIED IN ACCORDANCE WITH ODOT ITEM 407 SPECIFICATIONS
- MILL BUTT JOINTS WHERE MILLING OPERATION ABUTS ASPHALT PAVEMENT.
- TAPER NEW PAVEMENT TO MATCH EXISTING PAVEMENT.
- ADJUST EXISTING CATCH BASIN GRATES, MANHOLE COVERS, AND MISCELLANEOUS CASTINGS AS REQUIRED.
- ASSURE POSITIVE DRAINAGE DURING MILLING AND REPAVING OPERATIONS (1.5% MINIMUM SLOPED DESIRED, NO BIRD BATHS)

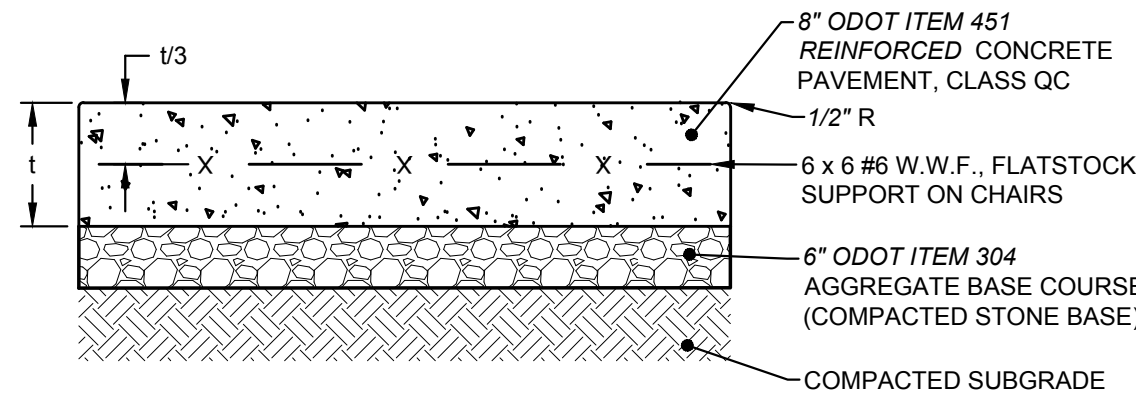
SUBGRADE IMPROVEMENT NOTE

CONTRACTOR SHALL PROOF ROLL EXPOSED PAVEMENT SUBGRADE ANY AREAS SHOWING DEFICIENT COMPACTION SHALL BE REMOVED TO 24" BELOW SUBGRADE AS DIRECTED BY ENGINEER AND APPROVED BY OWNER. INSTALL ASTM #1 AND #2 STONE ABOVE ONE LAYER OF TENSAR TX 190 GEO-GRID AND GEOTEXTILE FABRIC ODOT 712.09 TYPE D. CHOKE #1S AND #2S WITH ODOT ITEM 304 AGGREGATE.



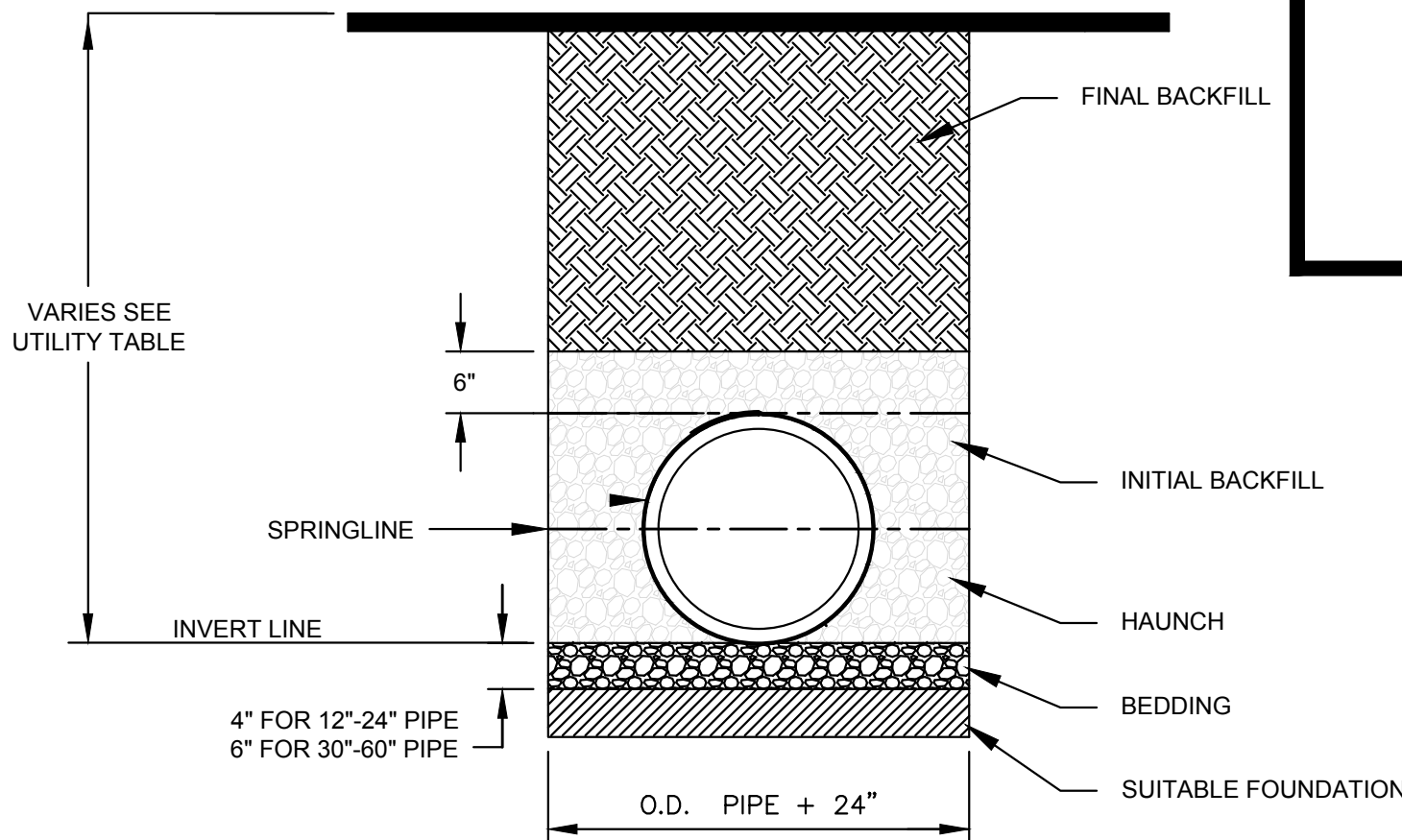
NOTES:

- ALL CONCRETE SHALL BE 4000 PSI, AIR ENTRAINED, (NO FLY ASH) UNLESS OTHERWISE DIRECTED BY ENGINEER.
- 1/2" PREFORMED EXPANSION JOIN WHEN ADJACENT TO STRUCTURE.
- 1/2" FOAM EXP JOINT WITH 1/2" REVEAL FILL JOINT WITH ONE COMPONENT SEALER (SIKA, OR APPROVED EQUAL). SELECT COLOR TO MATCH SURROUNDING PAVEMENT.



NOTES:

- ALL CONCRETE IS TO BE AIR-ENTRAINED 4000 PSI (NO FLY ASH), UNLESS OTHERWISE DIRECTED BY ENGINEER.
- SLOPE SURFACE TO DRAIN
- CONCRETE PAVEMENT TO HAVE MEDIUM BROOM FINISH PERPENDICULAR TO TRAFFIC FLOW, RUB OUT ALL TOOL MARKS.
- PROVIDE EXPANSION JOINTS AT 50'-60' O.C. AND WHERE CONCRETE ABUTS BUILDING, CURBS, OR OTHER STRUCTURES.
- CONTRACTION JOINTS SHOULD NOT EXCEED 15' O.C.
- COORDINATE LOCATION OF ALL JOINTS WITH THE ENGINEER.
- MATERIAL PLACING, FINISHING, AND JOINTING PER DETAILS AND SPECIFICATIONS.



NOTES:

- ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION
- MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.
- FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER, AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
- BEDDING: SUITABLE MATERIAL SHALL BE CLASS I COMPACTED AGGREGATE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 6" ASTM NO 57 STONE.
- INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II OR III IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
- MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOTATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 12" UP TO 48" DIAMETER PIPE AND 24" OF COVER FOR 60" DIAMETER PIPE. MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.
- FINAL BACKFILL

BACKFILL UNDER PAVEMENT SHALL BE PREMIUM BACKFILL SHALL BE ODOT 304 LIMESTONE. THE BACKFILL SHALL BE COMPACTED IN 6" LIFTS WITH EQUIPMENT ACCEPTABLE TO THE PIPE MANUFACTURER.

BACKFILL IN LAWN AREAS - SUITABLE MATERIAL MAY BE CLASS I, II, III, OR EXCAVATED MATERIAL - MAX. 8" LIFTS, 93% COMPACTION. NO ROCKS OVER 1-1/2" Ø ARE ACCEPTABLE IN UPPER 8" OF BACKFILL. A 4" (MIN.) LAYER OF SCREENED TOPSOIL IS REQUIRED IN LAWN AREAS.

HDPE PIPE SEWER TRENCH DETAIL

SCALE: NONE

NOTES:

1. BEDDING:

MATERIALS SHALL BE AASHTO M 43 NO. 56, 57, OR 87 CRUSHED STONE. NO ALTERNATES UNLESS APPROVED BY THE CITY ENGINEER. PRIVATE UTILITIES MAY PROVIDE ALTERNATIVE BEDDING MATERIAL AS APPROVED BY THE CITY ENGINEER.

PIPE TYPE	MIN. WIDTH, TYP.	MAX. WIDTH, TYP.
NON-RIGID PIPE (PVC, HDPE, CMP, ALUMINUM)	PIPE I.D. x 1.25 + 1'-0"	PIPE O.D. + 2'-0"
RIGID PIPE (CONC., VIT. CLAY, DUCTILE IRON)	PIPE I.D. x 1.33	PIPE O.D. + 2'-0"

CENTER PIPE HORIZONTALLY WITHIN BEDDING AREA. ANY DEVIATION TO TYPICAL BEDDING REQUIREMENTS ARE SUBJECT TO THE DISCRETION OF THE CITY ENGINEER.

THE BEDDING LIMITS SHOWN APPLY IN ALL CASES EXCEPT FOR WHEN PIPE MANUFACTURER SPECIFIES A BEDDING WIDTH DIFFERENT FROM THAT SHOWN AND THE CITY ENGINEER PERMITS SAME.

2. BACKFILL:

BACKFILL WITHIN THE PUBLIC STREET RW:

MATERIALS SHALL BE ODOT 304, 703.11, TYPE 1 GRANULAR MATERIAL OR TYPE 2 GRANULAR MATERIAL, ODOT 613, LOW STRENGTH MORTAR OR ALTERNATE GRANULAR MATERIAL ONLY IF APPROVED BY THE CITY ENGINEER (ALSO, SEE NOTE 5). DEVIATIONS FROM SPECIFIED MATERIALS ARE AS FOLLOWS:

A) NO FOUNDRY SAND OR SLAG IS PERMITTED.

B) ALTERNATE GRANULAR MATERIAL SHALL BE PERMITTED ONLY WITH THE SUPPLEMENTAL APPROVAL OF THE CITY ENGINEER. TO PETITION FOR SUCH SUPPLEMENTAL APPROVAL, THE DEVELOPER/CONTRACTOR SHALL SUBMIT IN WRITING THE FOLLOWING:

- SOURCE OF THE ALTERNATE BACKFILL MATERIAL.
- * GRADATION REPORT IN ACCORDANCE WITH AASHTO T 11 AND T 27.
- * PROCTOR CURVE ANALYSIS IN ACCORDANCE WITH ASTM D 998.
- * PROPOSED COMPACTION METHOD.

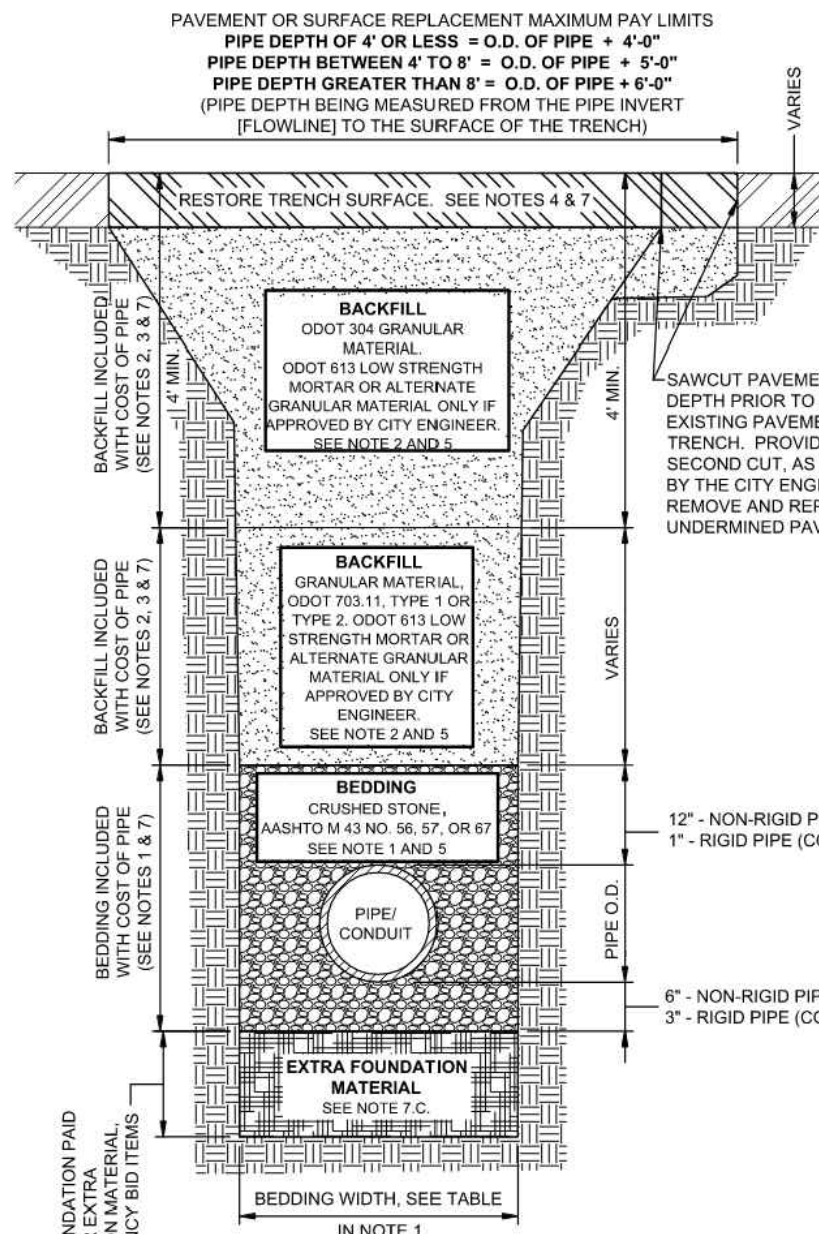
THE CITY ENGINEER RESERVES THE RIGHT TO REFUSE ANY ALTERNATE BACKFILL MATERIAL, REGARDLESS OF APPROVAL OF SIMILAR MATERIAL ON A PREVIOUS PROJECT.

THE CITY ENGINEER FURTHER RESERVES THE RIGHT TO REFUSE ANY ALTERNATE BACKFILL MATERIAL THE CITY FINDS NOT CONSISTENT WITH THE APPROVED SOURCE, GRADATION REPORT, PROCTOR REPORT, OR COMPACTION METHOD.

C) ODOT 703.11, TYPE 2, OR ALTERNATE MATERIALS ARE NOT PERMITTED WITHIN 4 FEET OF THE TRENCH SURFACE, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.

BACKFILL OUTSIDE OF THE PUBLIC STREET RW:

MATERIAL MAY BE NON-CONTAMINATED ASBESTOS OR EXCAVATED MATERIAL, UNLESS, SPECIFIED OTHERWISE BY PROPERTY OWNER OR PIPE/CONDUIT OWNER.



NOTES: (CONTINUED)

3. COMPACTION:

ALL BACKFILL SHALL BE PLACED IN LAYERS NOT TO EXCEED 12-INCHES LOOSE DEPTH AND COMPACTED BY APPROVED MECHANICAL MEANS. JETTING IS NOT APPROVED WITHOUT THE CITY ENGINEER'S APPROVAL. BUCKET COMPACTOR MUST BE SUPPLEMENTED WITH VIBRATION OR TAMPING EQUIPMENT AS DIRECTED. ANY MODIFICATIONS TO THESE REQUIREMENTS MUST BE APPROVED BY THE CITY ENGINEER.

4. SURFACE:

TRENCHES SHALL BE TOPPED WITH 4" OF ODOT 304 LIMESTONE OR ASPHALT GRINDINGS WITHIN EXISTING STREET PAVEMENTS WHEN THE STREET WILL BE OPENED TO VEHICULAR TRAFFIC PRIOR TO PAVEMENT REPLACEMENT. THE TRENCH TOPPING MATERIAL SHALL BE ROLLED OR OTHERWISE COMPLETED FLUSH WITH THE ADJOINING PAVEMENT.

STREET RESTORATION:
CONCRETE OR ASPHALT STREET PAVEMENT SHALL BE REPLACED IN ACCORDANCE WITH CITY STD. DWG. NO. 32. BRICK OR ASPHALT-BRICK COMPOSITE STREET PAVEMENT SHALL BE REPLACED IN ACCORDANCE WITH CITY STD. DWG. NO. 31.

SIDEWALK, CURB, AND DRIVEWAY RESTORATION:
DRIVEWAY SURFACES SHALL BE REPLACED IN ACCORDANCE WITH THE CURRENT EDITION OF THE CITY OF CANTON SPECIFICATIONS FOR THE CONSTRUCTION, REPAIR, AND REPLACEMENT OF SIDEWALKS, CURBS, AND DRIVEWAYS; AND CITY STD. DWG. NOS. 28 THRU 33.

LAWN RESTORATION:
LAWN SURFACES SHALL BE REPLACED WITH A MINIMUM OF 4" TOPSOIL, SEEDING, AND MULCHED. SEED MIX SHALL CONFORM TO ADJOINING LAWN GRASS.

12" - NON-RIGID PIPE (PVC, HDPE, CMP, ALUMINUM)

1" - RIGID PIPE (CONCRETE, VITRIFIED CLAY, OR DUCTILE IRON)

6" - NON-RIGID PIPE (PVC, HDPE, CMP, ALUMINUM)

3" - RIGID PIPE (CONCRETE, VITRIFIED CLAY, OR DUCTILE IRON)

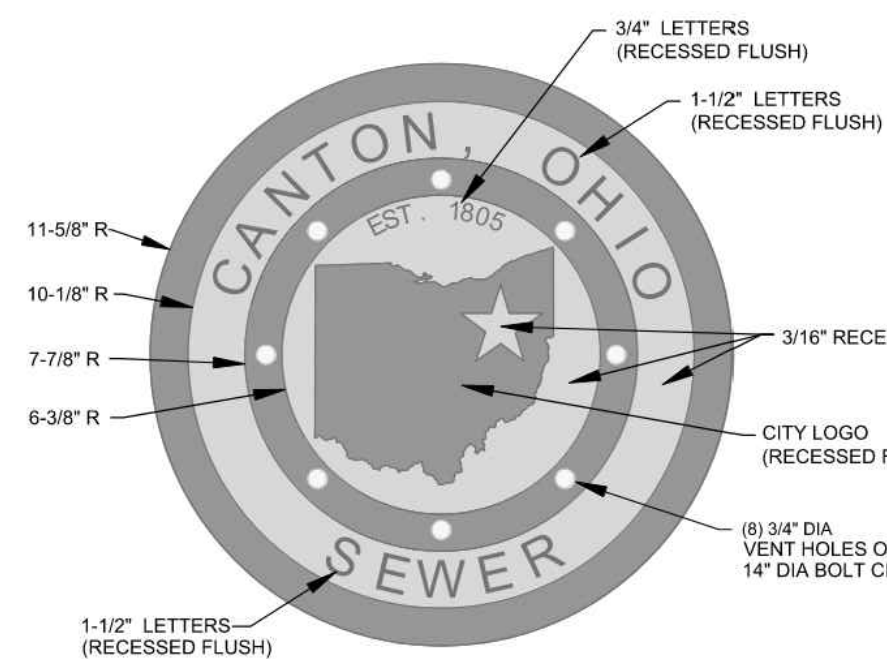
5. APPLICABILITY: THE STANDARD DRAWING HEREIN IS APPLICABLE WHEN ODOT 611 IS NOT SPECIFIED FOR CONDUIT INSTALLATION.

6. ODOT REFERENCES ARE FROM THE CURRENT ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS. ANY DISCREPANCIES SHALL BE SUBJECT TO THE CITY ENGINEER'S DISCRETION.

NOTES:

- COVER AND FRAME TO BE CAST OF GRAY IRON IN COMPLIANCE WITH ASTM SPEC. ASTM A-48 CLASS 35 AND AASHTO M 306. CASTINGS SHALL BE OF THE HEAVY DUTY RATING.
- SANITARY MANHOLE COVER/FRAME:
-EAST JORDAN 1850 B VENTED COVER (PRODUCT NO. 185026) AND 1850 FRAME.
-NEENAH R-1654 FRAME AND VENTED COVER.
-OR EQUAL APPROVED BY CITY ENGINEER.
- STORM MANHOLE COVER/FRAME:
-EAST JORDAN 1850 M GRATED COVER AND 1850 FRAME.
-NEENAH R-1654 FRAME AND GRATED COVER.
-USE THE VENTED COVER WITH CITY LOGO WITHIN CROSSWALKS.
- MACHINE BEARING SURFACES BETWEEN LID AND FRAME.
- CASTINGS ARE NOT REQUIRED TO BE PAINTED.
- CONTRACT CITY ENGINEER FOR CAD DRAWING OF CITY LOGO.
- CONTRACT CITY ENGINEER FOR CAD DRAWING OF CITY LOGO.

TOP OF SANITARY SEWER MANHOLE COVER
(SEE NOTE 2 FOR STORM SEWER COVER)



OFFICE OF THE CITY ENGINEER
CANTON, OHIO
DANIEL J. MOEGLIN, P.E., CITY ENGINEER
2435 34th St. NE 44705 330-489-3381 www.cantonohio.gov/engineering

DESCRIPTION	DATE	BY
CAD DRAWING	JAN 2012	CDB
MH COVER CITY LOGO	02/28/2014	RMB
NOTE 2 REVISED, ADD GRATED COVER	01/17/2015	RMB
REMOVED OLD CITY LOGO COVER	12/26/2017	RMB
TITLE BLOCK REVISION	02/26/2021	GML

STANDARD DRAWING NO. 12
MANHOLE COVER

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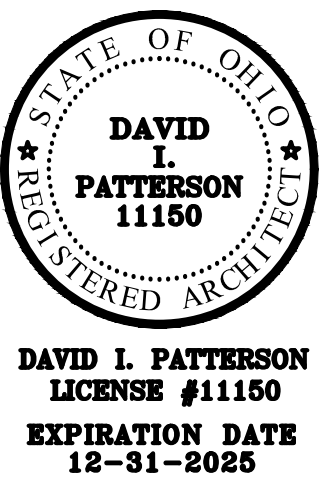
DESCRIPTION	DATE	BY
REVISION TO NOTES 7 & 8	06/04/2012	CDB
REVISION TO NOTES 7	06/10/2013	CDB
REVISION TO NOTES 2, 3, 5	09/23/2020	RMB
TITLE BLOCK REVISION	02/26/2021	GML
REVISION TO BACKFILL NOTES	3/2/2021	RMB

STANDARD DRAWING NO. 19
UTILITY TRENCH
REQUIREMENTS
CE_19_20210226.DWG

MOTTED MEADOWS
ARCHITECTS

600 MARKET AVENUE NORTH CANTON OHIO 44702

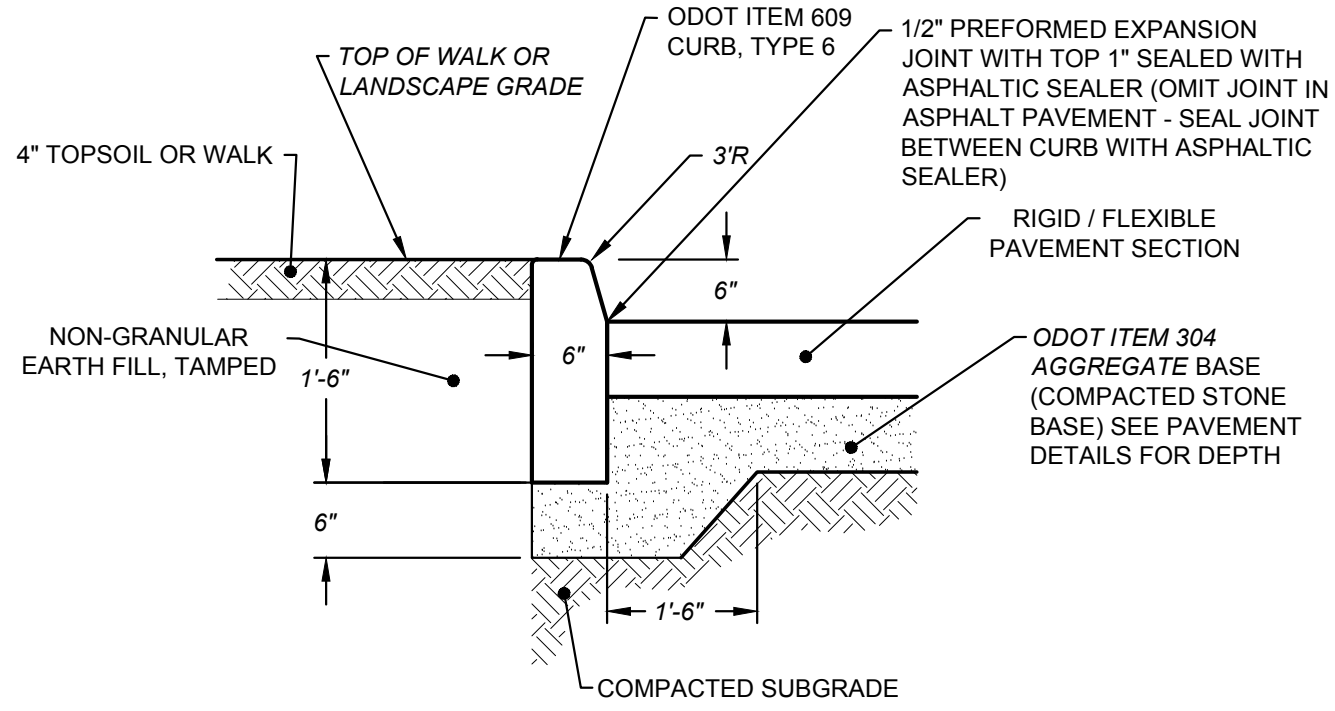
GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO



THIS DWG :
SITE
DETAILS

COMM 21161-B
DATE 02-01-2024

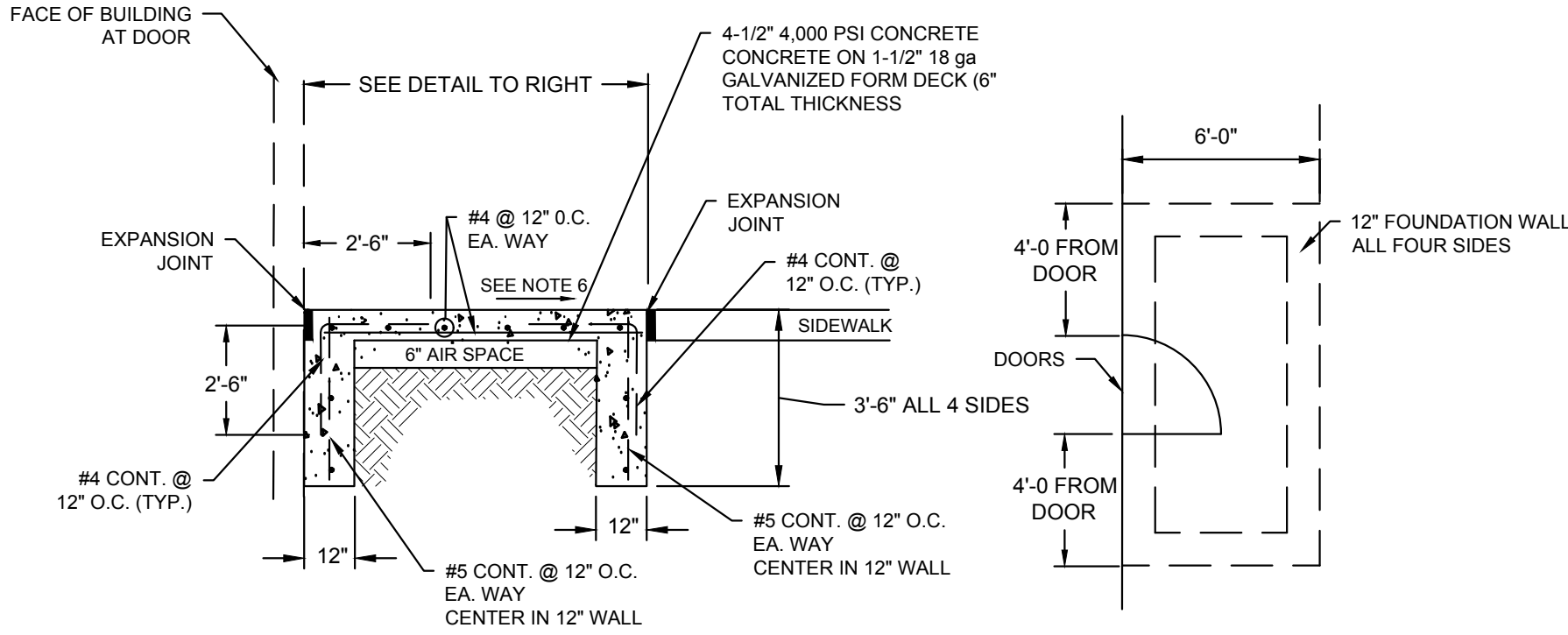
DWG
D-100



6" CONCRETE CURB DETAIL
SCALE: NONE

NOTES:

1. ALL CONCRETE SHALL BE AIR ENTRAINED 4,000 PSI UNLESS OTHERWISE DIRECTED BY ENGINEER (NO FLY ASH).
2. PROVIDE HOT APPLIED ASPHALTIC SEALER ACCORDING TO ASTM D 3405 AT ALL SURFACES WHERE ASPHALT PAVEMENT ABUTS CONCRETE CURB. APPLY SEALER IN A NEAT, WORKMANSHIP FASHION.
3. INSTALL CONTRACTION JOINT @ 10' O.C.
4. AGGREGATE BASE IS TO EXTEND 12" BEYOND BACK OF CURB.



FROST STOOP AT DOORS
SCALE: NONE

NOTES:

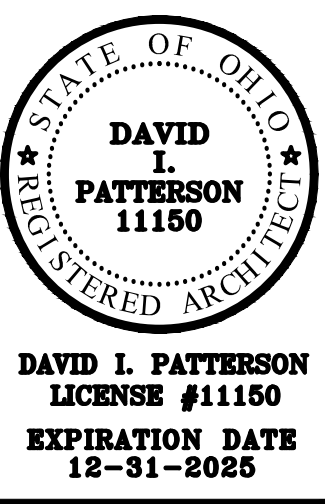
1. ALL CONCRETE SHALL BE AIR ENTRAINED 4000 PSI (NO FLY ASH) UNLESS OTHERWISE DIRECTED BY ENGINEER. CURING COMPOUND PER ODOT 705.07 1GAL / 206SF.
2. USE CHAIRS TO SUPPORT REINFORCEMENT IN WALK.
3. USE EPOXY COATED REBAR. MAINTAIN 2" COVER OVER REINFORCEMENT.
4. PROVIDE STANDARD RUBBED FINISH ON EXPOSED VERTICAL FACE.
6. SLOPE SURFACE TO DRAIN (MIN 1% MAX 2% CROSS-SLOPE).
7. 1/2" PREFORMED JOINT MATERIAL, CONTINUOUS STRIP SHALL BE INSTALLED EVERY 30' AND / OR BETWEEN SIDEWALK AND ANY FIXED STRUCTURE EXTENDING THE FULL DEPTH OF THE SIDEWALK.
8. SIDEWALK JOINTS SHALL BE DIVIDED INTO EQUALLY SPACED BLOCKS, BUT NOT GREATER THAN 10' O.C. (I.E. 5' INTERVALS FOR 5' WIDE SIDEWALKS). JOINTS SHALL BE HAND TOOLED OR SAW CUT TO A DEPTH OF 1/4" OF THE SLAB THICKNESS.
9. MATERIAL PLACING, FINISHING, AND JOINTING PER DETAILS AND SPECIFICATIONS
10. CONCRETE WALK IS TO HAVE MEDIUM BROOM FINISH PERPENDICULAR TO TRAFFIC FLOW, RUB OUT ALL TOOL MARKS.
11. THIS WALK DETAIL IS TO BE USED AT ALL DOORS TO THE BUILDING.

REVISIONS:

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTT & MEADOWS
ARCHITECTS

**GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER**
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D-200

NOTES

- CONTRACTOR SHALL MAINTAIN COMPLIANCE WITH THE STARK SOIL & WATER CONSERVATION DISTRICT REGULATIONS AS SPECIFIED IN THE STARK COUNTY CODE. SPECIAL ATTENTION MUST BE PAID TO ALL POTENTIAL STORM WATER IMPACTS FROM THE MODIFICATION OF THE SITE, INCLUDING BUT NOT LIMITED TO LONG-TERM OPERATION AND MAINTENANCE OF EXISTING STRUCTURAL AND NON-STRUCTURAL BEST MANAGEMENT PRACTICES.
 - CONTACT STARK SOIL & WATER CONSERVATION DISTRICT TO SCHEDULE A PRE-CONSTRUCTION MEETING AT (330) 451-7645 PRIOR TO ANY EARTH MOVING ACTIVITY.
 - CONSTRUCTION BMPS SHALL BE IN PLACE PRIOR TO THE START OF CONSTRUCTION ACTIVITIES.
 - SWP3 INSPECTION REPORTS SHALL BE KEPT ON SITE WITH THE SWP3 AND READILY ACCESSIBLE DURING NORMAL WORKING HOURS.
- CONTRACTOR SHALL MAINTAIN COMPLIANCE WITH OHIO EPA'S GENERAL STORMWATER NPDES PERMIT PROGRAMS.
- CONTRACTOR SHALL MAINTAIN COMPLIANCE WITH THE CITY OF CANTON, STARK SOIL & WATER CONSERVATION DISTRICT, AND STATE OF OHIO'S AIR QUALITY REGULATIONS APPLICABLE IN THE MUNICIPAL CODE AND THE OHIO ADMINISTRATIVE CODE INCLUDING, BUT NOT LIMITED TO THE ASBESTOS AND THE ANTI-NOISE LAWS.

EROSION AND SEDIMENT CONTROL NOTES

- THE CONTRACTOR IS TO REFER TO THIS PLAN AND THE E&S PLAN, NOTES, AND DETAILS.
- CONTRACTOR IS RESPONSIBLE TO MAINTAIN LAWN AND AND STORM WATER CONTROLS UNTIL SUBSTANTIAL COMPLETION OF THE PROJECT. PERIODIC INSPECTIONS ARE REQUIRED PER THE EPA GENERAL PERMIT OHC000005. GENERAL PERMIT TO BE OBTAINED BY CM. CONTRACTOR IS REQUIRED TO KEEP COPY OF PERMIT ON-SITE AND CONFORM WITH PERMIT REQUIREMENTS.
- THE CONTRACTOR IS TO INSTALL AND MAINTAIN THE E&S CONTROLS THROUGHOUT THE CONSTRUCTION PERIOD AND UNTIL THE SITE IS FULLY STABILIZED.
- THE CONTRACTOR IS RESPONSIBLE TO REMOVE THE TEMPORARY E&S CONTROLS ONCE THE SITE IS FULLY STABILIZED.
- CONTRACTOR IS TO MAINTAIN, ON-SITE AT ALL TIMES, LOGS DOCUMENTING GRADING AND STABILIZATION ACTIVITIES AS WELL AS AMENDMENTS TO THE SWP3, AS REQUIRED BY THE GENERAL PERMIT.
- DUMPSTERS, WASTE DISPOSAL AREA'S AND OTHER AREAS DESIGNATED UNDER NON-SEDIMENT POLLUTANT CONTROLS WILL BE LOCATED ON-SITE DURING CONSTRUCTION BY THE CONTRACTOR.
- INCIDENTAL WORK BEYOND APPROXIMATE CONSTRUCTION LIMIT LINE IS TO BE INCLUDED IN BASE BID.
- CONTRACTOR IS TO PREVENT DUST AND DEBRIS FROM BEING TRACKED OR BLOWN ONTO REGENT AVENUE N.E. OR SURROUNDING PROPERTIES BY USE OF REGULAR SWEEPING, TIRE WASHING, DUST CONTROL METHODS, ETC. EQUIPMENT (POWER BROOM, WATER TRUCK, ETC.) ARE TO REMAIN ON-SITE AS REQUIRED, TO ACCOMMODATE DUST AND DEBRIS. CONTRACTOR IS TO UTILIZE TIRE WASHING STATION DURING CONSTRUCTION ACTIVITIES, IF NEEDED, TO PREVENT DEBRIS FROM REACHING ADJACENT STREETS.
- IF CONTRACTOR IS NOTIFIED BY POLICE, STARK COUNTY OFFICIALS, OR STARK SOIL & WATER CONSERVATION DISTRICT PERSONNEL OF ANY SIGNIFICANT VIOLATION OF EPA GENERAL PERMIT AND/OR SWPPP PLANS AND INFORMATION, ALL CONSTRUCTION ON-SITE IS TO CEASE UNTIL PROBLEM(S) ARE RECTIFIED & DEEMED ACCEPTABLE.

PHASING OF SITE DEVELOPMENT

- STAKE OUT LIMIT OF DISTURBANCE
- CONTRACTOR SHALL PREVENT CONSTRUCTION DEBRIS FROM BEING TRACKED ONTO PUBLIC ROADWAYS
- THE CONTRACTOR SHALL CLEAN THE ADJACENT PUBLIC ROADWAYS ON A DAILY BASIS
- INSTALL SEDIMENT CONTROL DEVICES AS NOTED ON E&S PLAN
- SITE DEMOLITION
- INSTALL UTILITIES, FOUNDATIONS, CURBING, PAVEMENT, ETC.
- FINE GRADE SITE
- MAINTAIN TEMPORARY E&S CONTROLS UNTIL AFTER SUBSTANTIAL COMPLETION AND APPROVAL BY OWNER
- REMOVE TEMPORARY E&S CONTROLS ONCE SITE IS STABILIZED

MAINTENANCE/INSPECTION PROCEDURES

EROSION AND SEDIMENT CONTROL INSPECTION AND MAINTENANCE PRACTICES

ALL TEMPORARY AND PERMANENT CONTROL PRACTICES SHALL BE MAINTAINED AND REPAIRED AS NEEDED THROUGHOUT CONSTRUCTION TO ENSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. ALL SEDIMENT CONTROL PRACTICES MUST BE MAINTAINED IN A FUNCTIONAL CONDITION UNTIL ALL UP-SLOPE AREAS THEY CONTROL ARE PERMANENTLY STABILIZED.

INSPECTIONS (MINIMUM REQUIREMENTS)

- ALL CONTROLS ARE TO BE INSPECTED ONCE EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN ONE-HALF INCH OF RAIN PER 24 HOUR PERIOD. THE INSPECTION PERIOD MAY BE REDUCED TO AT LEAST ONCE EVERY MONTH IF THE ENTIRE SITE IS TEMPORARILY STABILIZED OR RUNOFF IS UNLIKELY. ONCE A DEFINABLE AREA HAS BEEN FINALLY STABILIZED NO FURTHER INSPECTION REQUIREMENTS APPLY TO THAT PORTION OF THE SITE.
- A CHECKLIST MUST BE COMPLETED AND SIGNED BY A QUALIFIED INSPECTION PERSONNEL AND INCLUDE THE FOLLOWING:
 - INSPECTION DATE
 - NAMES, TITLES, AND QUALIFICATIONS OF PERSONNEL MAKING THE INSPECTION
 - WEATHER INFORMATION FOR THE PERIOD SINCE THE LAST INSPECTION OR COMMENCEMENT OF CONSTRUCTION ACTIVITY (INCLUDE ANY STORM ACTIVITY - DURATION, INTENSITY, DISCHARGES)
 - LOCATION OF ANY SEDIMENT OR OTHER POLLUTANT DISCHARGES FROM THE SITE
 - LOCATION OF BMPs THAT NEED TO BE INSTALLED AND/OR MAINTAINED
 - LOCATION OF BMPs THAT FAILED TO OPERATE AS DESIGNED OR PROVED INADEQUATE
 - CHECK FOR ANY EVIDENCE OF POLLUTANTS FROM STORED MATERIALS ENTERING THE DRAINAGE SYSTEM
 - CORRECTIVE ACTION (INSTALLATION, REPAIRS, MODIFICATIONS TO SWPPP PLAN AND IMPLEMENTATION DATES)
 - A MAINTENANCE INSPECTION REPORT WILL BE MADE AFTER EACH INSPECTION. A COPY OF THE REPORT FORM TO BE COMPLETED BY THE INSPECTOR. THE SITE SUPERINTENDENT WILL SELECT INDIVIDUALS WHO WILL BE RESPONSIBLE FOR INSPECTIONS, MAINTENANCE AND REPAIR ACTIVITIES, AND FILLING OUT THE INSPECTION AND MAINTENANCE REPORT.
 - COPIES OF THE REPORT ARE TO BE SENT TO THE OWNER, CITY ENGINEER & LOCAL SOIL & WATER CONSERVATION DISTRICT

REPAIR SCHEDULE OF SWPPP CONTROLS

A CONTROL PRACTICE, EXCEPT A SEDIMENT SETTLING POND, THAT IS IN NEED OF REPAIR OR MAINTENANCE MUST BE REPAIRED WITH 3 DAYS OF THE INSPECTION, IF APPLICABLE. SEDIMENT SETTLING PONDS MUST BE REPAIRED OR MAINTAINED WITHIN 10 DAYS OF THE INSPECTION. IF THE SPECIFIED CONTROL PRACTICE IS DEEMED INADEQUATE OR WAS NOT YET INSTALLED A NEW CONTROL PRACTICE MUST BE INSTALLED WITHIN 10 DAYS OF THE INSPECTION.

MAINTENANCE REQUIREMENTS DURING CONSTRUCTION (WHERE APPLICABLE)

- BUILT UP SEDIMENT WILL BE REMOVED FROM SILT FENCE WHEN IT HAS REACHED ONE-THIRD THE HEIGHT OF THE FENCE
- SILT FENCE WILL BE INSPECTED FOR DEPTH OF SEDIMENT, TEARS, TO SEE IF THE FABRIC IS SECURELY ATTACHED TO THE FENCE POSTS, AND TO SEE THAT THE FENCE POSTS ARE FIRMLY IN THE GROUND. REPAIRS ARE TO BE MADE PROMPTLY.
- IF APPLICABLE, THE SEDIMENT BASIN WILL BE INSPECTED FOR DEPTH OF SEDIMENT, AND BUILT UP SEDIMENT WILL BE REMOVED WHEN IT REACHES 40 PERCENT OF THE DESIGN CAPACITY OR AT THE END OF THE JOB.
- IF APPLICABLE, DIVERSION DIKES WILL BE INSPECTED AND ANY BREACHES PROMPTLY REPAIRED.
- TEMPORARY AND PERMANENT SEEDING AND PLANTINGS WILL BE INSPECTED FOR BARE SPOTS, WASHOUTS, AND HEALTHY GROWTH.

DEWATERING REQUIREMENTS DURING CONSTRUCTION

THERE SHALL BE NO SEDIMENT-LADEN DISCHARGES TO SURFACE WATERS RESULTING FROM DEWATERING ACTIVITIES. SHOULD DEWATERING BE REQUIRED, E.G., FROM TRENCHES, ETC., DURING CONSTRUCTION, ALL WATER SHALL BE PUMPED TO THE TEMPORARY SEDIMENT BASINS, IF POSSIBLE, BEFORE BEING RELEASED TO DOWNSTREAM CHANNELS, STORM SEWERS, ETC. IF A TEMPORARY SEDIMENT BASIN IS NOT SHOWN ON THE PLAN, OR NOT ACHIEVABLE FOR DEWATERING, THE WATER SHALL BE PUMPED INTO A SEDIMENT TRAP OR THROUGH SEDIMENT BAGS ONTO A RELATIVELY FLAT SURFACE AWAY FROM INLET BASINS, STREAMS, ETC.

HAZARDOUS WASTE

CONSTRUCTION PERSONNEL, INCLUDING SUBCONTRACTORS WHO MAY USE OR HANDLE HAZARDOUS OR TOXIC MATERIALS, SHALL BE MADE AWARE OF THE FOLLOWING GENERAL GUIDELINES REGARDING DISPOSAL AND HANDLING OF HAZARDOUS AND CONSTRUCTION WASTES:

- PREVENT SPILLS
- USE PRODUCTS UP
- FOLLOW LABEL DIRECTIONS FOR DISPOSAL
- REMOVE LIDS FROM EMPTY BOTTLES AND CANS WHEN DISPOSING IN TRASH
- RECYCLE WASTES WHENEVER POSSIBLE
- DON'T POUR INTO WATERWAYS, STORM DRAINS OR ONTO THE GROUND
- DON'T POUR DOWN THE SINK, FLOOR DRAIN OR SEPTIC TANKS
- DON'T BURY CHEMICALS OR CONTAINERS
- DON'T BURN CHEMICALS OR CONTAINERS
- DON'T MIX CHEMICALS TOGETHER

SPILL REPORTING REQUIREMENTS

SPILLS ON PAVEMENT SHALL BE ABSORBED WITH SAWDUST, KITTY LITTER OR OTHER ABSORBENT MATERIAL AND DISPOSED OF WITH THE TRASH AT A LICENSED SANITARY LANDFILL. HAZARDOUS OR INDUSTRIAL WASTES SUCH AS MOST SOLVENTS, GASOLINE, OIL-BASED PAINTS, AND CEMENT CURING COMPOUNDS REQUIRE SPECIAL HANDLING. SPILLS SHALL BE REPORTED TO OHIO EPA (1-800-282-9378). SPILLS OF 25 GALLONS OR MORE OF PETROLEUM PRODUCTS SHALL BE REPORTED TO OHIO EPA (1-800-282-9378), THE LOCAL FIRE DEPARTMENT, AND THE LOCAL EMERGENCY PLANNING COMMITTEE WITHIN 30 MIN. OF THE DISCOVERY OF THE RELEASE. ALL SPILLS, WHICH RESULT IN CONTACT WITH WATERS OF THE STATE, MUST BE REPORTED TO OHIO EPA'S HOTLINE.

HANDLING CONSTRUCTION CHEMICALS

MIXING, PUMPING, TRANSFERRING OR OTHER HANDLING OF CONSTRUCTION CHEMICALS SUCH AS FERTILIZER, LIME, ASPHALT, CONCRETE DRYING COMPOUNDS, AND ALL OTHER POTENTIALLY HAZARDOUS MATERIALS SHALL BE PERFORMED IN AN AREAWAY FROM ANY WATERCOURSE, DITCH OR STORM DRAIN.

EQUIPMENT FUELING AND MAINTENANCE

EQUIPMENT FUELING AND MAINTENANCE, OIL CHANGING, ETC., SHALL BE PERFORMED AWAY FROM WATERCOURSES, DITCHES OR STORM DRAINS, IN AN AREA DESIGNATED FOR THAT PURPOSE. THE DESIGNATED AREA SHALL BE EQUIPPED FOR RECYCLING OIL AND CATCHING SPILLS. SECONDARY CONTAINMENT SHALL BE PROVIDED FOR ALL FUEL OIL STORAGE TANKS. THESE AREAS MUST BE INSPECTED EVERY SEVEN DAYS AND WITHIN 24 HRS. OF A 0.5 INCH OR GREATER RAIN EVENT TO ENSURE THERE ARE NO EXPOSED MATERIALS WHICH WOULD CONTAMINATE STORM WATER. SITE OPERATORS MUST BE AWARE THAT SPILL PREVENTION CONTROL AND COUNTERMEASURES (SPCC) REQUIREMENTS MAY APPLY. AN SPCC PLAN IS REQUIRED FOR SITES WITH ONE SINGLE ABOVEGROUND TANK OF 660 GALLONS OR MORE, ACCUMULATIVE ABOVEGROUND STORAGE OF 1330 GALLONS OR MORE, OR 42,000 GALLONS OF UNDERGROUND STORAGE. SOILS THAT HAVE BECOME CONTAMINATED MUST BE DISPOSED OF ACCORDANCE WITH THE "CONTAMINATED SOILS" NOTE.

CONTAMINATED SOILS

IF SUBSTANCES SUCH AS OIL, DIESEL FUEL, HYDRAULIC FLUID, ANTIFREEZE, ETC. ARE SPILLED, LEAKED, OR RELEASED ONTO THE SOIL, THE SOIL SHOULD BE DUG UP AND DISPOSED OF AT LICENSED SANITARY LANDFILL OR OTHER APPROVED PETROLEUM CONTAMINATED SOIL REMEDIATION FACILITY (NOT A CONSTRUCTION/DEMOLITION DEBRIS LANDFILL). PLEASE BE AWARE THAT STORM WATER RUN OFF ASSOCIATED WITH CONTAMINATED SOILS ARE NOT AUTHORIZED UNDER OHIO EPA'S GENERAL STORM WATER PERMIT ASSOCIATED WITH CONSTRUCTION ACTIVITIES. IN THE EVENT THERE ARE LARGE EXTENSIVE AREAS OF CONTAMINATED SOILS ADDITIONAL MEASURES ABOVE AND BEYOND THE CONDITIONS OF OHIO EPA'S GENERAL CONSTRUCTION STORM WATER PERMIT WILL BE REQUIRED.

DEPENDING ON THE EXTENT OF CONTAMINATION, ADDITIONAL TREATMENT AND/OR COLLECTION AND DISPOSAL MAY BE REQUIRED. ALL STORM WATER DISCHARGES ASSOCIATED WITH THE CONTAMINATED SOILS MUST BE AUTHORIZED UNDER AN ALTERNATE NPDES (NATIONAL POLLUTANT DISCHARGE ELIMINATION PERMIT).

CONCRETE WASH WATER/WASH OUTS

CONCRETE WASH WATER SHALL NOT BE ALLOWED TO FLOW TO STREAMS, DITCHES, STORM DRAINS, OR ANY OTHER WATER CONVEYANCE. A SUMP OR PIT WITH NO POTENTIAL FOR DISCHARGE SHALL BE CONSTRUCTED IF NEEDED TO CONTAIN CONCRETE WASH WATER. FIELD TILE OR OTHER SUBSURFACE DRAINAGE STRUCTURES WITHIN 10 FT. OF THE SUMP SHALL BE CUT AND PLUGGED.

CONSTRUCTION WASTE

CONTAINERS SHALL BE PROVIDED FOR THE PROPER COLLECTION OF ALL WASTE MATERIAL INCLUDING CONSTRUCTION DEBRIS, TRASH, PETROLEUM PRODUCTS AND ANY HAZARDOUS MATERIALS USED ON-SITE. CONTAINERS SHALL BE COVERED AND NOT LEAKING. ALL WASTE MATERIAL SHALL BE DISPOSED OF AT FACILITIES APPROVED FOR THAT MATERIAL. CONSTRUCTION DEMOLITION AND DEBRIS (CD&D) WASTE MUST BE DISPOSED OF AT AN OHIO EPA APPROVED CD&D LANDFILL.

NO CONSTRUCTION RELATED WASTE MATERIALS ARE TO BE BURIED ON-SITE. BY EXCEPTION, CLEAN FILL (BRICKS, HARDENED CONCRETE, SOIL) MAY BE UTILIZED IN A WAY WHICH DOES NOT ENCR OACH UPON NATURAL WETLANDS, STREAMS OR FLOODPLAINS OR RESULT IN THE CONTAMINATION OF WATERS OF THE STATE.

CONSTRUCTION DEMOLITION AND DEBRIS (CD&D) WASTE MUST BE DISPOSED OF IN ACCORDANCE WITH ORC 3714 AT AN APPROVED OHIO EPA CD&D LANDFILL.

OPEN BURNING

NO MATERIALS MAY BE BURNED WHICH CONTAIN RUBBER, GREASE, ASPHALT, OR PETROLEUM PRODUCTS SUCH AS TIRES, CARS, AUTOPARTS, PLASTICS OR PLASTIC COATED WIRE. (SEE OAC 3745-19)

OPEN BURNING IS NOT ALLOWED IN RESTRICTED AREAS. RESTRICTED AREAS ARE DEFINED AS:

- WITHIN CORPORATION LIMITS
- WITHIN 1000 FEET OUTSIDE A MUNICIPAL CORPORATION HAVING A POPULATION OF 1000 TO 10,000
- A ONE MILE ZONE OUTSIDE OF A CORPORATION OF 10, 000 OR MORE.
- WITHIN HALF MILE OF A SCHOOL OR PLAYGROUND.

OUTSIDE A RESTRICTED AREA, NO OPEN BURNING CAN TAKE PLACE WITHIN A 1000 FEET OF AN INHABITED BUILDING LOCATED OFF THE PROPERTY WHERE THE FIRE IS SET.

OPEN BURNING IS PERMISSIBLE IN A RESTRICTED AREA FOR THE FOLLOWING ACTIVITIES:

- HEATING TAR, WELDING AND ACETYLENE TORCHES, SMUDGE POTS AND SIMILAR OCCUPATIONAL NEEDS
- HEATING FOR WARMTH OR OUTDOOR BARBEQUES, OUTSIDE OF RESTRICTED AREAS

DUST CONTROL/SUPPRESSANTS

DUST CONTROL IS REQUIRED TO PREVENT NUISANCE CONDITIONS. DUST CONTROLS MUST BE USED IN ACCORDANCE WITH THE MANUFACTURERS' SPECIFICATIONS AND NOT BE APPLIED IN A MANNER, WHICH WOULD RESULT IN A DISCHARGE TO WATERS OF THE STATE. ISOLATION DISTANCES FROM BRIDGES, CATCH BASINS, AND OTHER DRAINAGE WAYS MUST BE OBSERVED. APPLICATION (EXCLUDING WATER) MAY NOT OCCUR WHEN PRECIPITATION IS IMMINENT AS NOTED IN THE SHORT TERM FORECAST. USED OIL MAY NOT BE APPLIED FOR DUST CONTROL.

POST-CONSTRUCTION INSPECTION PROCEDURE

- (NA) THE SITE SHALL BE MAINTAINED PER THE POST-CONSTRUCTION MAINTENANCE PLAN FOLLOWING THE SUBMITAL OF THE N.O.T.
- THE PROPERTY OWNER OR THE OWNER'S AUTHORIZED REPRESENTATIVE(S) IS RESPONSIBLE FOR THE INSPECTION OF THE PERMANENT SWPPP CONTROLS, DISCHARGES FROM THE SITE AND ANY SEDIMENT ACCUMULATIONS.
- MAINTENANCE COSTS, IF INSPECTED BY THE OWNER OR THE OWNER'S DESIGNATED REPRESENTATIVE(S) WILL BE PAID BY THE OWNER.
- REGULAR INSPECTIONS, ESPECIALLY FOLLOWING MAJOR STORM EVENTS, WILL REQUIRE AN INSPECTION REPORT THAT SHALL BE KEPT BY THE OWNER FOR A PERIOD OF THREE YEARS. A COPY OF THE REPORT IS TO BE SUBMITTED TO THE STARK SOIL & WATER CONSERVATION DISTRICT.

POST CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

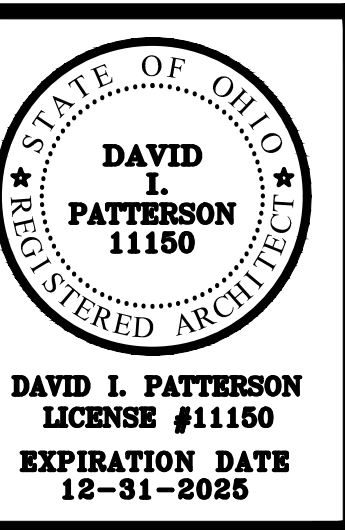
POST-CONSTRUCTION STORM WATER MANAGEMENT PRACTICES TREAT RUNOFF FROM A DEVELOPMENT SITE AFTER CONSTRUCTION IS COMPLETE.

REVISIONS:

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTT & MEADOWS
ARCHITECT &

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
CANTON, OHIO
2664 HARRISBURG RD. NE



THIS DWG :
SWPPP
DETAILS

COMM 21161-B
DATE 02-01-2024

DWG
D-300

DUST CONTROL DC

DESCRIPTION

DUST CONTROL INVOLVES PREVENTING OR REDUCING DUST FROM EXPOSED SOILS OR OTHER SOURCES DURING LAND DISTURBING, DEMOLITION AND CONSTRUCTION ACTIVITIES TO REDUCE THE PRESENCE OF AIR-BORNE SUBSTANCES WHICH MAY PRESENT HEALTH HAZARDS, TRAFFIC SAFETY PROBLEMS OR HARM ANIMAL OR PLANT LIFE.

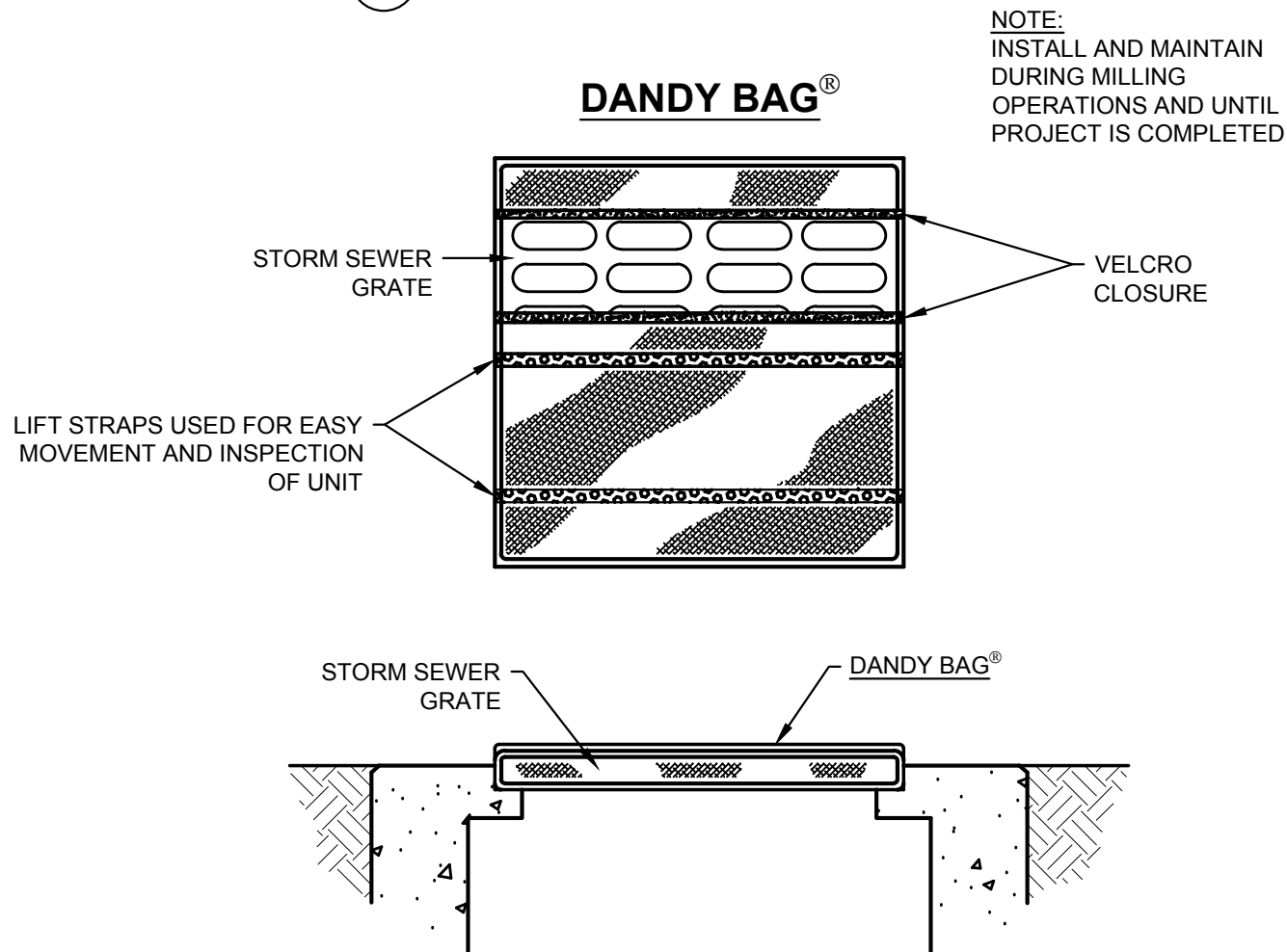
SPECIFICATIONS FOR DUST CONTROL

- VEGETATIVE COVER AND MULCH - APPLY TEMPORARY OR PERMANENT SEEDING AND MULCH TO AREAS THAT WILL REMAIN IDLE FOR OVER 21 DAYS. SAVING EXISTING TREES AND LARGE SHRUBS WILL ALSO REDUCE SOIL AND AIR MOVEMENT ACROSS DISTURBED AREAS. SEE TEMPORARY SEEDING; PERMANENT SEEDING; MULCHING PRACTICES; AND TREE AND NATURAL AREA PROTECTION PRACTICES.
- WATERING - SPRAY SITE WITH WATER UNTIL THE SURFACE IS WET BEFORE AND DURING GRADING AND REPEAT AS NEEDED, ESPECIALLY ON HAUL ROADS AND OTHER HEAVY TRAFFIC ROUTES. WATERING SHALL BE DONE AT A RATE THAT PREVENTS DUST BUT DOES NOT CAUSE SOIL EROSION. WETTING AGENTS SHALL BE UTILIZED ACCORDING TO MANUFACTURER'S INSTRUCTIONS.
- SPRAY-ON ADHESIVES - APPLY ADHESIVE ACCORDING TO THE FOLLOWING TABLE OR MANUFACTURERS' INSTRUCTIONS.
- STONE - GRADED ROADWAYS AND OTHER SUITABLE AREAS WILL BE STABILIZED USING CRUSHED STONE OR COARSE GRAVEL AS SOON AS PRACTICABLE AFTER REACHING AN INTERIM OR FINAL GRADE. CRUSHED STONE OR COARSE GRAVEL CAN BE USED AS A PERMANENT COVER TO PROVIDE CONTROL OF SOIL EMISSIONS.
- BARRIERS - EXISTING WINDBREAK VEGETATION SHALL BE MARKED AND PRESERVED. SNOW FENCING OR OTHER SUITABLE BARRIER MAY BE PLACED PERPENDICULAR TO PREVAILING AIR CURRENTS AT INTERVALS OF ABOUT 15 TIMES THE BARRIER HEIGHT TO CONTROL AIR CURRENTS AND BLOWING SOIL.
- CALCIUM CHLORIDE - THIS CHEMICAL MAY BE APPLIED BY MECHANICAL SPREADER AS LOOSE, DRY GRANULES OR FLAKES AT A RATE THAT KEEPS THE SURFACE MOIST BUT NOT SO HIGH AS TO CAUSE WATER POLLUTION OR PLANT DAMAGE. APPLICATION RATES SHOULD BE STRICTLY IN ACCORDANCE WITH SUPPLIERS' SPECIFIED RATES.
- OPERATION AND MAINTENANCE - WHEN TEMPORARY DUST CONTROL MEASURES ARE USED; REPETITIVE TREATMENT SHOULD BE APPLIED AS NEEDED TO ACCOMPLISH CONTROL. STREET CLEANING - PAVED AREAS THAT HAVE ACCUMULATED SEDIMENT FROM CONSTRUCTION SHOULD BE CLEANED DAILY, OR AS NEEDED, UTILIZING A STREET SWEEPER OR BUCKET - TYPE ENDLOADER OR SCRAPER.

ADHESIVES FOR DUST CONTROL

ADHESIVE	WATER DILUTION (ADHESIVE: WATER)	NOZZLE TYPE	APPLICATION RATE (GAL./AC.)
LATEX EMULSION	12.5:1	FINE	235
RESIN IN WATER ACRYLIC EMULSION (NO-TRAFFIC)	4:1	FINE	300
ACRYLIC EMULSION (NO-TRAFFIC)	7:1	COARSE	450
ACRYLIC EMULSION (TRAFFIC)	3.5:1	COARSE	350

INLET PROTECTION IP



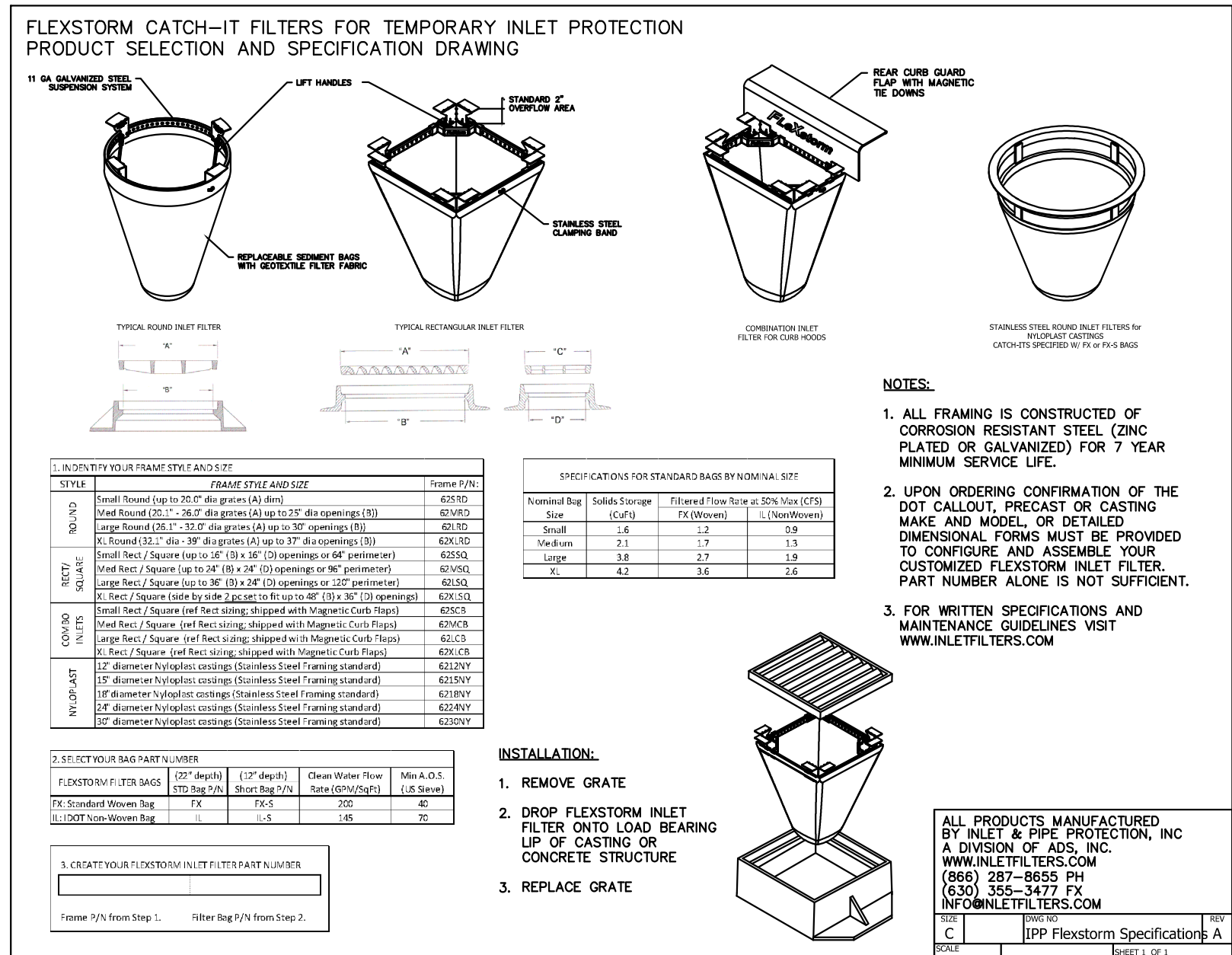
NOTE: THE DANDY BAG WILL BE MANUFACTURED IN THE U.S.A. FROM A WOVEN MONOFILAMENT FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS:

HI-FLOW DANDY BAG® (SAFETY ORANGE)

MECHANICAL PROPERTIES	TEST METHOD	UNITS	MARV
GRAB TENSILE STRENGTH	ASTM D 4632	kN (lbs)	1.62 (365) X 0.89 (200)
GRAB TENSILE ELONGATION	ASTM D 4632	%	24 X 10
PUNCTURE STRENGTH	ASTM D 4833	kN (LBS)	0.40 (90)
MULLEN BURST STRENGTH	ASTM D 3786	KPa (PSI)	3097 (450)
TRAPEZOID TEAR STRENGTH	ASTM D 4533	kN (LBS)	0.51 (115) X 0.33 (75)
UV RESISTANCE	ASTM D 4355	%	90
APPARENT OPENING SIZE	ASTM D 4751	Mm (US STD SIEVE)	0.425 (4)
FLOW RATE	ASTM D 4491	1/MIN/M² (GAL/MIN/FT²)	5907 (145)
PERMITTIVITY	ASTM D 4491	SEC ⁻¹	2.1000

*NOTE: ALL DANDY BAGS® CAN BE ORDERED WITH OUR OPTIONAL OIL ABSORBENT PILLOWS

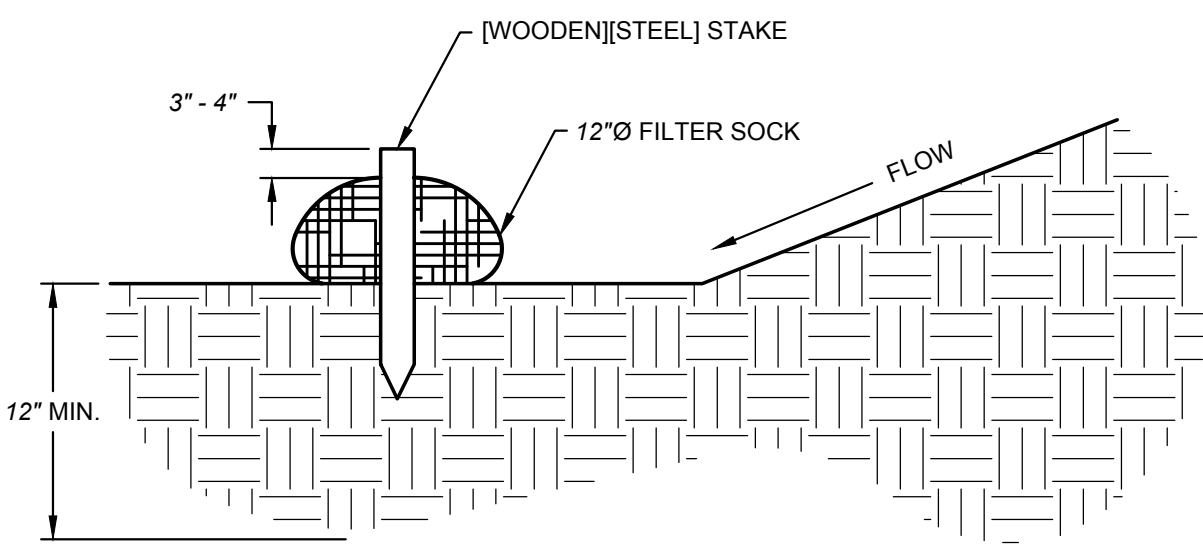
INLET PROTECTION IP



FILTER SOCK FS

DESCRIPTION

FILTER SOCKS ARE SEDIMENT-TRAPPING DEVICES USING COMPOST INSERTED INTO A FLEXIBLE, PERMEABLE TUBE WITH A PNEUMATIC BLOWER DEVICE OR EQUIVALENT. FILTER SOCKS TRAP SEDIMENT BY FILTERING WATER PASSING THROUGH THE BERM AND ALLOWING WATER TO POND, CREATING A SETTLING OF SOLIDS.



SECTION

SPECIFICATIONS FOR FILTER SOCK

- MATERIALS - COMPOST USED FOR FILTER SOCKS SHALL BE WEED, PATHOGEN AND INSECT FREE AND FREE OF ANY REFUSE, CONTAMINANTS OR OTHER MATERIALS TOXIC TO PLANT GROWTH. THEY SHALL BE DERIVED FROM A WELL-DECOMPOSED SOURCE OF ORGANIC MATTER AND CONSIST OF A PARTICLES RANGING FROM 3/8" TO 2".
- FILTER SOCKS SHALL BE 3 OR 5 MIL CONTINUOUS, TUBULAR, HDPE 3/8" KNITTED MESH NETTING MATERIAL, FILLED WITH COMPOST PASSING THE ABOVE SPECIFICATIONS FOR COMPOST PRODUCTS.

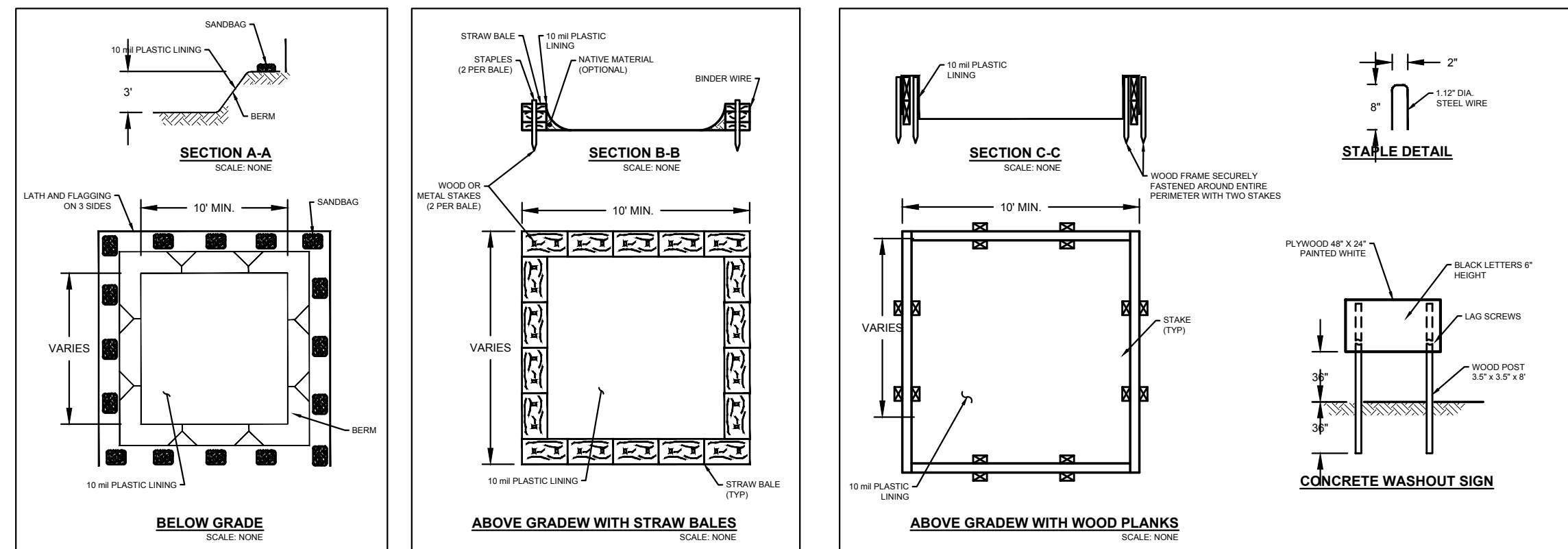
INSTALLATION:

- FILTER SOCKS WILL BE PLACED ON A LEVEL LINE ACROSS SLOPES, GENERALLY PARALLEL TO THE BASE OF THE SLOPE OR OTHER AFFECTED AREA. ON SLOPES APPROACHING 2:1, ADDITIONAL SOCKS SHALL BE PROVIDED AT THE TOP AND AS NEEDED MID-SLOPE.
- FILTER SOCKS INTENDED TO BE LEFT AS A PERMANENT FILTER OR PART OF THE NATURAL LANDSCAPE, SHALL BE SEEDED AT THE TIME OF INSTALLATION FOR ESTABLISHMENT OF PERMANENT VEGETATION.
- FILTER SOCKS ARE NOT TO BE USED IN CONCENTRATED FLOW SITUATIONS OR IN RUNOFF CHANNELS.

MAINTENANCE:

- ROUTINELY INSPECT FILTER SOCKS AFTER EACH SIGNIFICANT RAIN, MAINTAINING FILTER SOCKS IN A FUNCTIONAL CONDITIONAL AT ALL TIMES.
- REMOVE SEDIMENTS COLLECTED AT THE BASE OF THE FILTER SOCKS WHEN THEY REACH 1/3 OF THE EXPOSED HEIGHT OF THE PRACTICE.
- WHERE THE FILTER SOCK DETERIORATES OR FAILS, IT WILL BE REPAIRED OR REPLACED WITH A MORE EFFECTIVE ALTERNATIVE.
- REMOVAL - FILTER SOCKS WILL BE DISPERSED ON SITE WHEN NO LONGER REQUIRED IN SUCH A WAY AS TO FACILITATE AND NOT OBSTRUCT SEEDINGS.

REVISIONS:



CONCRETE WASHOUT DETAILS CW

SCALE: NONE

NOTES:

- ACTUAL LAYOUT TO BE DETERMINED IN THE FIELD.
- A CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30'-0" OF THE TEMPORARY CONCRETE WASHOUT FACILITY.
- MATERIALS USED TO CONSTRUCT TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE REMOVED FROM THE SITE OF THE WORK AND DISPOSED OF OR RECYCLED.
- HOLES, DEPRESSIONS OR OTHER GROUND DISTURBANCE CAUSED BY THE REMOVAL OF THE TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE BACKFILLED, REPAIRED, AND STABILIZED TO PREVENT EROSION.

CWA INSTALLATION NOTES

- THE CWA SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE. BERM SURROUNDING SIDES AND BACK OF CWA SHALL HAVE A MINIMUM HEIGHT OF 1'-0".
- SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE CWA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CWA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.
- USE EXCAVATED MATERIAL FOR PERIMETER BERM CONSTRUCTION.

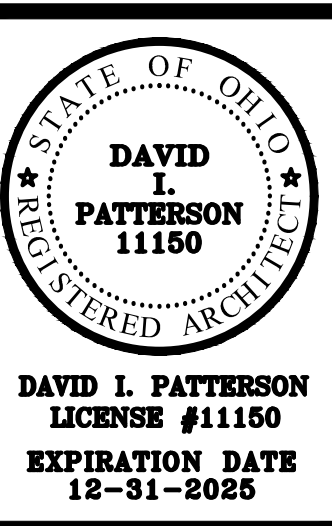
CWA MAINTENANCE NOTES

- INSPECT BMP'S EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMP'S SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMP'S AS SOON AS POSSIBLE (AND ALWAYS WITH 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMP'S IN EFFECTIVE OPERATING CONDITIONS. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- WHERE BMP'S HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
- THE CWA SHALL BE REPAIRED, CLEANED, OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR CONCRETE WASTE. CONCRETE MATERIALS, ACCUMULATED IN PIT, SHALL BE REMOVED ONCE THE MATERIALS HAVE REACHED A DEPTH OF 2'-0".
- CONCRETE WASHOUT WATER, WASTED PIECES OF CONCRETE AND ALL OTHER DEBRIS IN THE SUBSURFACE PIT SHALL BE TRANSPORTED FROM THE JOB SITE IN A WATER-TIGHT CONTAINER AND DISPOSED OF PROPERLY.
- THE CWA SHALL REMAIN IN PLACE UNTIL ALL CONCRETE FOR THE PROJECT IS PLACED.
- WHEN THE CWA IS REMOVED, COVER THE DISTURBED AREA WITH TOP SOIL, SEED AND MULCH OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO



THIS DWG :
SWPPP
DETAILS

COMM 21161-B
DATE 02-01-2024

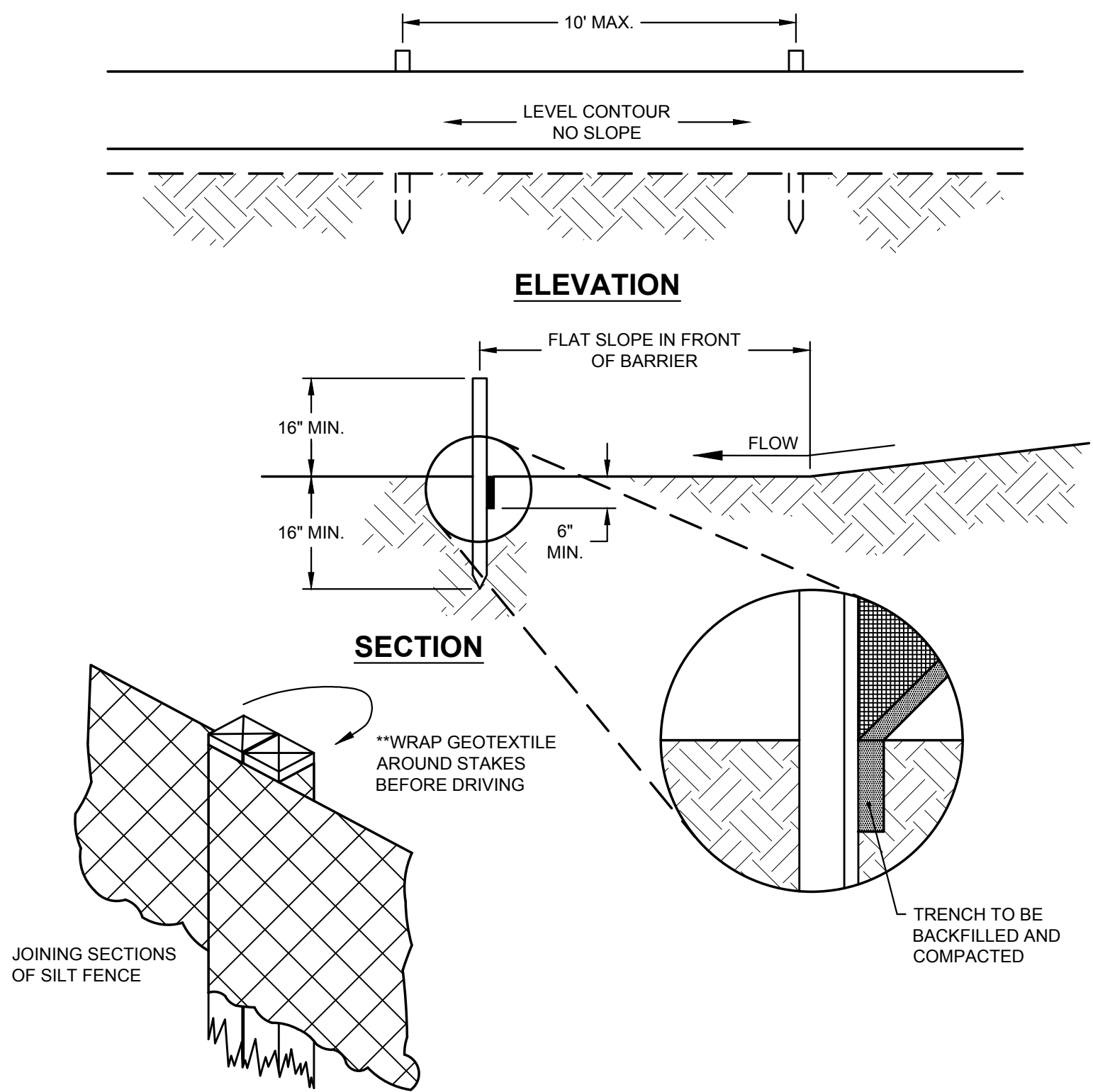
DWG
D-400

SILT FENCE SF

DESCRIPTION

SILT FENCE IS A SEDIMENT-TRAPPING PRACTICE UTILIZING A GEOTEXTILE FENCE, TOPOGRAPHY AND SOMETIMES VEGETATION TO CAUSE SEDIMENT DEPOSITION. SILT FENCE REDUCES RUNOFF'S ABILITY TO TRANSPORT SEDIMENT BY PONDING RUNOFF AND DISSIPATING SMALL RILLS OR CONCENTRATED FLOW INTO UNIFORM SHEET FLOW. SILT FENCE IS USED TO PREVENT SEDIMENT-LADEN SHEET RUNOFF FROM ENTERING INTO DOWNSTREAM CREEKS AND SEWER SYSTEMS.

SPECIFICATIONS FOR SILT FENCE



TEMPORARY SEEDING TS

DESCRIPTION

TEMPORARY SEEDINGS ESTABLISH TEMPORARY COVER ON DISTURBED AREAS BY PLANTING APPROPRIATE RAPIDLY GROWING ANNUAL GRASSES OR SMALL GRAINS. TEMPORARY SEEDING PROVIDES EROSION CONTROL ON AREAS IN BETWEEN CONSTRUCTION OPERATIONS. GRASSES, WHICH ARE QUICK GROWING, ARE SEEDED AND USUALLY MULCHED TO PROVIDE PROMPT, TEMPORARY SOIL STABILIZATION. IT EFFECTIVELY MINIMIZES THE AREA OF A CONSTRUCTION SITE PRONE TO EROSION AND SHOULD BE USED EVERYWHERE THE SEQUENCE OF CONSTRUCTION OPERATIONS ALLOWS VEGETATION TO BE ESTABLISHED.

SPECIFICATIONS FOR TEMPORARY SEEDING

TEMPORARY SEEDING SPECIES SELECTION			
SEEDING DATES	SPECIES	LB./1,000 SF	LB./ACRE
MARCH 1 TO AUGUST 15	OATS	3	128 (4 BUSHEL)
	TALL FESCUE	1	40
	ANNUAL RYEGRASS	1	40
	PERENNIAL RYEGRASS	1	40
	TALL FESCUE	1	40
	ANNUAL RYEGRASS	1	40
	ANNUAL RYEGRASS	1.25	55
	PERENNIAL RYEGRASS	3.25	142
	CREEPING RED FESCUE	0.4	17
	KENTUCKY BLUEGRASS	0.4	17
AUGUST 16 TO NOVEMBER	OATS	3	128 (3 BUSHEL)
	TALL FESCUE	1	40
	ANNUAL RYEGRASS	1	40
	RYE	3	112 (2 BUSHEL)
	TALL FESCUE	1	40
	ANNUAL RYEGRASS	1	40
	WHEAT	3	120 (2 BUSHEL)
	TALL FESCUE	1	40
	ANNUAL RYEGRASS	1	40
	PERENNIAL RYEGRASS	1	40
NOVEMBER 1 TO FEB. 29	TALL FESCUE	1	40
	ANNUAL RYEGRASS	1	40
	PERENNIAL RYEGRASS	1	40
	ANNUAL RYEGRASS	1.25	40
	PERENNIAL RYEGRASS	3.25	40
	CREEPING RED FESCUE	0.4	40
	KENTUCKY BLUEGRASS	0.4	0
USE MULCH ONLY OR DORMANT SEEDING			

NOTE: OTHER APPROVED SPECIES MAY BE SUBSTITUTED.

- SILT FENCE SHALL BE CONSTRUCTED BEFORE UPSLOPE LAND DISTURBANCE BEGINS.
- ALL SILT FENCE SHALL BE PLACED AS CLOSE TO THE CONTOUR AS POSSIBLE SO THAT WATER WILL NOT CONCENTRATE AT LOW POINTS IN THE FENCE AND SO THAT SMALL SWALES OR DEPRESSIONS THAT MAY CARRY SMALL CONCENTRATED FLOWS TO THE SILT FENCE ARE DISSIPATED ALONG ITS LENGTH.
- ENDS OF THE SILT FENCE SHOULD BE BROUGHT UPSLOPE SLIGHTLY SO THAT WATER PONDED BY THE SILT FENCE WILL BE PREVENTED FROM FLOWING AROUND THE ENDS.
- SILT FENCE SHALL BE PLACED ON THE FLATTEST AREA AVAILABLE.
- WHERE POSSIBLE, VEGETATION SHALL BE PRESERVED FOR 5 FEET (OR AS MUCH AS POSSIBLE) UPSLOPE FROM THE SILT FENCE. IF VEGETATION IS REMOVED, IT SHALL BE REESTABLISHED WITHIN 7 DAYS FROM THE INSTALLATION OF THE SILT FENCE.
- THE HEIGHT OF THE SILT FENCE SHALL BE A MINIMUM OF 16 INCHES ABOVE THE ORIGINAL GROUND SURFACE.
- THE SILT FENCE SHALL BE PLACED IN AN EXCAVATED OR SLICED TRENCH CUT A MINIMUM OF 6 INCHES DEEP. THE TRENCH SHALL BE MADE WITH A TRENCHER, CABLE LAYING MACHINE, SLICING MACHINE, OR OTHER SUITABLE DEVICE THAT WILL ENSURE AN ADEQUATE UNIFORM TRENCH DEPTH.
- THE SILT FENCE SHALL BE PLACED WITH THE STAKES ON THE DOWNSLOPE SIDE OF THE GEOTEXTILE. A MINIMUM OF 8 INCHES OF GEOTEXTILE MUST BE BELOW THE GROUND SURFACE. EXCESS MATERIAL SHALL LAY ON THE BOTTOM OF THE 6-INCH DEEP TRENCH. THE TRENCH SHALL BE BACKFILLED AND COMPACTED ON BOTH SIDES OF THE FABRIC.
- SEAMS BETWEEN SECTIONS OF SILT FENCE SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST WITH A MINIMUM 6-IN. OVERLAP PRIOR TO DRIVING INTO GROUND. (SEE DETAIL.)
- MAINTENANCE - SILT FENCE SHALL ALLOW RUNOFF TO PASS ONLY AS DIFFUSE FLOW THROUGH THE GEOTEXTILE. IF RUNOFF OVERTOPS THE SILT FENCE, FLOWS UNDER THE FABRIC OR AROUND THE FENCE ENDS, OR IN ANY OTHER WAY ALLOWS A CONCENTRATED FLOW DISCHARGE, ONE OF THE FOLLOWING SHALL BE PREFORMED, AS APPROPRIATE: 1) THE LAYOUT OF THE SILT FENCE SHALL BE CHANGED, 2) ACCUMULATED SEDIMENT SHALL BE REMOVED, OR 3) OTHER PRACTICES SHALL BE INSTALLED.
- SEDIMENT DEPOSITS SHALL BE ROUTINELY REMOVED WHEN THE DEPOSIT REACHES APPROXIMATELY ONE-HALF THE HEIGHT OF THE SILT FENCE.
- SILT FENCES SHALL BE INSPECTED AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. THE LOCATION OF THE EXISTING SILT FENCE SHALL BE REVIEWED DAILY TO ENSURE ITS PROPER LOCATION AND EFFECTIVENESS. IF DAMAGED, THE SILT FENCE SHALL BE REPAIRED IMMEDIATELY.

CRITERIA FOR SILT FENCE MATERIALS:

- FENCE POST - THE LENGTH SHALL BE A MINIMUM OF 32 INCHES. WOOD POST WILL BE 2-BY-2-IN. NOMINAL DIMENSIONED HARDWOOD OF SOUND QUALITY. THEY SHALL BE FREE OF KNOTS, SPLITS, AND OTHER VISIBLE IMPERFECTIONS, THAT WILL WEAKEN THE POSTS. THE MAXIMUM SPACING BETWEEN POSTS SHALL BE 10 FT. POSTS SHALL BE DRIVEN A MINIMUM 16 INCHES INTO THE GROUND, WHERE POSSIBLE. IF NOT POSSIBLE, THE POSTS SHALL BE ADEQUATELY SECURED TO PREVENT OVERTURNING OF THE FENCE DUE TO SEDIMENT/WATER LOADING.
- SILT FENCE FABRIC - SEE CHART BELOW.

FABRIC PROPERTIES	VALUES	TEST METHOD
MINIMUM TENSILE STRENGTH	120 LBS (535 N)	ASTM D 4632
MAXIMUM ELONGATION AT 60 LBS	50 %	ASTM D 4632
MINIMUM PUNCTURE STRENGTH	50 LBS (220 N)	ASTM D 4833
MINIMUM TEAR STRENGTH	40 LBS (180 N)	ASTM D 4533
APPARENT OPENING SIZE	≤ 0.84 mm	ASTM D 4751
MINIMUM PERMITTIVITY	1 x 10 ⁻² SEC. ⁻¹	ASTM D 4491
UV EXPOSURE STRENGTH RETENTION	70%	ASTM D 4355

NOTES:

- STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SUCH AS DIVERSIONS AND SEDIMENT TRAPS SHALL BE INSTALLED AND STABILIZED WITH TEMPORARY SEEDING PRIOR TO GRADING THE REST OF THE CONSTRUCTION SITE.
- TEMPORARILY STABILIZE DISTURBED AREAS THAT WILL REMAIN IDLE FOR 14 DAYS OR LONGER WITHIN 7 DAYS OF LAST DISTURBANCE OR WITHIN 2 DAYS FOR AREAS WITHIN 50' OF A STREAM.
- THE SEEDBED SHOULD BE PULVERIZED AND LOOSE TO ENSURE THE SUCCESS OF ESTABLISHING VEGETATION. TEMPORARY SEEDING SHOULD NOT BE POSTPONED IF IDEAL SEEDBED PREPARATION IS NOT POSSIBLE.
- SOIL AMENDMENTS - TEMPORARY VEGETATION SEEDING RATES SHALL ESTABLISH ADEQUATE STANDS OF VEGETATION, WHICH MAY REQUIRE THE USE OF SOIL AMENDMENTS. BASE RATES FOR LIME AND FERTILIZER SHALL BE USED.
- SEEDING METHOD - SEED SHALL BE APPLIED UNIFORMLY WITH A CYCLONE SPREADER, DRILL, CULTIPACKER SEEDER, OR HYDROSEEDER. WHEN FEASIBLE, SEED THAT HAS BEEN BROADCAST SHALL BE COVERED BY RAKING OR DRAGGING AND THEN LIGHTLY TAMPED INTO PLACE USING A ROLLER OR CULTIPACKER. IF HYDROSEEDING IS USED, THE SEED AND FERTILIZER WILL BE MIXED ON-SITE AND THE SEEDING SHALL BE DONE IMMEDIATELY AND WITHOUT INTERRUPTION.

MULCHING TEMPORARY SEEDING

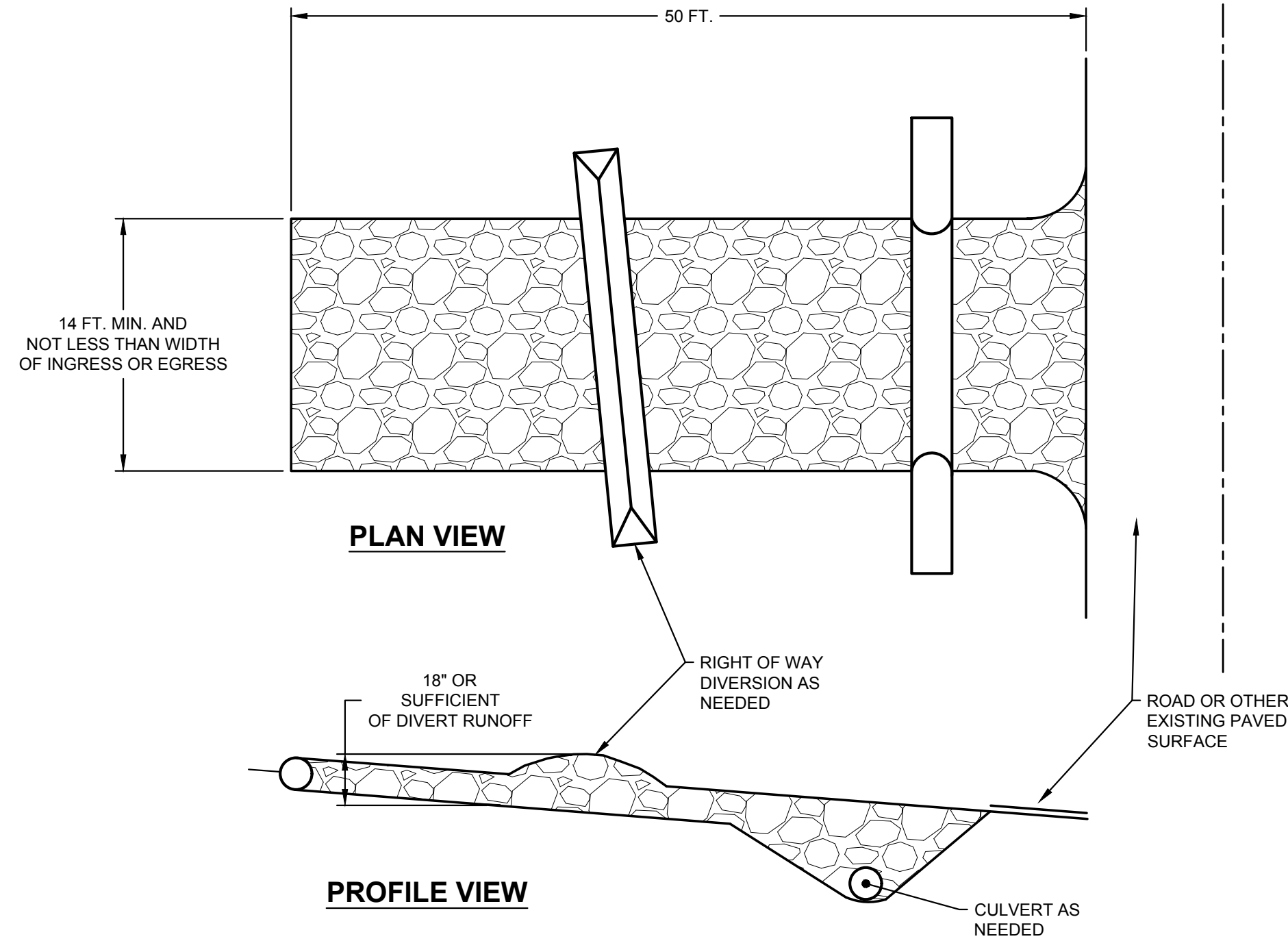
- APPLICATIONS OF TEMPORARY SEEDING SHALL INCLUDE MULCH, WHICH SHALL BE APPLIED DURING OR IMMEDIATELY AFTER SEEDING. SEEDINGS MADE DURING OPTIMUM SEEDING DATES ON FAVORABLE, VERY FLAT SOIL CONDITIONS MAY NOT NEED MULCH TO ACHIEVE ADEQUATE STABILIZATION.
- MATERIALS:
 - STRAW - IF STRAW IS USED, IT SHALL BE UNROTTED SMALL-GRAIN STRAW APPLIED AT A RATE OF 2 TONS/ACRE OR 90 LBS./1,000 SQ.-FT. (2-3 BALES)
 - HYDROSEEDERS - IF WOOD CELLULOSE FIBER IS USED, IT SHALL BE USED AT 2,000 LBS./AC. OR 48 LB./1,000 SQ.-FT.
 - OTHER - OTHER ACCEPTABLE MULCHES INCLUDE MULCH MATTINGS APPLIED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS OR WOOD CHIPS APPLIED AT 6 TON/AC.
- STRAW MULCH SHALL BE ANCHORED IMMEDIATELY TO MINIMIZE LOSS BY WIND OR WATER. ANCHORING METHODS:
 - MECHANICAL - A DISK, CRIMPER, OR SIMILAR TYPE TOOL SHALL BE SET STRAIGHT TO PUNCH OR ANCHOR THE MULCH MATERIAL INTO THE SOIL. STRAW MECHANICALLY ANCHORED SHALL NOT BE FINELY CHOPPED BUT LEFT TO A LENGTH OF APPROXIMATELY 6 INCHES.
 - MULCH NETTING - NETTING SHALL BE USED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. NETTING MAY BE NECESSARY TO HOLD MULCH IN PLACE IN AREAS OF CONCENTRATED RUNOFF AND ON CRITICAL SLOPES.
 - SYNTHETIC BINDERS - SYNTHETIC BINDERS SUCH AS ACRYLIC DLR (AGRI-TAC), DCA-70, PETROSET, TERRA TRACK OR EQUIVALENT MAY BE USED AT RATES RECOMMENDED BY THE MANUFACTURER.
 - WOOD-CELLULOSE FIBER - WOOD-CELLULOSE FIBER BINDER SHALL BE APPLIED AT A NET DRY WT. OF 750 LB./AC. THE WOOD-CELLULOSE FIBER SHALL BE MIXED WITH WATER AND THE MIXTURE SHALL CONTAIN A MAXIMUM OF 50 LB./100 GAL.

CONSTRUCTION ENTRANCE CE

DESCRIPTION

A CONSTRUCTION ENTRANCE IS A STABILIZED PAD OF STONE UNDERLAIN WITH A GEOTEXTILE AND IS USED TO REDUCE THE AMOUNT OF MUD TRACKED OFF-SITE WITH CONSTRUCTION TRAFFIC. LOCATED AT POINTS OF INGRESS/EGRESS, THE PRACTICE IS USED TO REDUCE THE AMOUNT OF MUD TRACKED OFF-SITE WITH CONSTRUCTION TRAFFIC.

SPECIFICATIONS FOR CONSTRUCTION ENTRANCE



- STONE SIZE - # 2 (1.5-2.5 INCH) STONE SHALL BE USED, OR RECYCLED CONCRETE EQUIVALENT.
- LENGTH - THE CONSTRUCTION ENTRANCE SHALL BE AS LONG AS REQUIRED TO STABILIZE HIGH TRAFFIC AREAS BUT NOT LESS THAN 70 FT. (EXCEPTION: APPLY 30 FT. MINIMUM TO SINGLE RESIDENCE LOTS).
- THICKNESS - THE STONE LAYER SHALL BE AT LEAST 6 INCHES THICK FOR LIGHT DUTY ENTRANCES OR AT LEAST 10 INCHES FOR HEAVY DUTY USE.
- WIDTH - THE ENTRANCE SHALL BE AT LEAST 14 FEET WIDE, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
- GEOTEXTILE - A GEOTEXTILE SHALL BE LAID OVER THE ENTIRE AREA PRIOR TO PLACING STONE. IT SHALL BE COMPOSED OF STRONG ROT-PROOF POLYMERIC FIBERS AND MEET THE FOLLOWING SPECIFICATIONS:

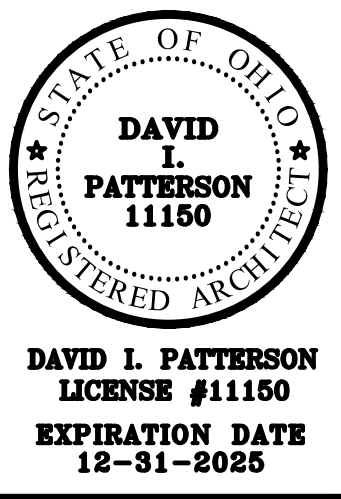
GEOTEXTILE SPECIFICATIONS FOR CONSTRUCTION ENTRANCES	
MINIMUM TENSILE STRENGTH	200 LBS.
MINIMUM PUNCTURE STRENGTH	80 PSI
MINIMUM TEAR STRENGTH	50 LBS
MINIMUM BURST STRENGTH	320 PSI
MINIMUM ELONGATION	20%
EQUIVALENT OPENING SIZE	EOS < 0.6MM
PERMITTIVITY	1x10 ⁻³ CM/SEC

- TIMING - THE CONSTRUCTION ENTRANCE SHALL BE INSTALLED AS SOON AS IS PRACTICABLE BEFORE MAJOR GRADING ACTIVITIES.
- CULVERT - A PIPE OR CULVERT SHALL BE CONSTRUCTED UNDER THE ENTRANCE IF NEEDED TO PREVENT SURFACE WATER FROM FLOWING ACROSS THE ENTRANCE OR TO PREVENT RUNOFF FROM BEING DIRECTED OUT ONTO PAVED SURFACES.
- WATER BAR - A WATER BAR SHALL BE CONSTRUCTED AS PART OF THE CONSTRUCTION ENTRANCE IF NEEDED TO PREVENT SURFACE RUNOFF FROM FLOWING THE LENGTH OF THE CONSTRUCTION ENTRANCE AND OUT ONTO PAVED SURFACES.
- MAINTENANCE - TOP DRESSING OF ADDITIONAL STONE SHALL BE APPLIED AS CONDITIONS DEMAND. MUD SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADS, OR ANY SURFACE WHERE RUNOFF IS NOT CHECKED BY SEDIMENT CONTROLS, SHALL BE REMOVED IMMEDIATELY. REMOVAL SHALL BE ACCOMPLISHED BY SCRAPING OR SWEEPING.
- CONSTRUCTION ENTRANCES SHALL NOT BE RELIED UPON TO REMOVE MUD FROM VEHICLES AND PREVENT OFF-SITE TRACKING. VEHICLES THAT ENTER AND LEAVE THE CONSTRUCTION SITE SHALL BE RESTRICTED FROM MUDDY AREAS.
- REMOVAL - THE ENTRANCE SHALL REMAIN IN PLACE UNTIL THE DISTURBED AREA IS STABILIZED OR REPLACED WITH A PERMANENT ROADWAY OR ENTRANCE.

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTT & MEADOWS
ARCHITECTS

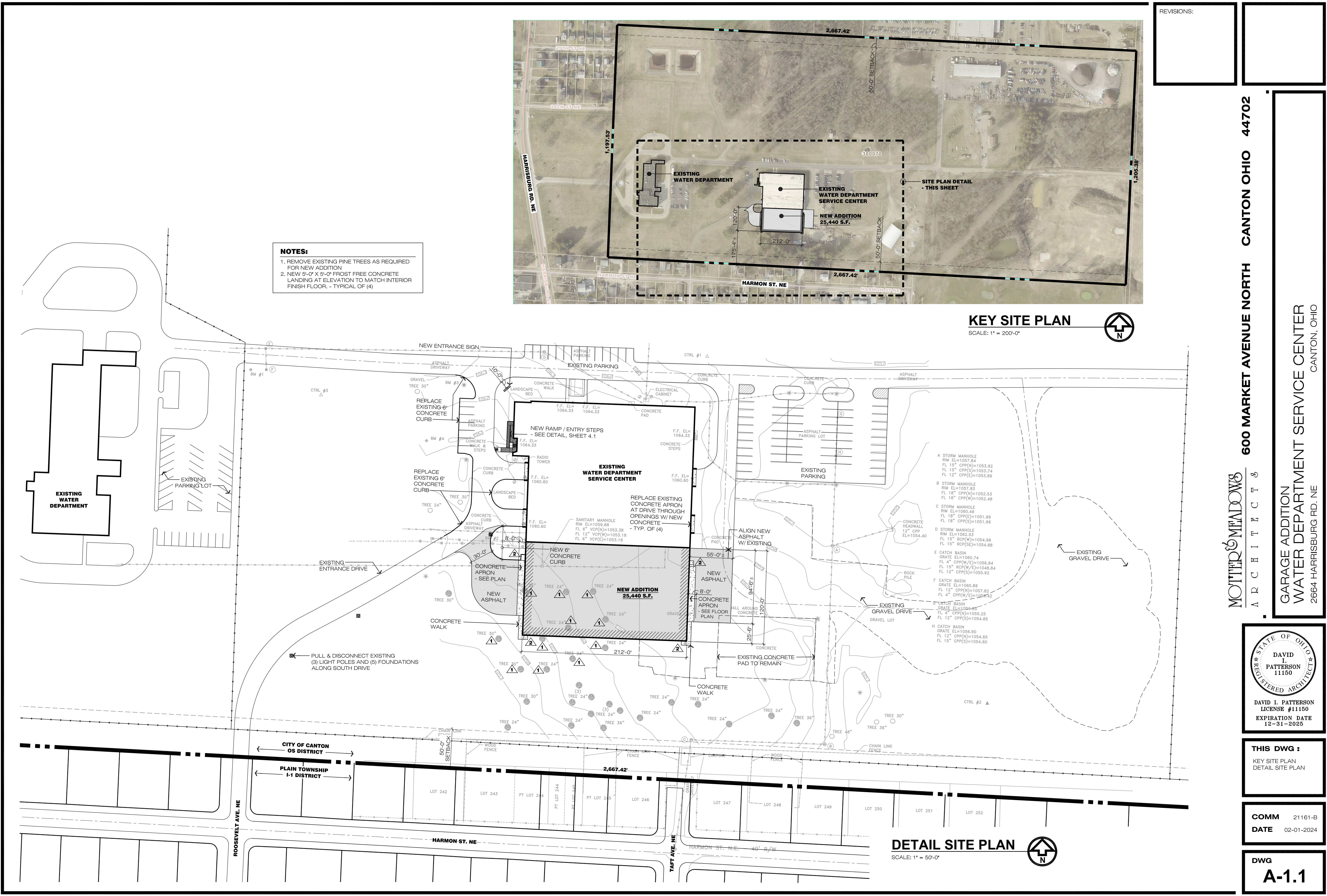
GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
CANTON, OHIO
2684 HARRISBURG RD. NE



THIS DWG :
SWPPP
DETAILS

COMM 21161-B
DATE 02-01-2024

DWG
D-500

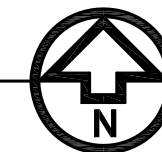


NOTES:

1. REMOVE EXISTING PINE TREES AS REQUIRED FOR NEW ADDITION
2. NEW 5'-0" X 5'-0" FROST FREE CONCRETE LANDING AT ELEVATION TO MATCH INTERIOR FINISH FLOOR, - TYPICAL OF (4)

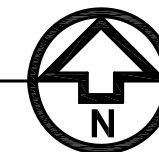
KEY SITE PLAN

SCALE: 1" = 200'-0"



DETAIL SITE PLAN

SCALE: 1" = 50'-0"



REVISIONS:

MOTTER & MEADOWS
ARCHITECTS

600 MARKET AVENUE NORTH CANTON OHIO 44702

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
CANTON, OHIO



DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
KEY SITE PLAN
DETAIL SITE PLAN

COMM 21161-B
DATE 02-01-2024

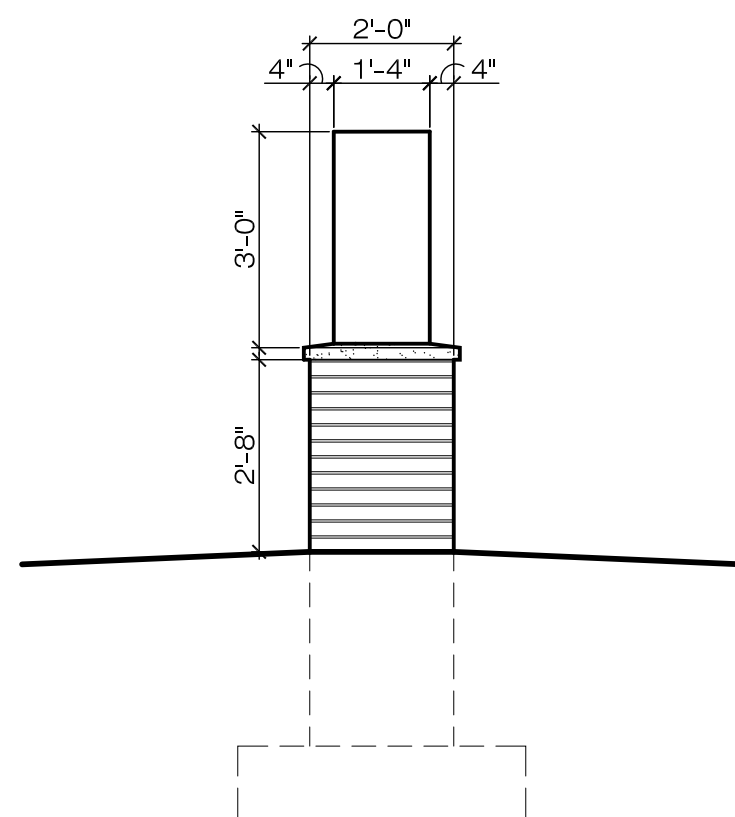
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NEW 2' X 3' BRONZE PLAQUE
- COORDINATE LOCATION WITH OWNER
- PROVIDE BLOCKING AS REQUIRED

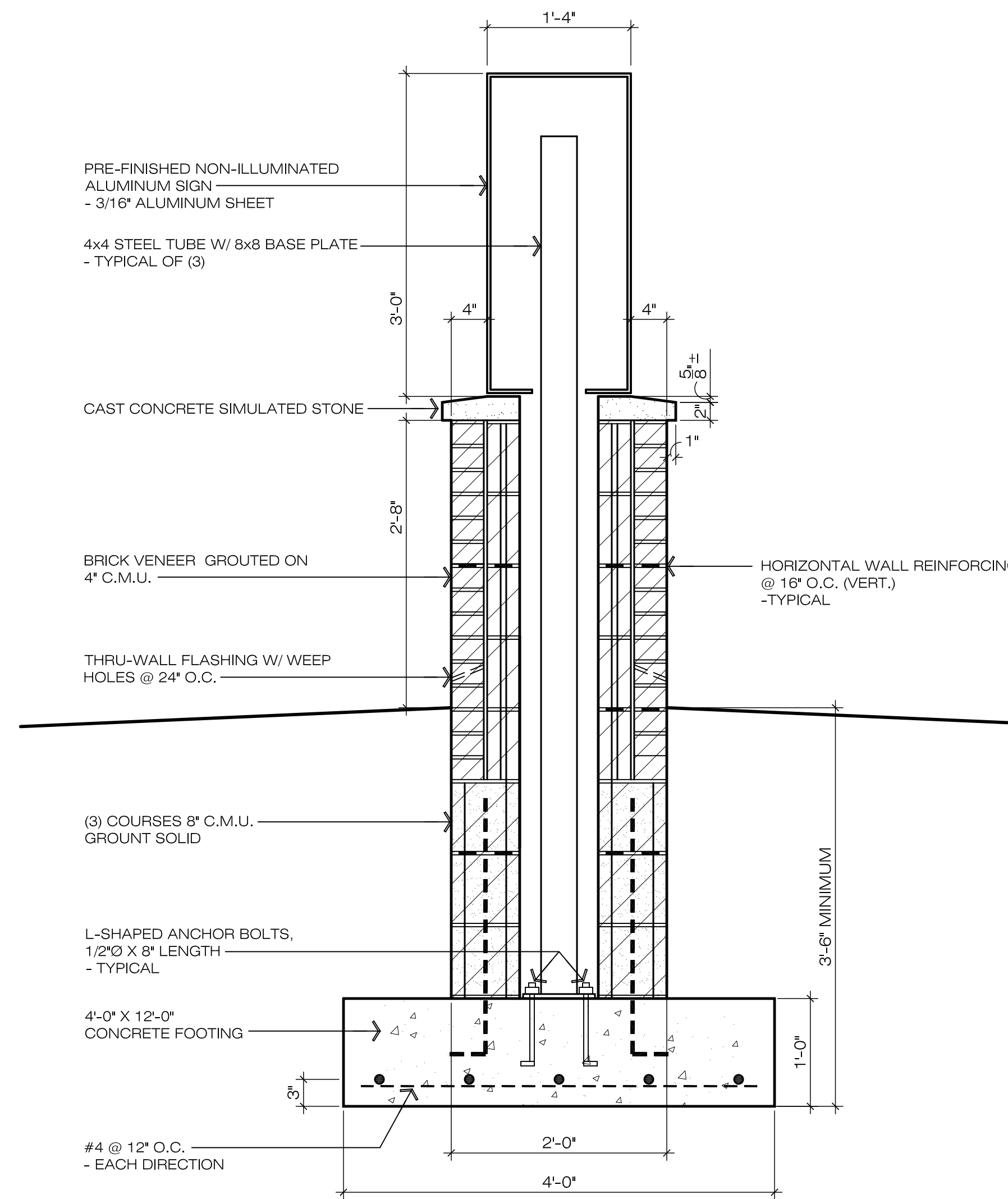
BRONZE PLAQUE

SCALE: 6" = 1'-0"



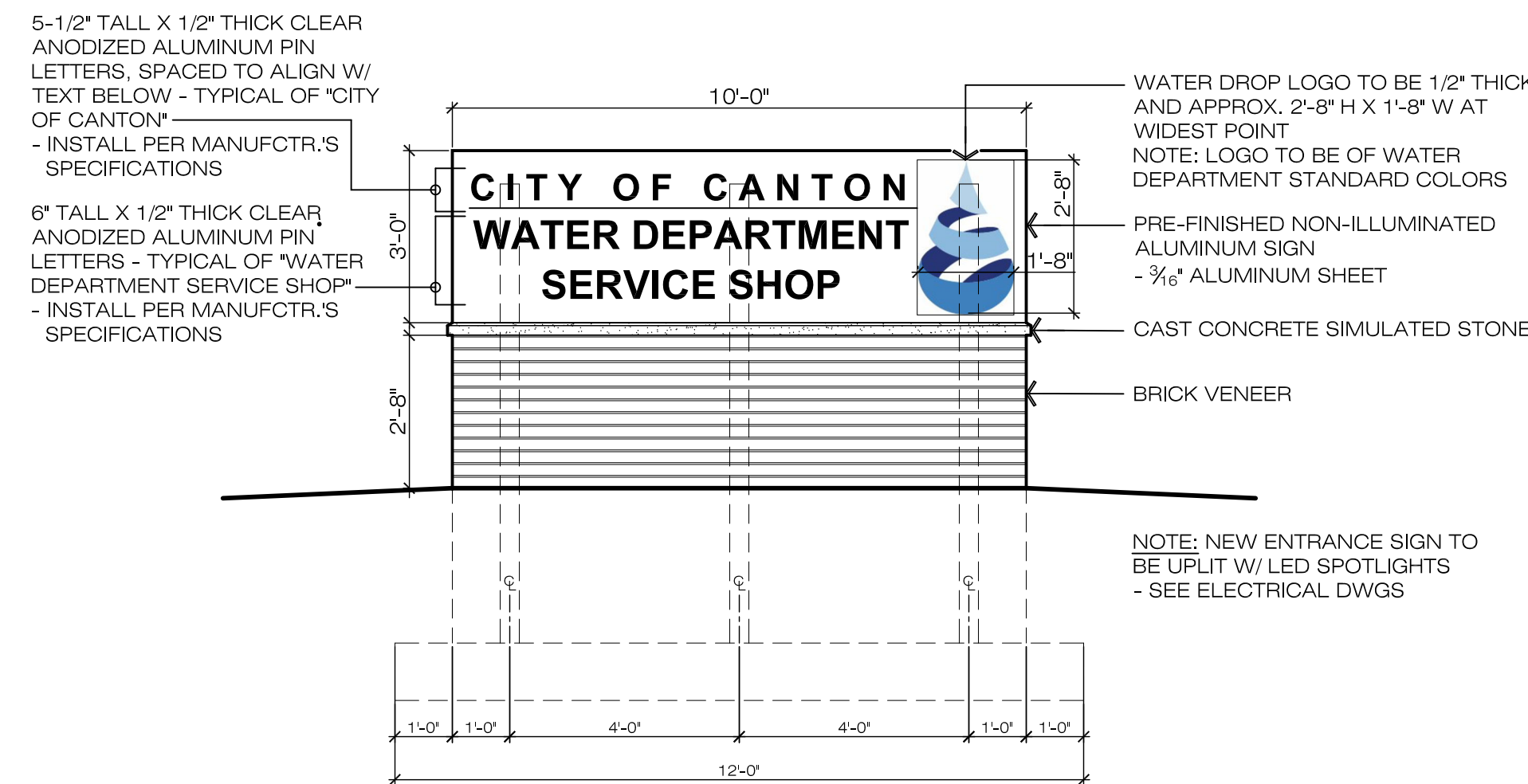
**ENTRANCE SIGN
WEST ELEVATION**

SCALE: 3/8" = 1'-0"



**ENTRANCE SIGN
SECTION DETAIL**

SCALE: 1" = 1'-0"



**ENTRANCE SIGN
NORTH ELEVATION**

SCALE: 3/8" = 1'-0"

REVISIONS:

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
CANTON, OHIO
2664 HARRISBURG RD. NE



DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
SITE SIGNAGE

COMM 21161-B
DATE 02-01-2024

DWG
A-1.2

REVISIONS:

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO



DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
CONSTRUCTION
PHASING PLANS

COMM 21161-B
DATE 02-01-2024

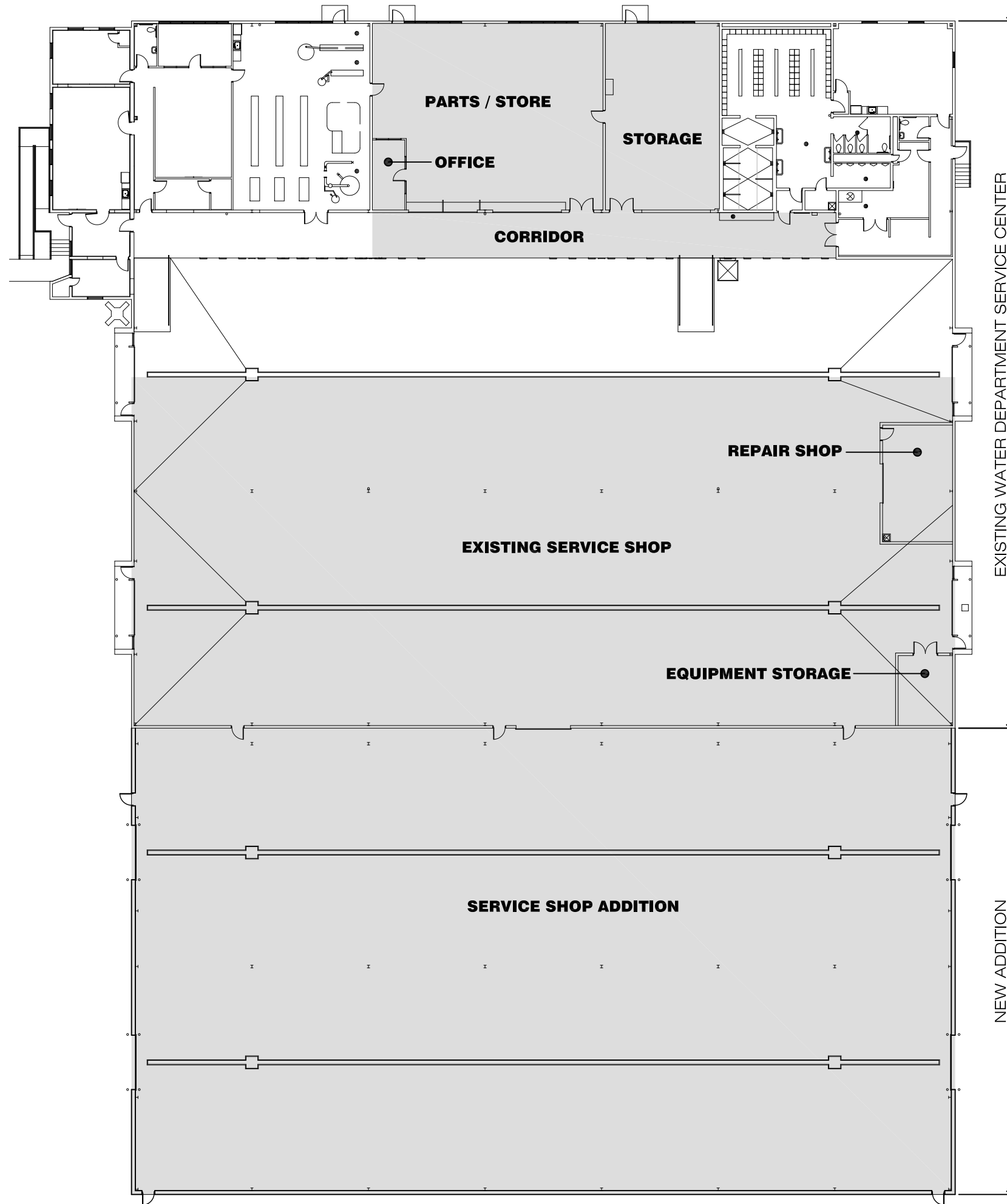
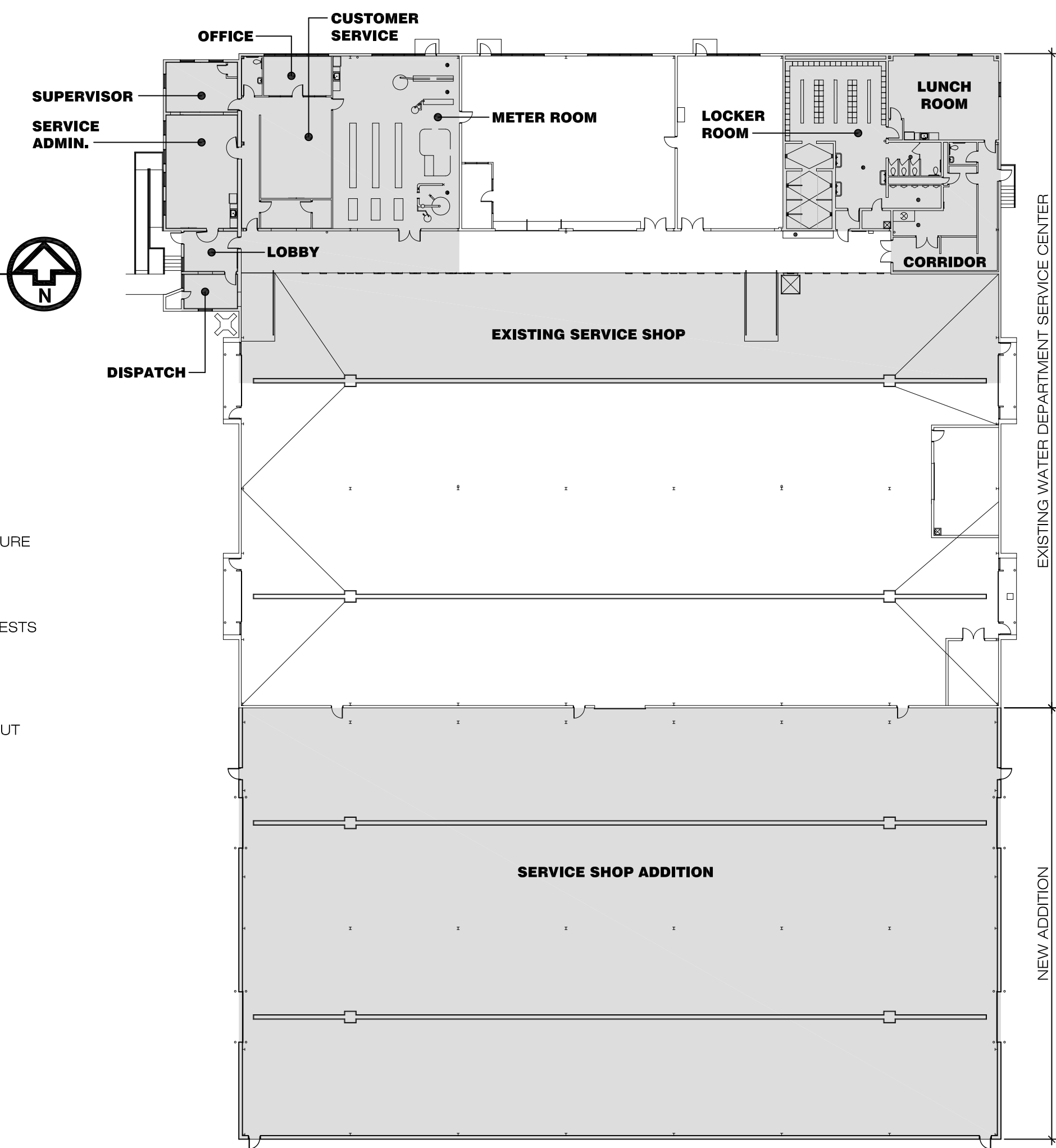
DWG
CP-1.1

PHASE 1 CONSTRUCTION

SCALE: 1" = 30'-0"

DURATION:
PHASE 1: (6) MONTHS
TOTAL / NEW ADDITION: 20 MONTHS

- BEGIN NEW 25,440 S.F. ADDITION
- ADMINISTRATION DEMOLITION & REMODEL
 - NEW PAINT & FINISHES THROUGHOUT
 - NEW ACOUST. CEILING THROUGHOUT
 - UPGRADE LIGHTING
- METER ROOM
 - NEW KITCHENETTE
 - NEW WALL / DOOR TO ADMINISTRATION
 - RE-ORGANIZE / CONDENSE EXISTING EQUIPMENT & FURNITURE
 - INFILL EXISTING O.H. DOOR
 - CLEAN & PAINT THROUGHOUT
- RENOVATIONS TO EMPLOYEE LOCKER ROOM, LUNCH ROOM, STORAGE
 - UPGRADE SHOWERS, LAVATORY FIXTURES & WATER CLOSETS
 - NEW LUNCH ROOM KITCHENETTE
 - CLEAN & PAINT THROUGHOUT
 - UPGRADE FLOORING
 - UPGRADE LIGHTING
- RENOVATIONS TO EXISTING SERVICE SHOP (SHADED PORTION)
 - CLEAN & REPAIR DAMAGED CONCRETE FLOOR THROUGHOUT
 - UPGRADE TRENCH DRAIN GRATING
 - CLEAN & PAINT THROUGHOUT
 - UPGRADE LIGHTING



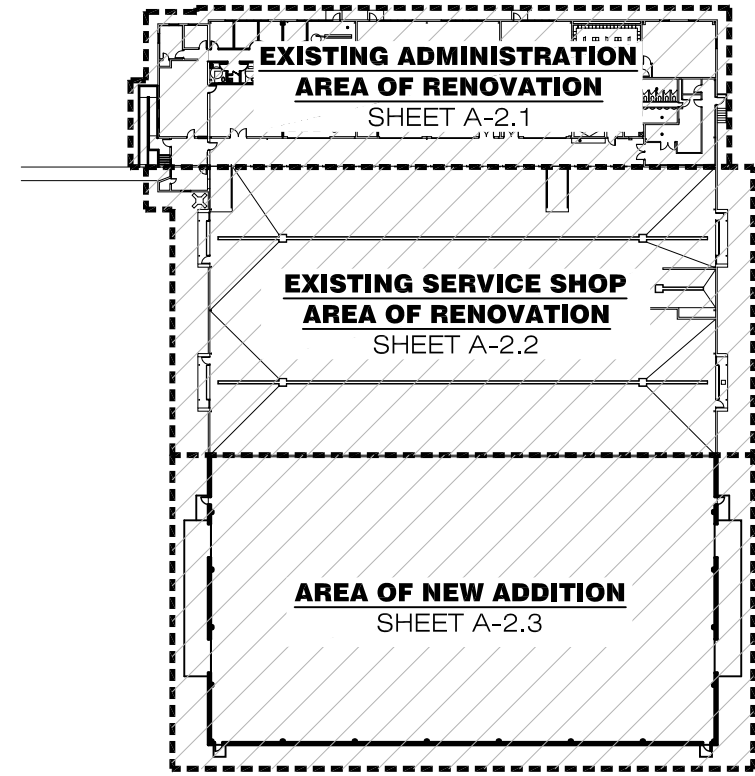
PHASE 2 CONSTRUCTION

SCALE: 1" = 30'-0"

DURATION:
PHASE 2: (6) MONTHS
TOTAL / NEW ADDITION: 20 MONTHS

- RENOVATIONS TO STORAGE ROOM & PARTS STORE
 - INFILL EXISTING O.H. DOOR, REPLACE (2) EXISTING MANUAL O.H. DOORS
 - CLEAN & PAINT THROUGHOUT
- NEW PARTS STORE OFFICE
- RENOVATIONS TO MAIN CORRIDOR C102
 - CLEAN & PAINT THROUGHOUT
 - UPGRADE LIGHTING
- RENOVATIONS TO EXISTING SERVICE SHOP (SHADED PORTION)
 - CLEAN & REPAIR DAMAGED CONCRETE FLOOR THROUGHOUT
 - UPGRADE TRENCH DRAIN GRATING
 - CLEAN & PAINT THROUGHOUT
 - UPGRADE LIGHTING
- NEW REPAIR SHOP AND EQUIPMENT STORAGE
- CONTINUE NEW 25,440 S.F. ADDITION

- FLOOR PLAN DEMOLITION LEGEND**
- 1 REMOVE EXISTING FLOORING AND ASSOCIATED BASE
 - 2 REMOVE EXISTING WALL
 - 3 REMOVE EXISTING DOOR AND FRAME
 - 4 REMOVE EXISTING FIXTURES
 - 5 REMOVE EXISTING INTERIOR WINDOWS
 - 6 REMOVE EXISTING CASEWORK
- SALVAGE FOR EXISTING STORAGE ROOM
- RE-CONFIGURATION. COORDINATE W/ OWNER
 - 7 REMOVE EXISTING EXTERIOR WINDOWS
- SEE WINDOW TYPE DETAILS FOR WINDOW
REPLACEMENT
 - 8 REMOVE EXISTING O.H. DOOR, TRACK AND OPERATOR
 - 9 REMOVE EXISTING CONCRETE APRON
 - 10 REMOVE AND REPLACE EXISTING STEEL ANGLE INSERT
 - 10 REMOVE EXISTING MOSAIC TILE IN SURROUNDING
AREA OF LAVATORY FIXTURE, EXACT DIMENSION OF
AREA TO BE DETERMINED WHEN FIXTURE IS REMOVED



KEY PLAN
SCALE: 1" = 80'-0"

REVISIONS:

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS
ARCHITECTS

**GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER**
2664 HARRISBURG RD. NE
CANTON, OHIO



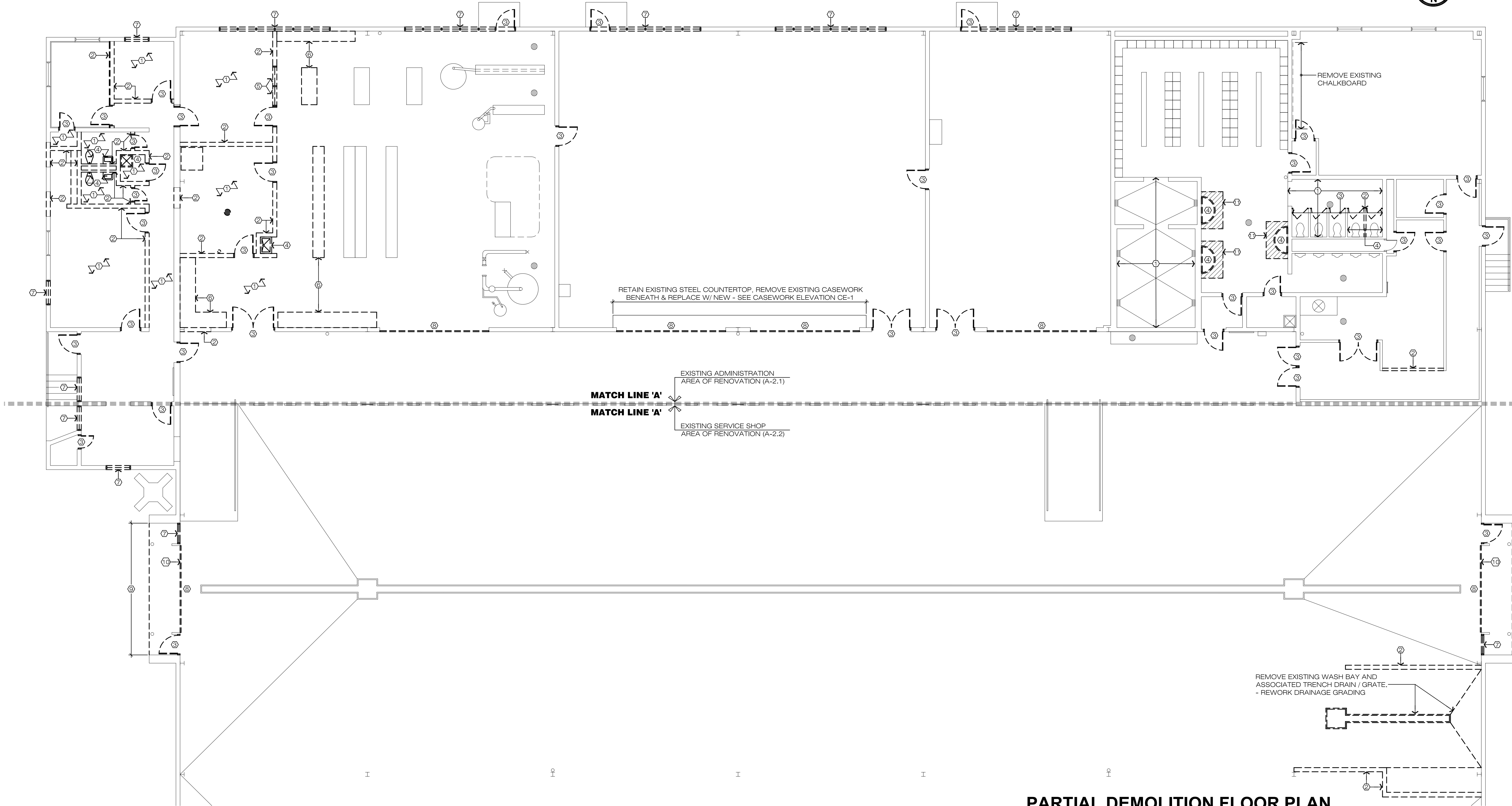
DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

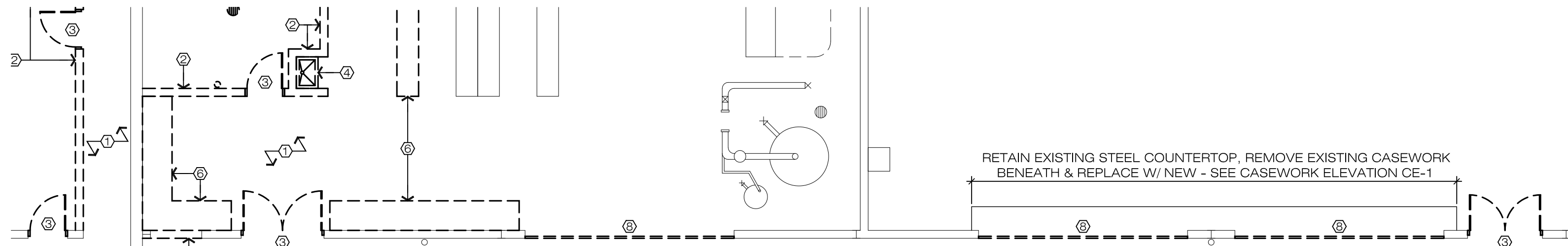
THIS DWG :
EXISTING
ADMINISTRATION -
PARTIAL DEMOLITION
FLOOR PLAN

COMM 21161-B
DATE 02-01-2024

DWG
D-1.1

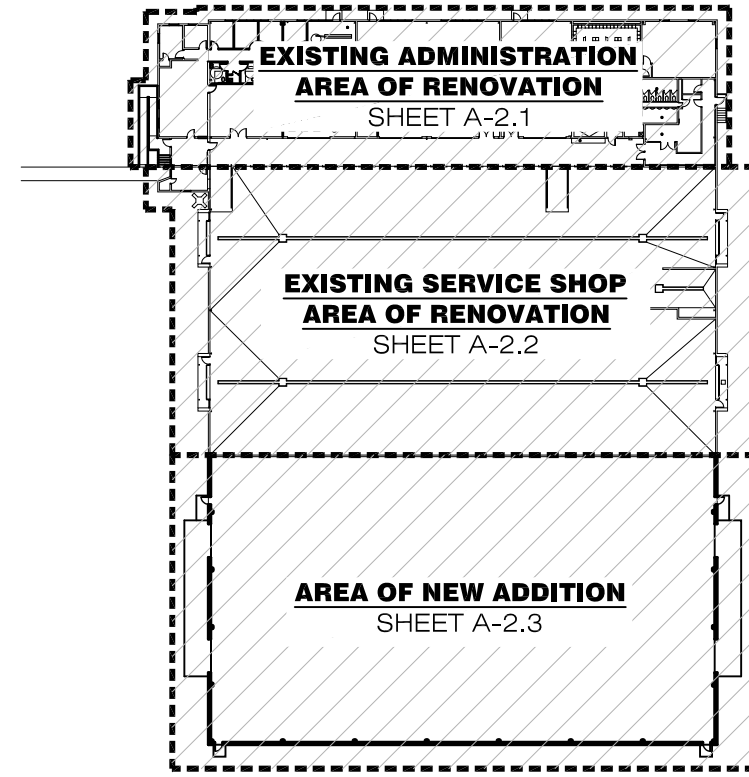
**PARTIAL DEMOLITION FLOOR PLAN
EXISTING ADMINISTRATION**
SCALE: 1/8" = 1'-0"





- FLOOR PLAN DEMOLITION LEGEND**
- 1 REMOVE EXISTING FLOORING AND ASSOCIATED BASE
 - 2 REMOVE EXISTING WALL
 - 3 REMOVE EXISTING DOOR AND FRAME
 - 4 REMOVE EXISTING FIXTURES
 - 5 REMOVE EXISTING INTERIOR WINDOWS
 - 6 REMOVE EXISTING CASEWORK
- SALVAGE FOR EXISTING STORAGE ROOM
- RE-CONFIGURATION, COORDINATE W/ OWNER
 - 7 REMOVE EXISTING EXTERIOR WINDOWS
- SEE WINDOW TYPE DETAILS FOR WINDOW REPLACEMENT
 - 8 REMOVE EXISTING O.H. DOOR, TRACK AND OPERATOR
 - 9 REMOVE EXISTING CONCRETE APRON
 - 10 REMOVE AND REPLACE EXISTING STEEL ANGLE INSERT

KEY PLAN
SCALE: 1" = 80'-0"



REVISIONS:

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
CANTON, OHIO
2664 HARRISBURG RD. NE

STATE OF OHIO
DAVID I. PATTERSON
11150
REGISTERED ARCHITECT
DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
EXISTING SERVICE
SHOP - PARTIAL
DEMOLITION FLOOR
PLAN

COMM 21161-B
DATE 02-01-2024

DWG
D-1.2

**PARTIAL DEMOLITION FLOOR PLAN
EXISTING SERVICE SHOP**

SCALE: 1/8" = 1'-0"

TYPE OF CONSTRUCTION: II-B
USE GROUP CLASSIFICATION: S-2 (STORAGE - LOW HAZARD)
B (BUSINESS) ACCESSORY
(AREA IS LESS THAN 10%)

SEE FLOOR PLAN FOR PORTABLE FIRE EXTINGUISHER LOCATIONS, PER 906.1

	ALLOWABLE	PROVIDED
HEIGHT TABLE 504.3	75'-0"	20'-8"± (MATCH EXISTING)
STORIES TABLE 504.4	4 ABOVE GRADE PLANE	1 ABOVE GRADE PLANE
AREA TABLE 506.2	104,000 S.F.	EXISTING: 40,000 S.F. NEW: 25,440 S.F. TOTAL: 65,440 S.F.

	AREA DESCRIPTION	CALCULATED	ACTUAL
BUSINESS / ADMIN. AREA 5,480 S.F.	ADMINISTRATION / SERVICE OFFICES, LOBBY, DISPATCH, LUNCH ROOM, LOCKER ROOM, & RESTROOMS	38 PERSONS	38 PERSONS
SERVICE SHOP (S) STORAGE 58,776 S.F.	PARTS STORE, METER ROOM, STORAGE, EXISTING SERVICE SHOP, SERVICE SHOP ADDITION, REPAIR SHOP, EQUIPMENT	196 PERSONS	62 PERSONS
TOTAL:		234 PERSONS	100 PERSONS

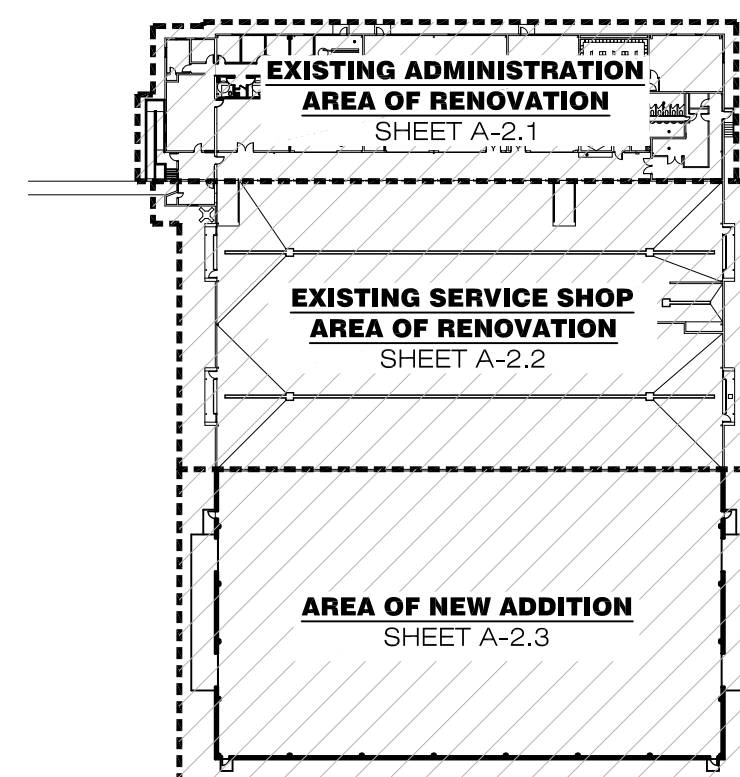
PLUMBING FIXTURES REQUIRED - TABLE 2902.1

	REQUIRED		PROVIDED
	WATER CLOSETS	LAVATORIES	
<u>MEN</u>			(4) WATER CLOSETS (5) URINALS (6) LAVATORIES (4) SHOWERS
$\frac{224}{2} = 117$ PERSONS	2	2	
<u>WOMEN</u>			(2) WATER CLOSETS (2) LAVATORIES
$\frac{224}{2} = 117$ PERSONS	2	2	
SERVICE SINK	1		(2) SERVICE SINKS
DRINKING FOUNTAIN(S)	1		BOTTLE WATER COOLER SHALL BE PROVIDED. DRINKING FOUNTAIN(S) NOT REQUIRED PER OPC 410

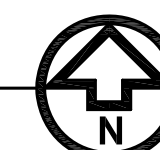
	<p>NEW 8" C.M.U. WALL CONSTRUCTION</p> <ul style="list-style-type: none"> - WHEN INDICATED TO INFILL OPENING; TOOTH-IN NEW C.M.U. TO MATCH EXISTING - FULL HEIGHT UP TO (1) COURSE ABOVE FINISH CEILING, UNLESS NOTED OTHERWISE ON FLOOR PLAN
	<p>NEW 1'-0" C.M.U. EXTERIOR WALL CONSTRUCTION</p> <ul style="list-style-type: none"> - SEE WALL SECTION(S)
	<p>NEW 8" C.M.U. WALL CONSTRUCTION W/ 5/8" TYPE 'X' GYPSUM DRYWALL FURRING ON EXPOSED SIDE, TO MATCH EXISTING - TYPICAL OF ROOM 105A - SUPERVISOR OFFICE</p> <ul style="list-style-type: none"> - FULL HEIGHT UP TO (1) COURSE ABOVE FINISH CEILING
	<p>NEW 8" C.M.U. WALL CONSTRUCTION W/ 5/8" TYPE 'X' GYPSUM DRYWALL FURRING EACH SIDE</p> <ul style="list-style-type: none"> - FULL HEIGHT UP TO (1) COURSE ABOVE FINISH CEILING

EXISTING WALL TO REMAIN

<p>[FE] NEW PORTABLE FIRE EXTINGUISHER</p>	<p>[FE] EXISTING PORTABLE FIRE EXTINGUISHER EXST.</p>
<p>[NOTE 1] NEW MOSAIC FLOOR TILE, COORDINATE DIMENSIONS OF MOSAIC FLOOR REPLACEMENT W/ ARCHITECT</p>	



SCALE: 1" = 80'-0"



REVISIONS:

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTHER & MEADOWS
A B C H I T E C T S

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO

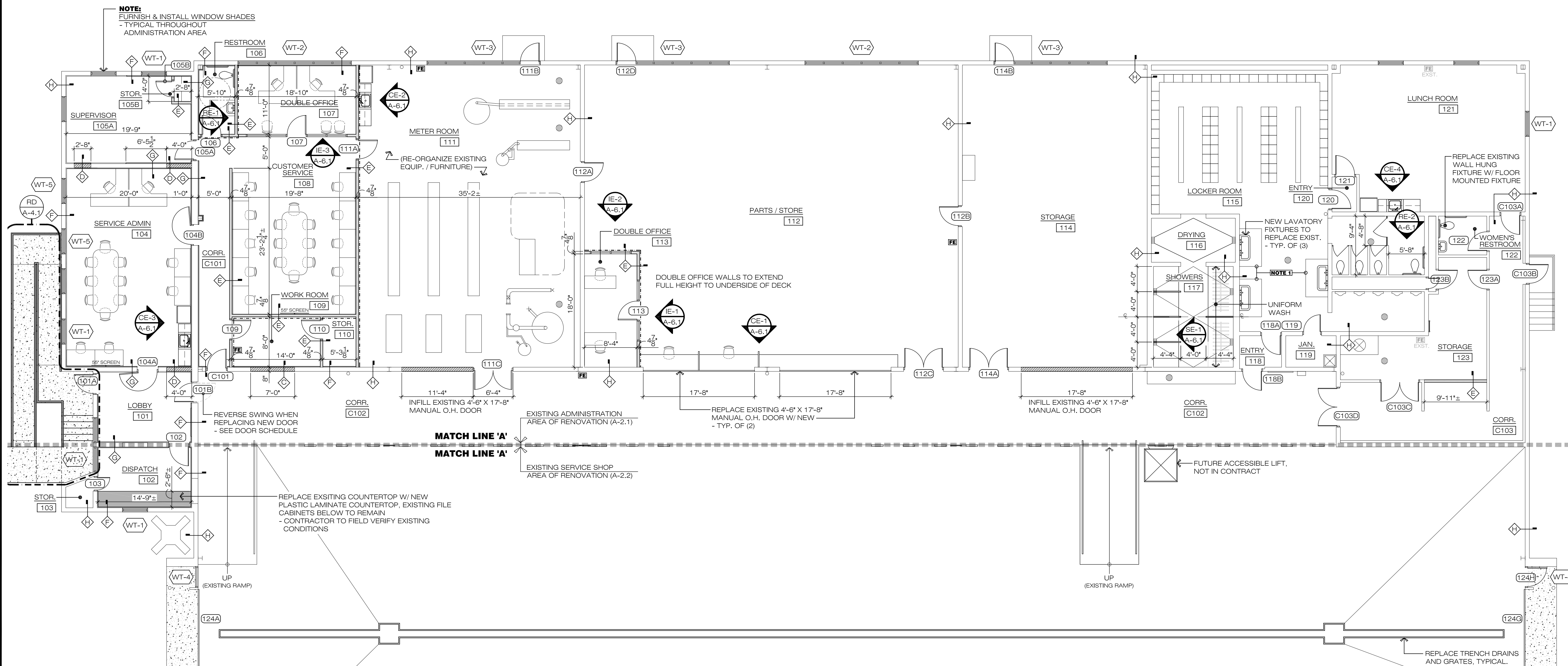


DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
PROJECT DATA;
EXISTING
ADMINISTRATION -
PARTIAL FLOOR PLAN
(AREA OF RENOVATION)

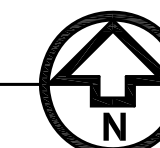
COMM 21161-B
DATE 02-01-2024

DWG
A-2.1



PARTIAL FLOOR PLAN EXISTING ADMINISTRATION

SCALE: 1/8" = 1'-0"



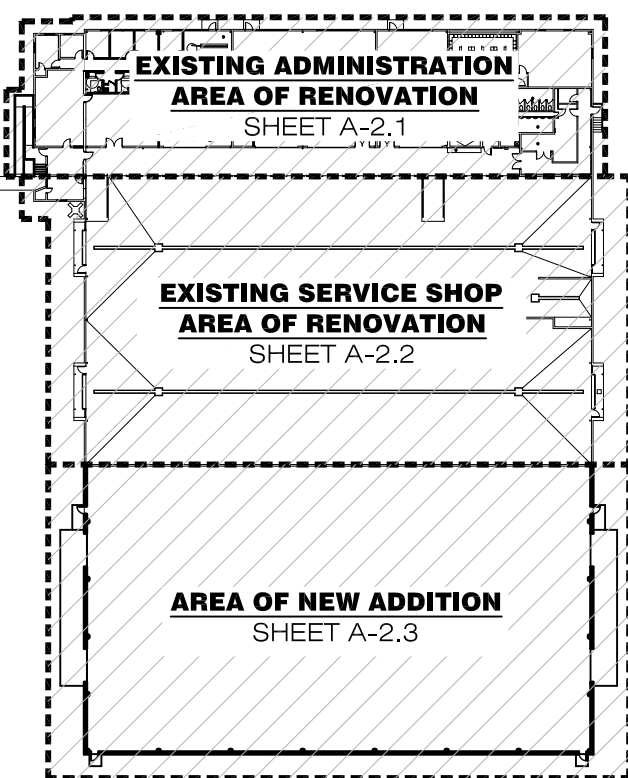
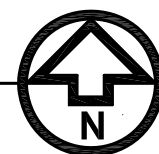


REFERENCE PHOTOS - SGFT DAMAGE

SCALE: NTS

KEY PLAN

SCALE: 1" = 80'-0"



REVISIONS:

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO



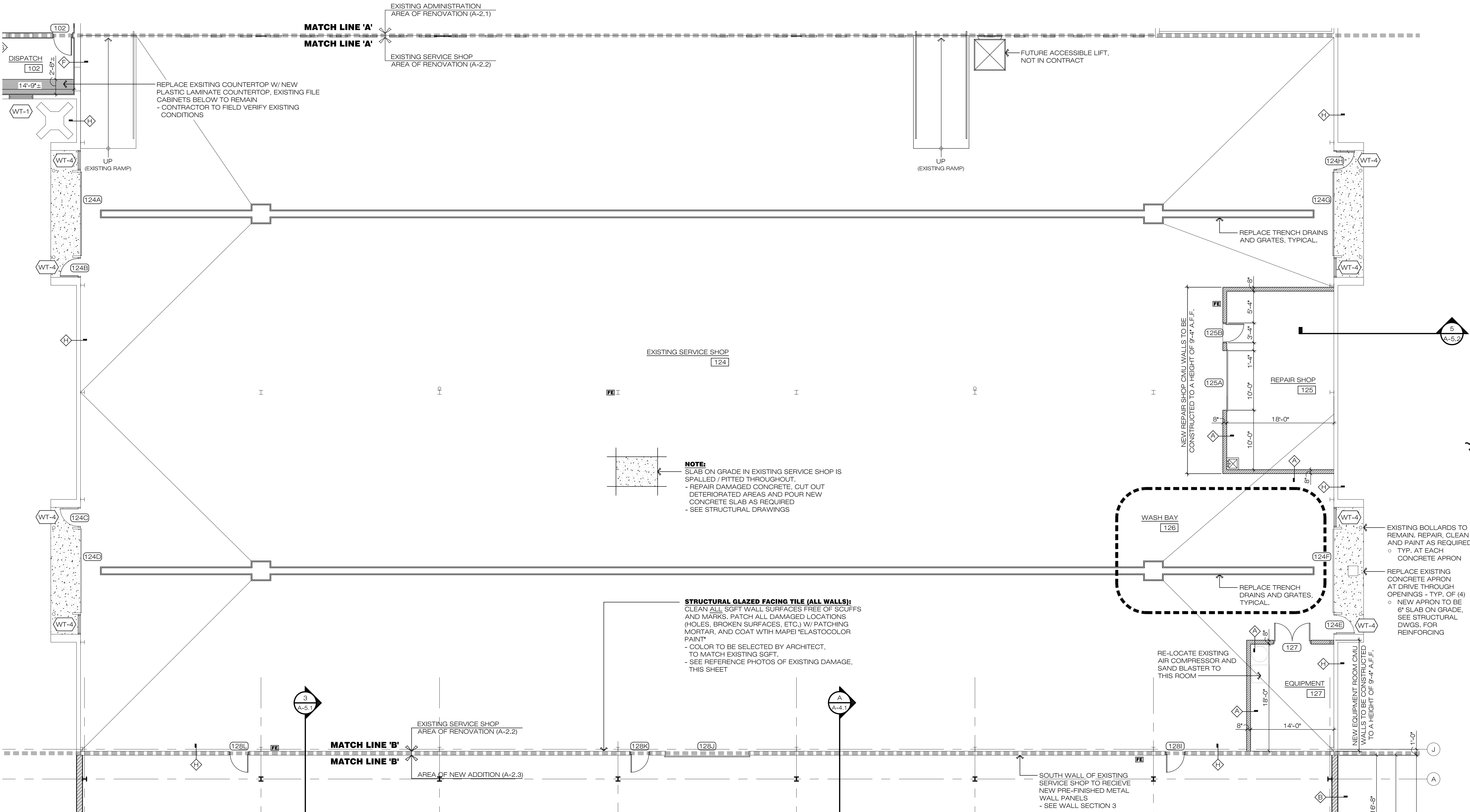
DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :

EXISTING SERVICE
SHOP - PARTIAL
FLOOR PLAN (AREA
OF RENOVATION)

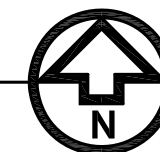
COMM 21161-B
DATE 02-01-2024

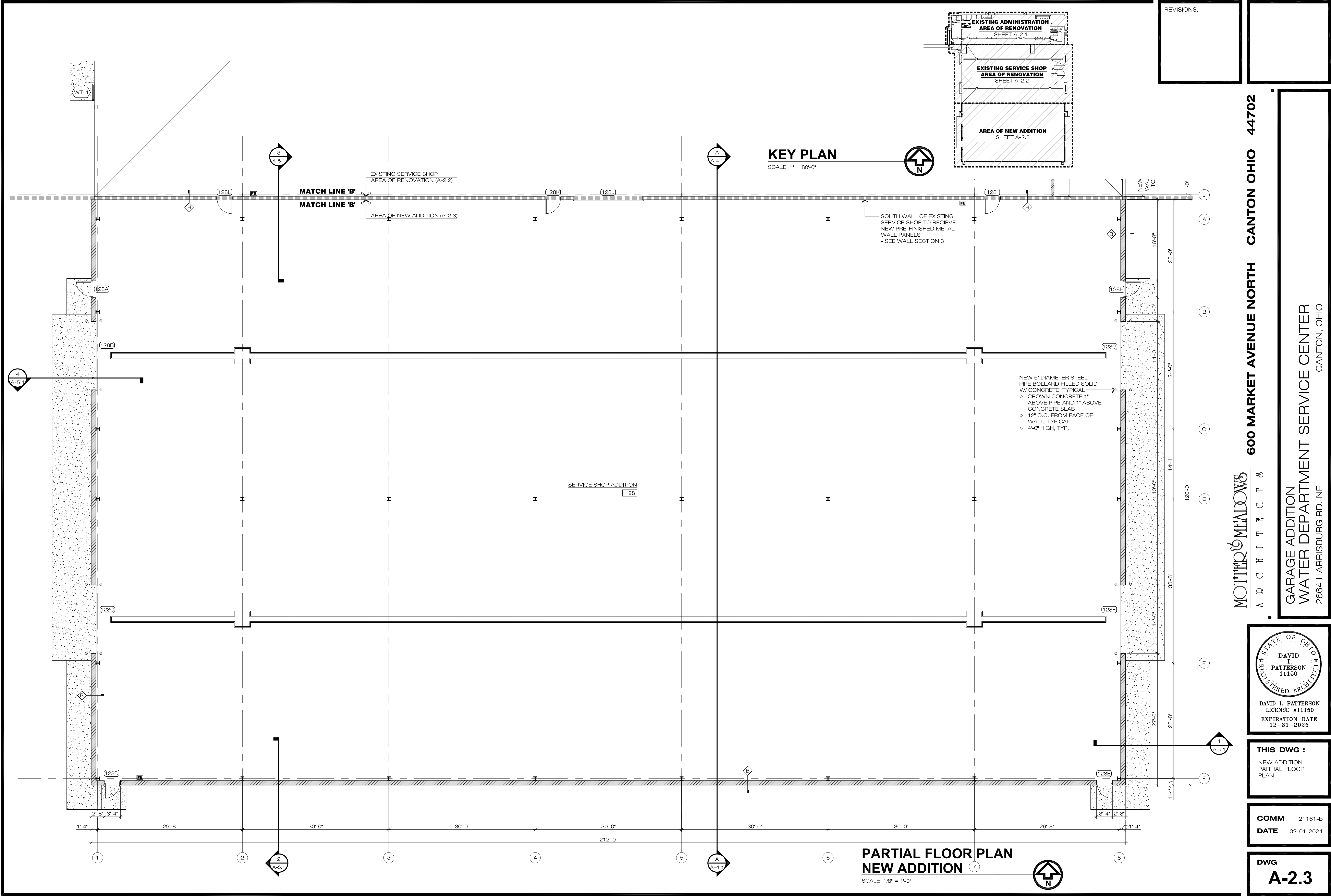
DWG
A-2.2



PARTIAL FLOOR PLAN
EXISTING SERVICE SHOP

SCALE: 1/8" = 1'-0"





REVISIONS:

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600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO

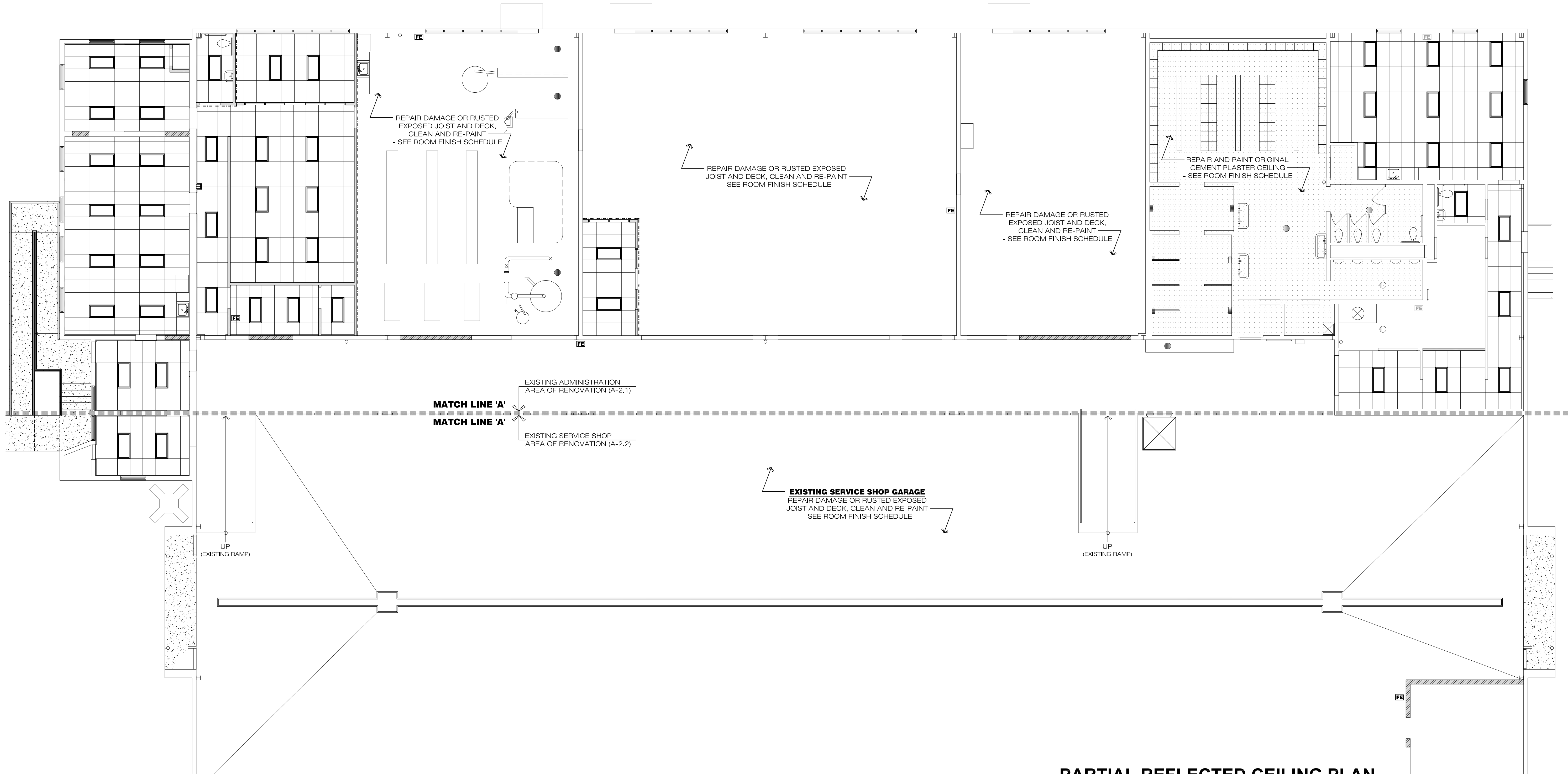
STATE OF OHIO
DAVID I. PATTERSON
11150
REGISTERED ARCHITECT

DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
NEW ADDITION -
PARTIAL FLOOR
PLAN

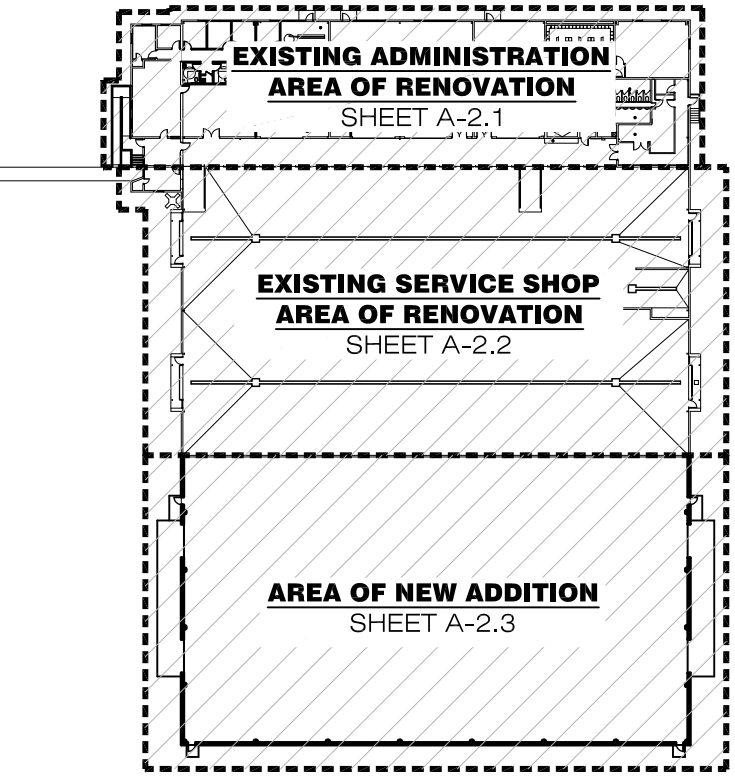
COMM 21161-B
DATE 02-01-2024

DWG
A-2.3



REFLECTED CEILING PLAN LEGEND

	2x4 SUSPENDED CEILING SYSTEM
	NEW 2X4 LAY-IN RECESSED LIGHT FIXTURE
	RECESSED LIGHT FIXTURE
	SUPPLY AIR DIFFUSER
	RETURN AIR GRILL
	EXHAUST FAN
	GYPSUM DRYWALL BULKHEAD
	SECURITY CAMERA



KEY PLAN

SCALE: 1" = 80'-0"



REVISIONS:

MOTT & MEADOWS
ARCHITECTS

600 MARKET AVENUE NORTH CANTON OHIO 44702

**GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER**
2664 HARRISBURG RD. NE
CANTON, OHIO



DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

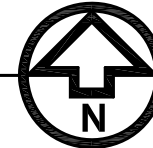
THIS DWG :
REFLECTED CEILING
PLAN
(AREA OF
RENOVATION)

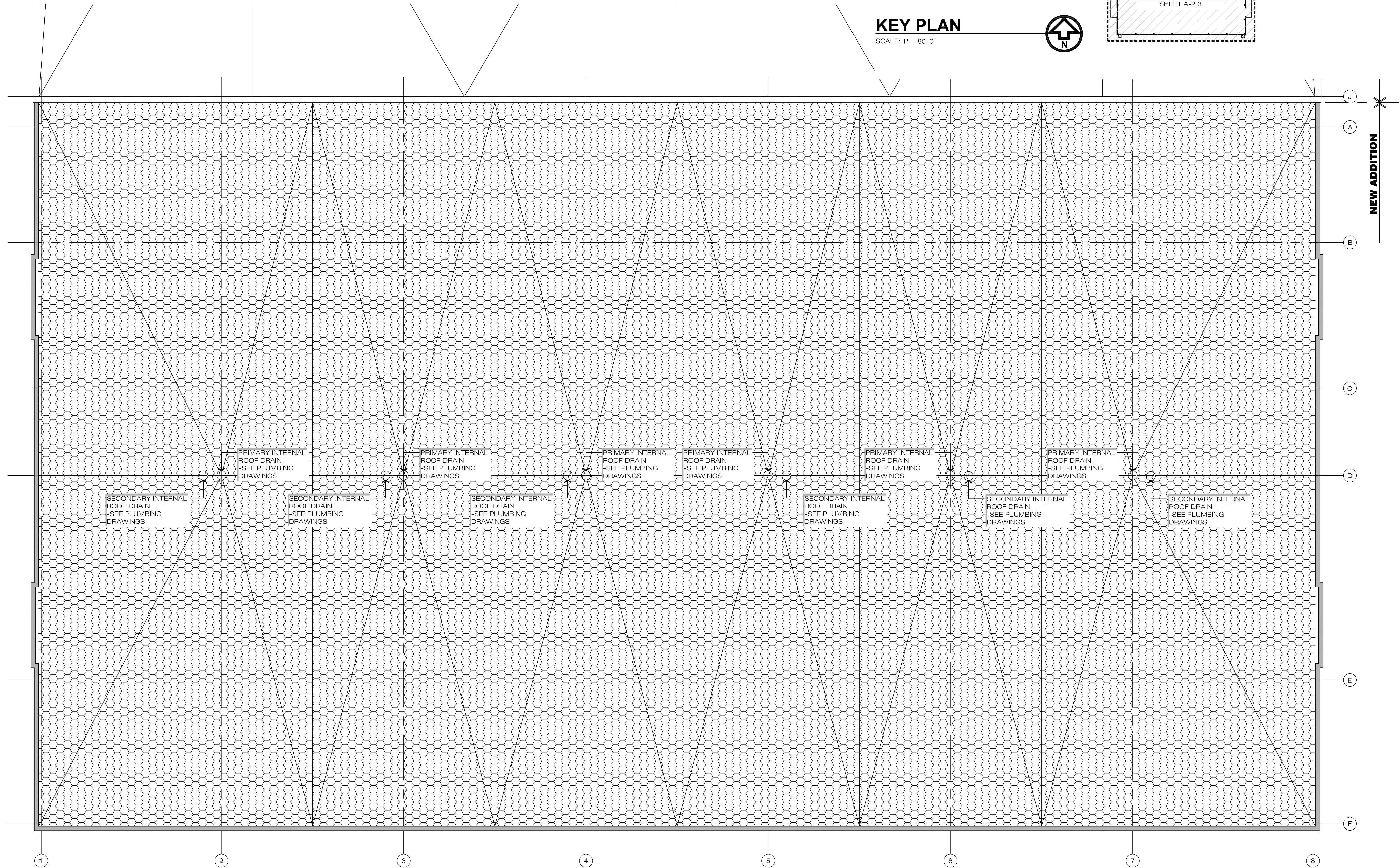
COMM 21161-B
DATE 02-01-2024

DWG
A-2.4

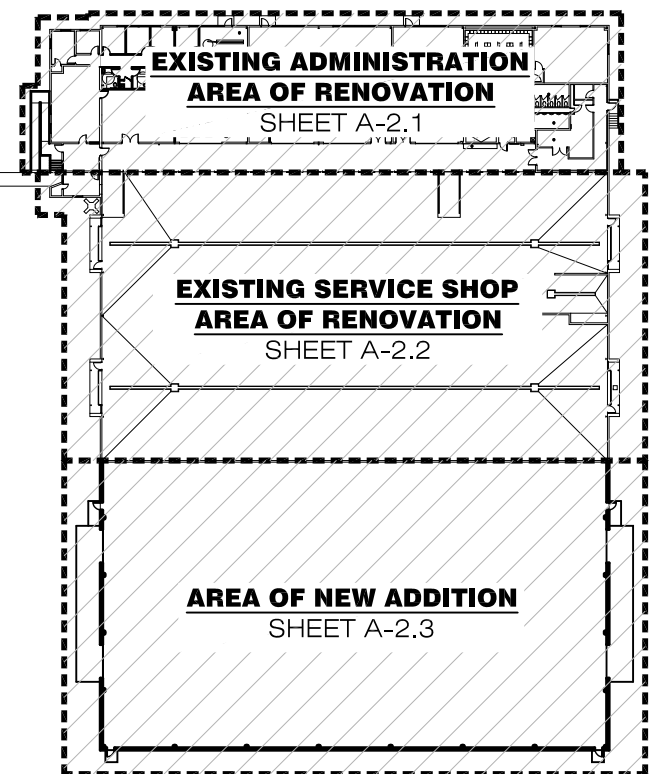
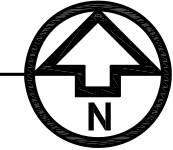
**PARTIAL REFLECTED CEILING PLAN
EXISTING ADMINISTRATION**

SCALE: 1/8" = 1'-0"





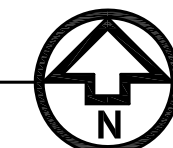
KEY PLAN
SCALE: 1" = 80'-0"



NEW ADDITION

PARTIAL ROOF PLAN
NEW ADDITION

SCALE: 1/8" = 1'-0"



REVISIONS:

MOTTER & MEADOWS
ARCHITECTS

600 MARKET AVENUE NORTH CANTON OHIO 44702

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO



DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
NEW ADDITION
ROOF PLAN

COMM 21161-B
DATE 02-01-2024

DWG
A-2.5

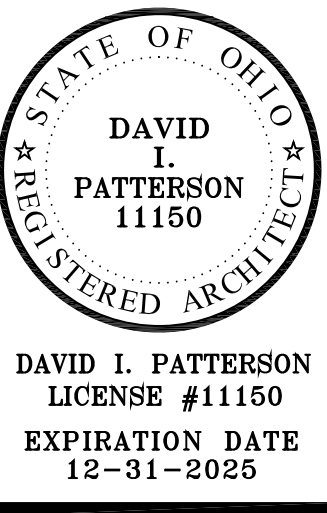
REVISIONS:

A R C H I T E C T &
 600 MAHKEI AVENUE NORTH
 CANTON OHIO 44705

GARAGE ADDITION
 WATER DEPARTMENT SERVICE CENTER
 CANTON, OHIO
 2664 HARRISBURG RD. NE

MOTTET & MEADOWS
A R C H I T E C T S &

**GARAGE ADDITION
WATER DEPARTMENT**
2664 HARRISBURG RD. NE

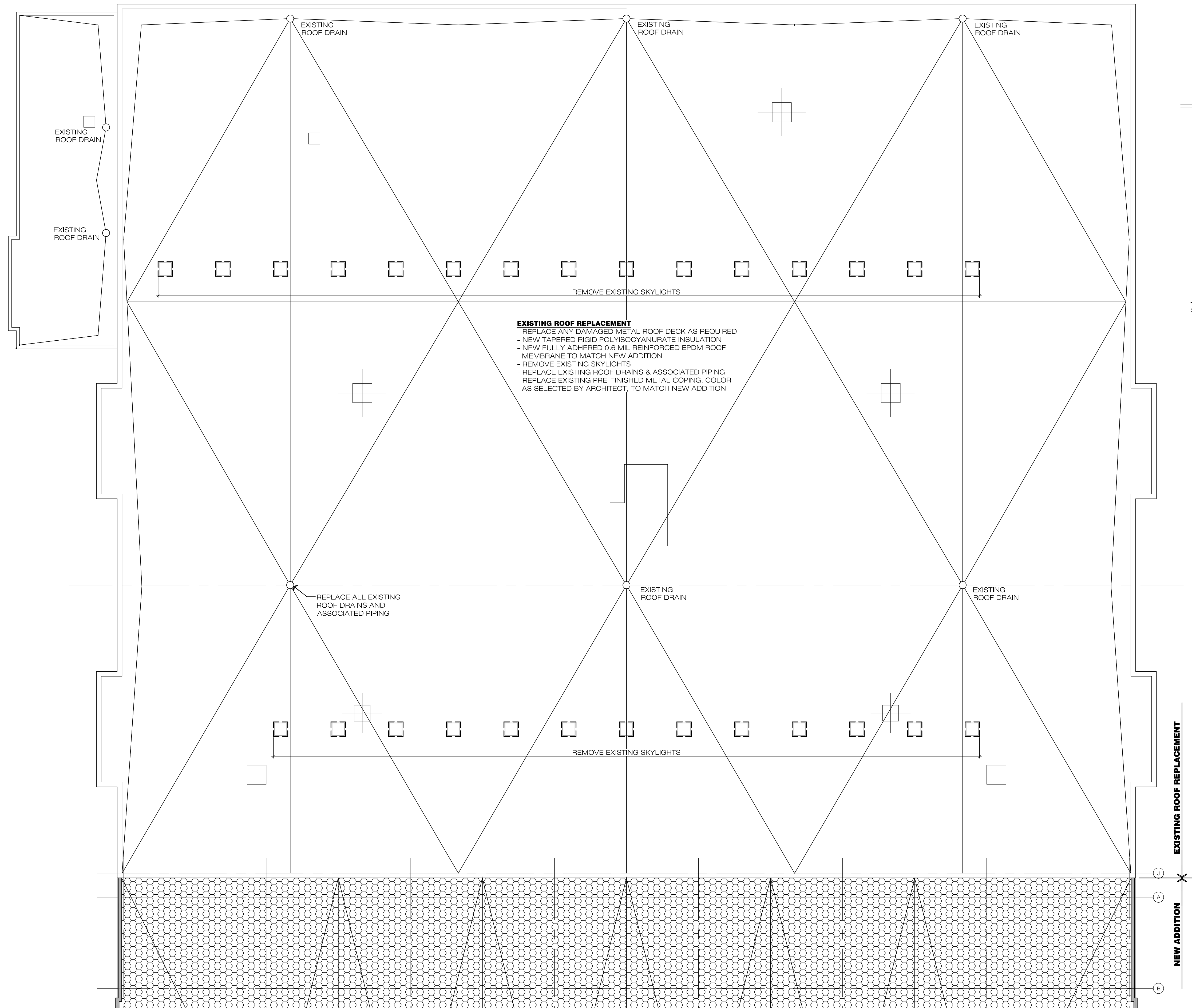


DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

HIS DWG :
EXISTING ROOF
PLAN - ROOF
REPLACEMENT

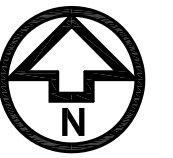
COMM 21161-B
DATE 02-01-2024

A-2.6



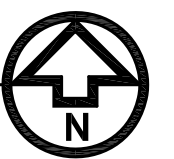
KEY PLAN

SCALE: 1" = 80'-0"



PARTIAL ROOF PLAN EXISTING ROOF REPLACEMENT

SCALE: 3/32" = 1'-0"



REVISIONS:

--

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO

STATE OF OHIO

DAVID I. PATTERSON
11150

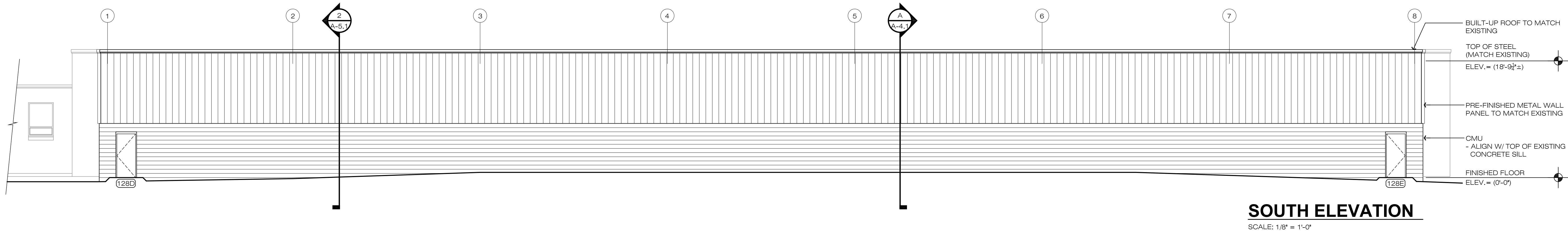
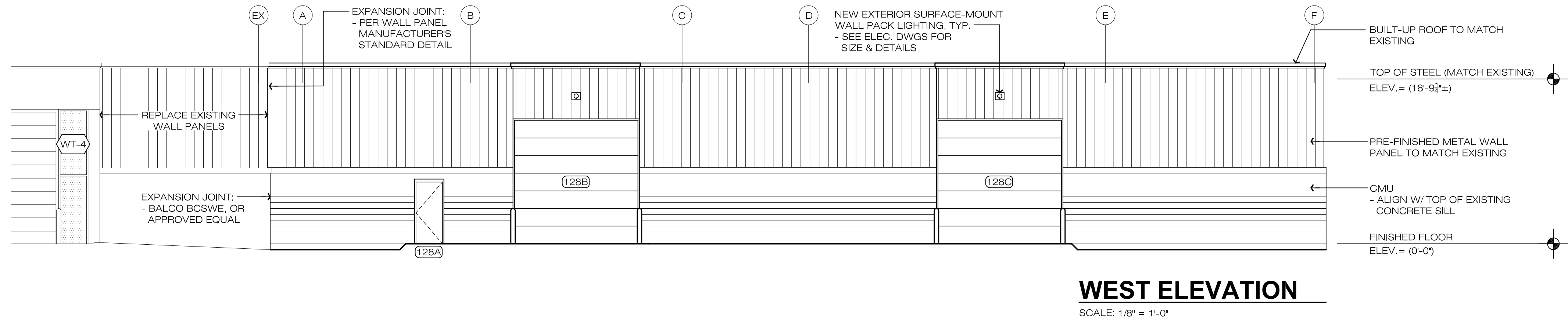
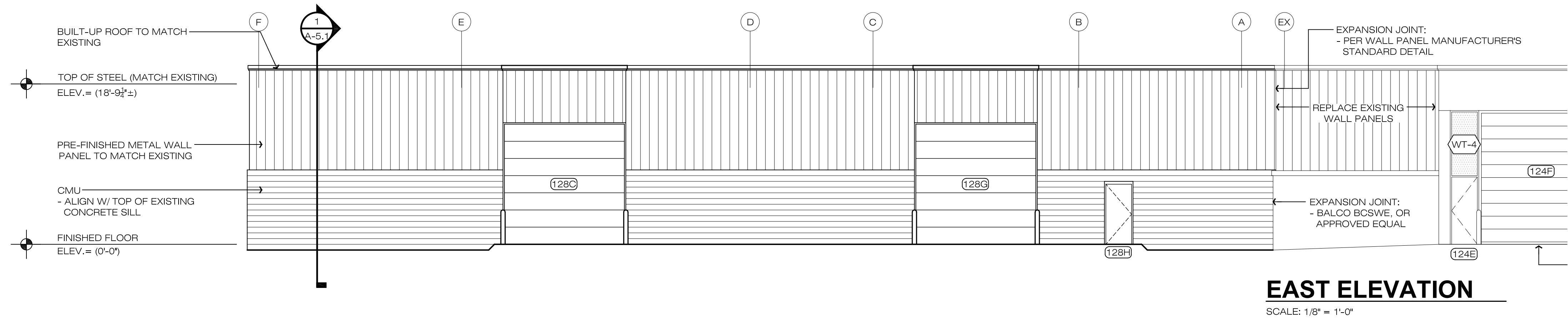
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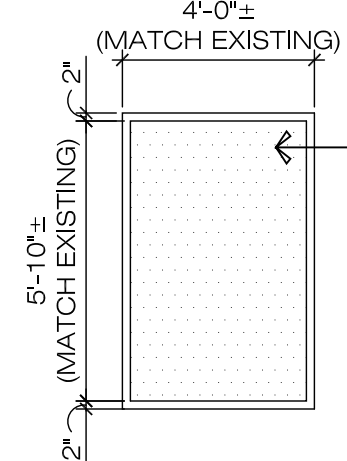
DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
NEW ADDITION
EXTERIOR
ELEVATIONS

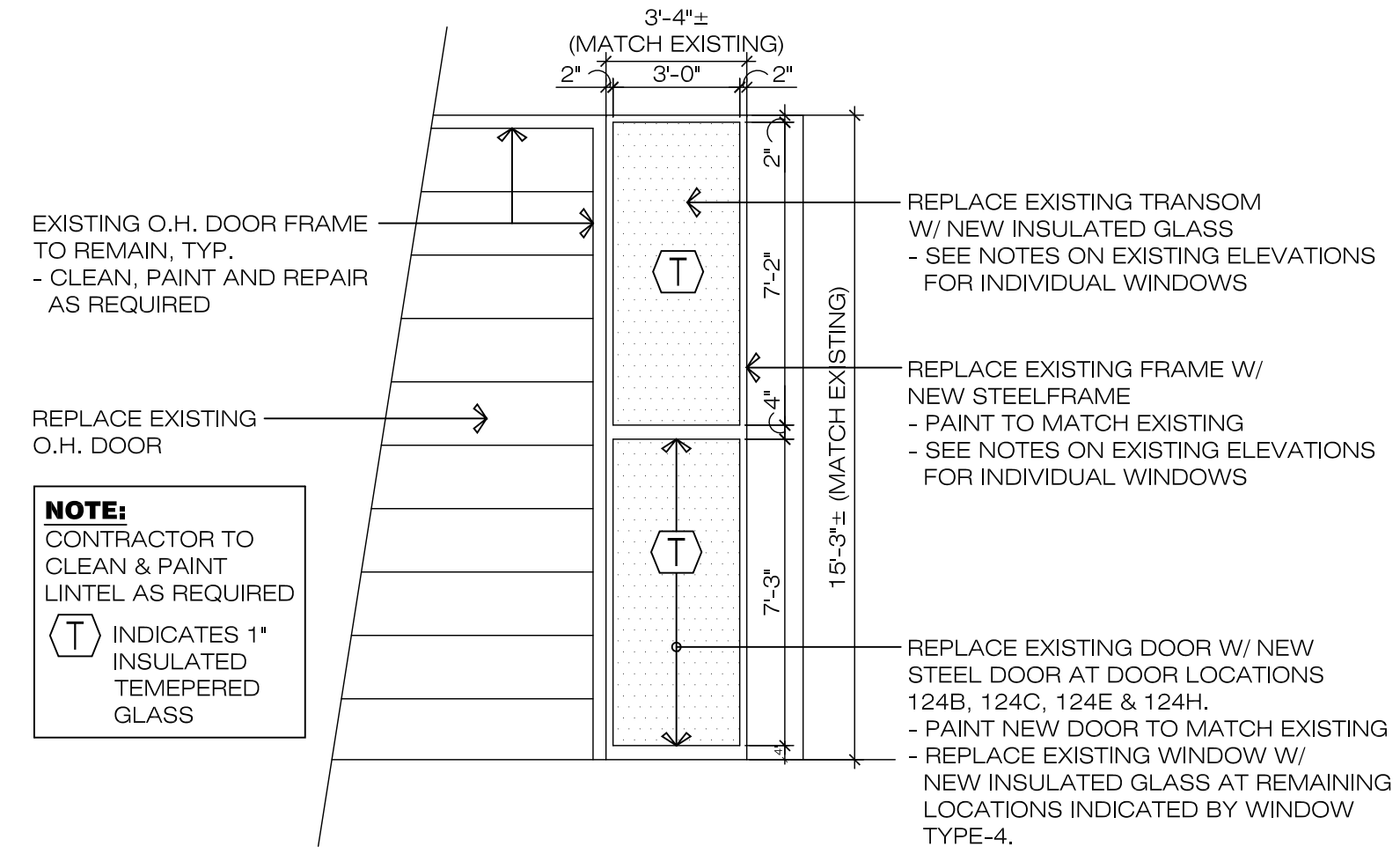
COMM 21161-B
DATE 02-01-2024

DWG
A-3.1

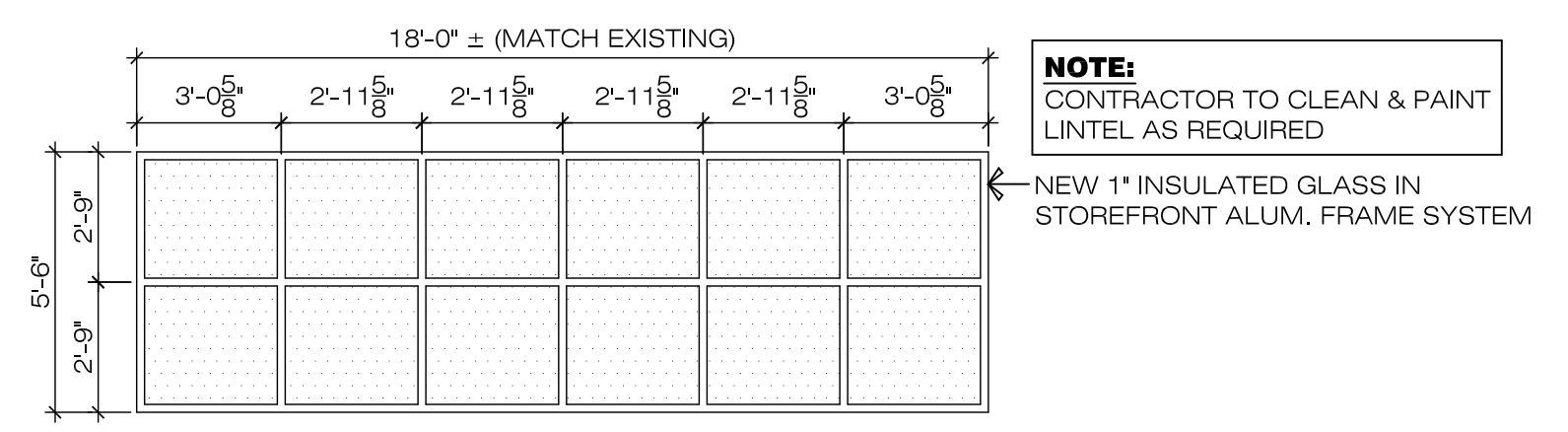




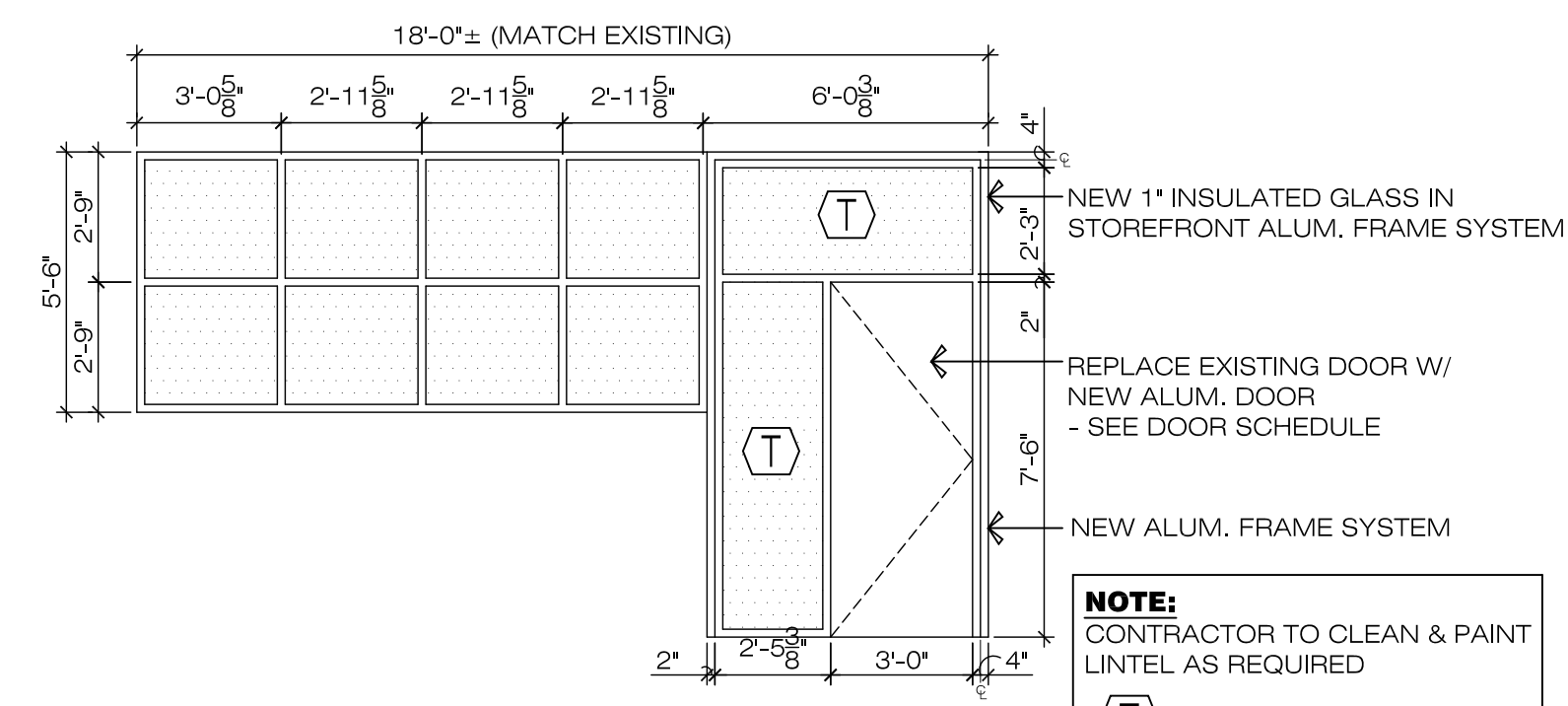
WINDOW TYPE
SCALE: 1/4" = 1'-0"
WT-5
A-3.2



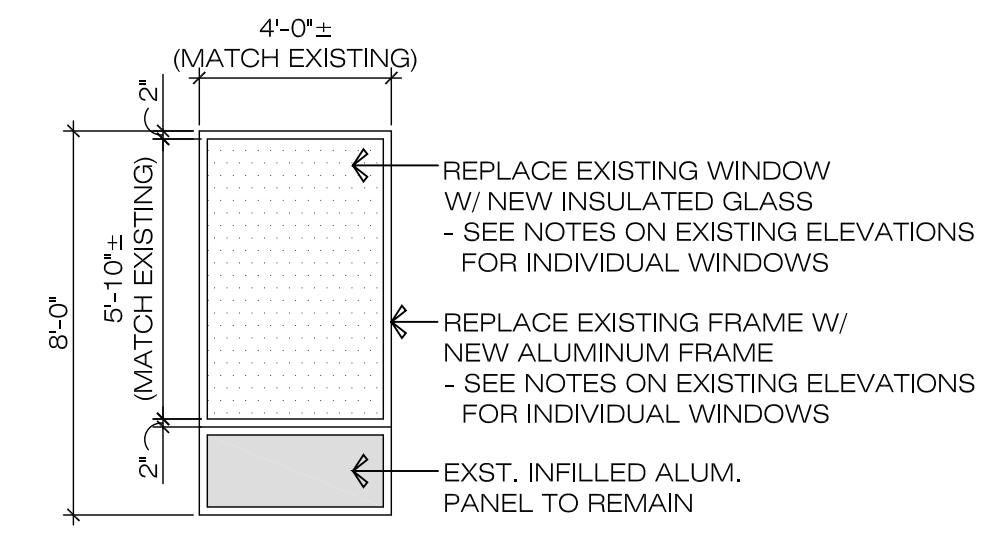
WINDOW TYPE
SCALE: 1/4" = 1'-0"
WT-4
A-3.2



WINDOW TYPE
SCALE: 1/4" = 1'-0"
WT-2
A-3.2

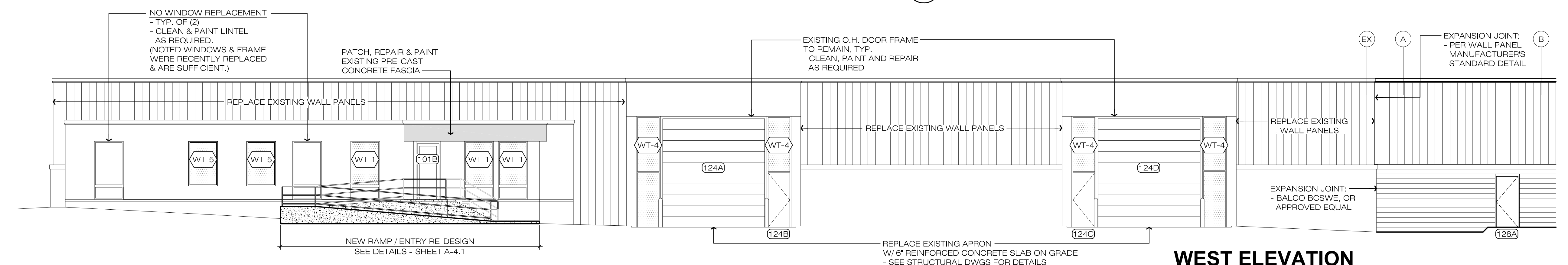


WINDOW TYPE
SCALE: 1/4" = 1'-0"
WT-3
A-3.2

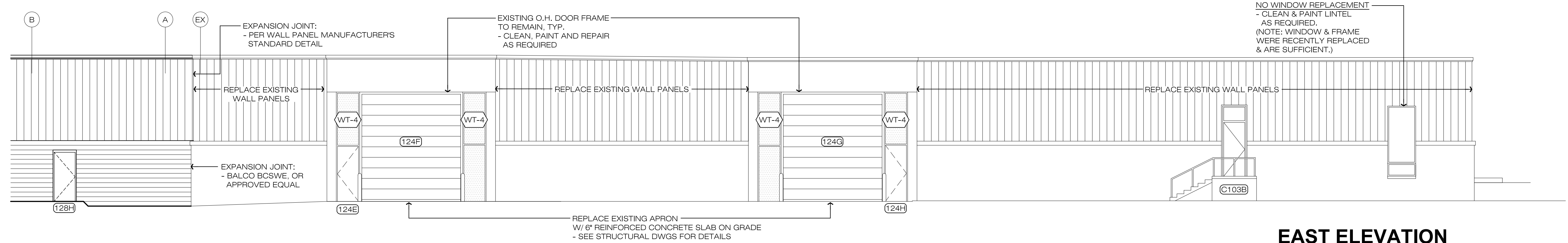


WINDOW TYPE
SCALE: 1/4" = 1'-0"
WT-1
A-3.2

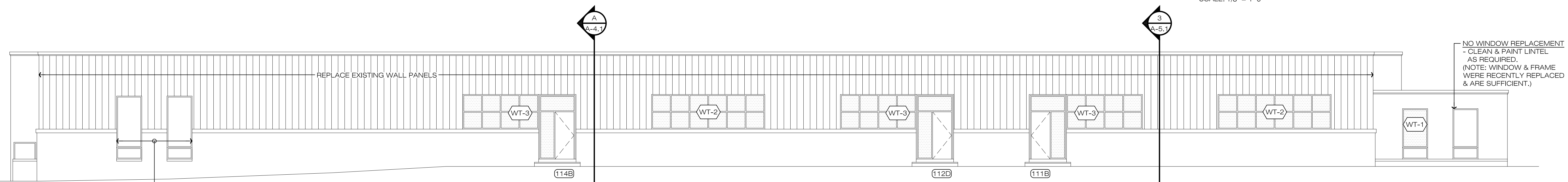
REVISIONS:



WEST ELEVATION
SCALE: 1/8" = 1'-0"



EAST ELEVATION
SCALE: 1/8" = 1'-0"



NORTH ELEVATION
SCALE: 1/8" = 1'-0"

MOTTER & MEADOWS
ARCHITECTS

600 MARKET AVENUE NORTH CANTON OHIO 44702

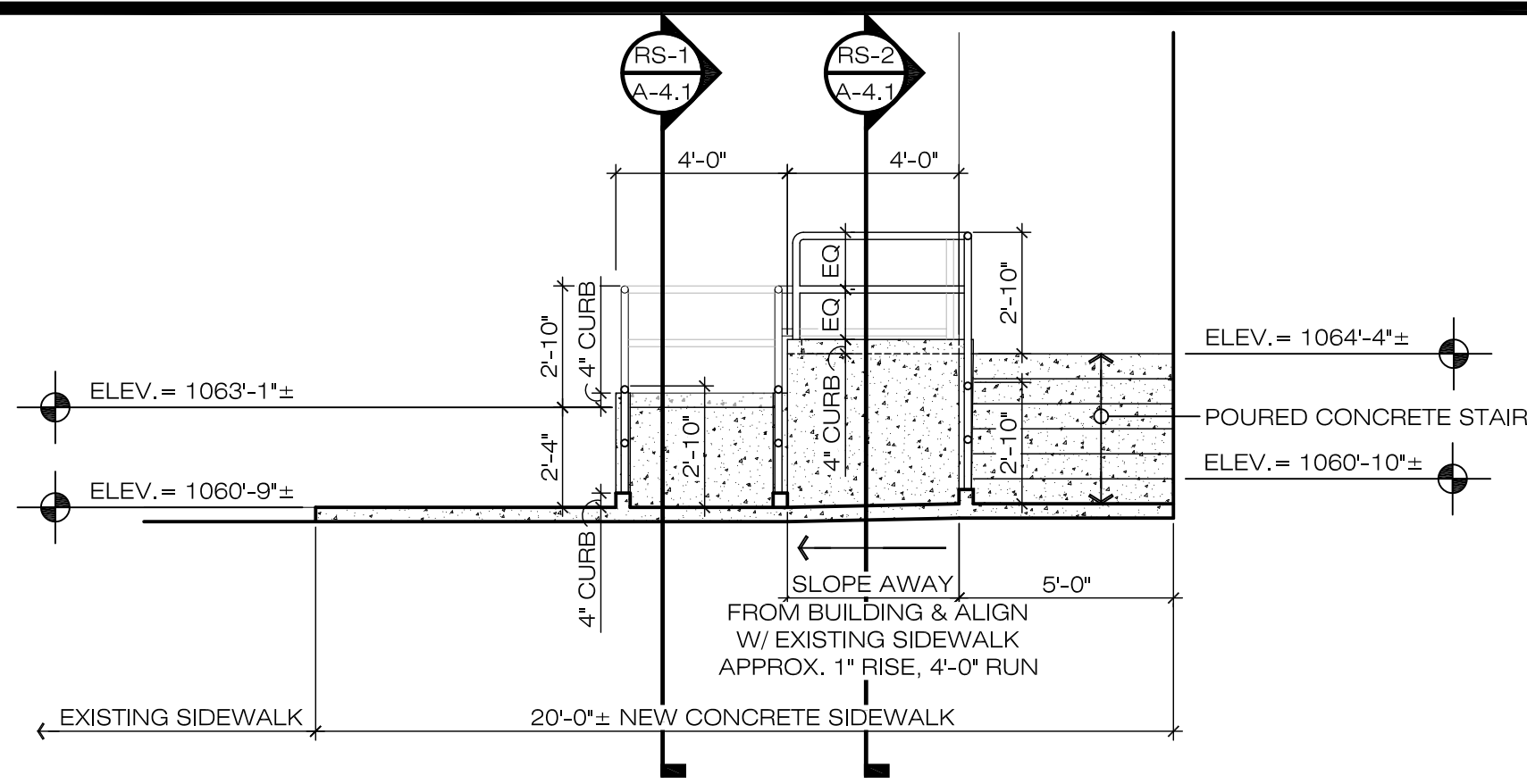
GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO

DAVID I. PATTERSON
11150
REGISTERED ARCHITECT
DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
EXISTING EXTERIOR
ELEVATIONS
WINDOW TYPES

COMM 21161-B
DATE 02-01-2024

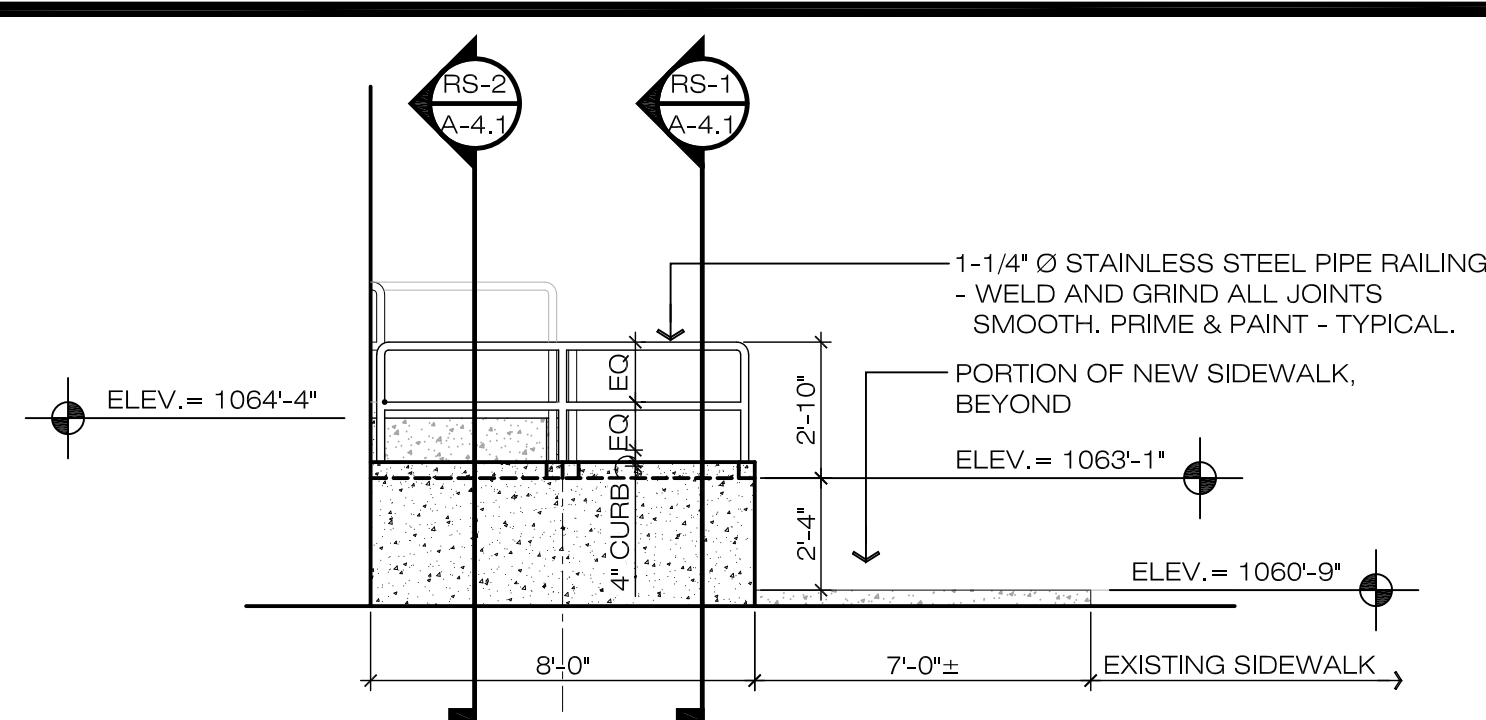
DWG
A-3.2



RAMP ELEVATION

SCALE: 1/4" = 1'-0"

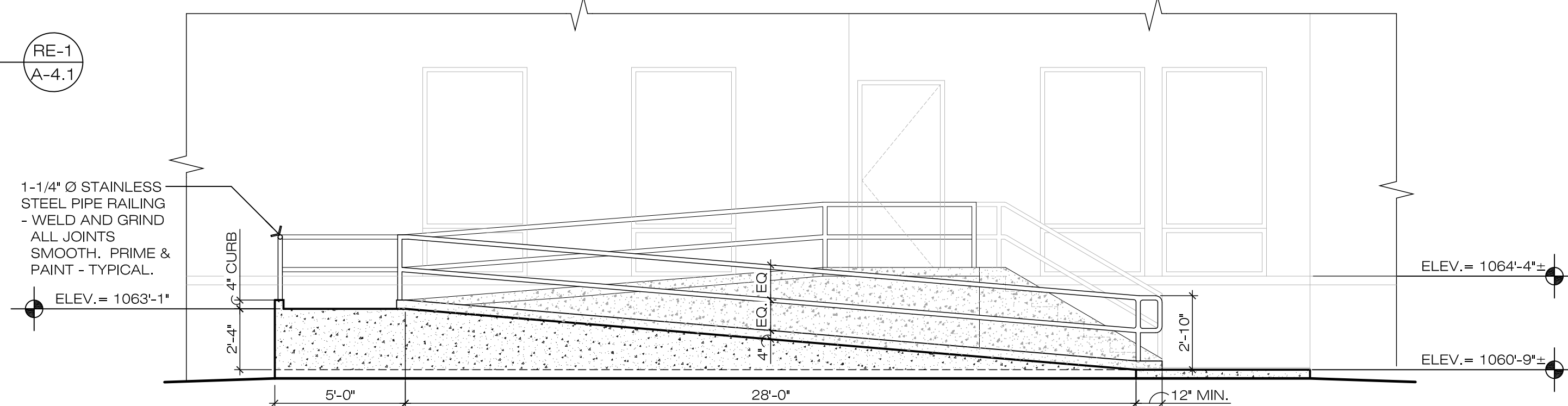
RE-1
A-4.1



RAMP ELEVATION

SCALE: 1/4" = 1'-0"

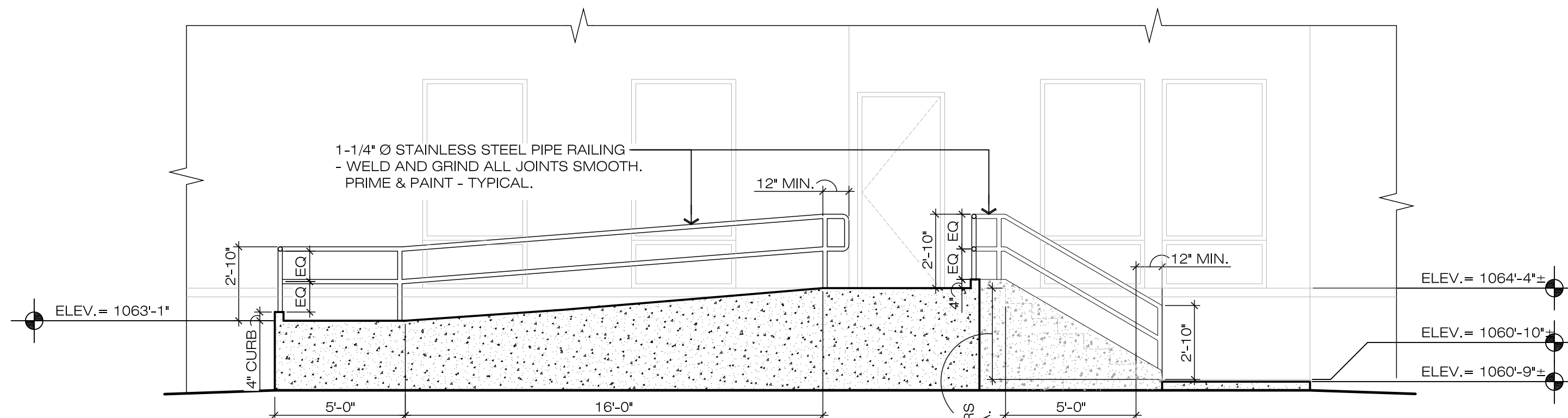
RE-2
A-4.1



RAMP SECTION

SCALE: 1/4" = 1'-0"

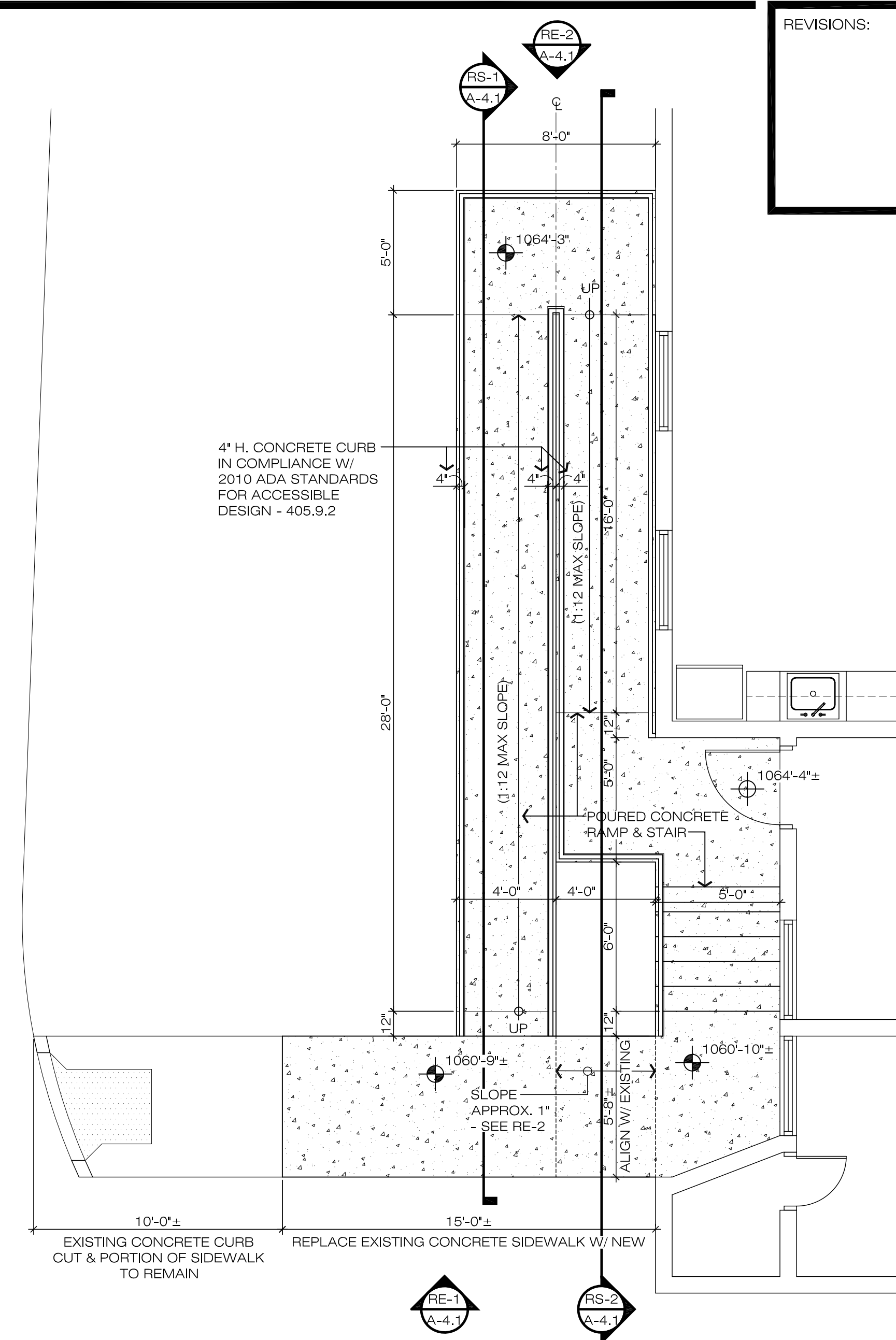
RS-1
A-4.1



RAMP SECTION

SCALE: 1/4" = 1'-0"

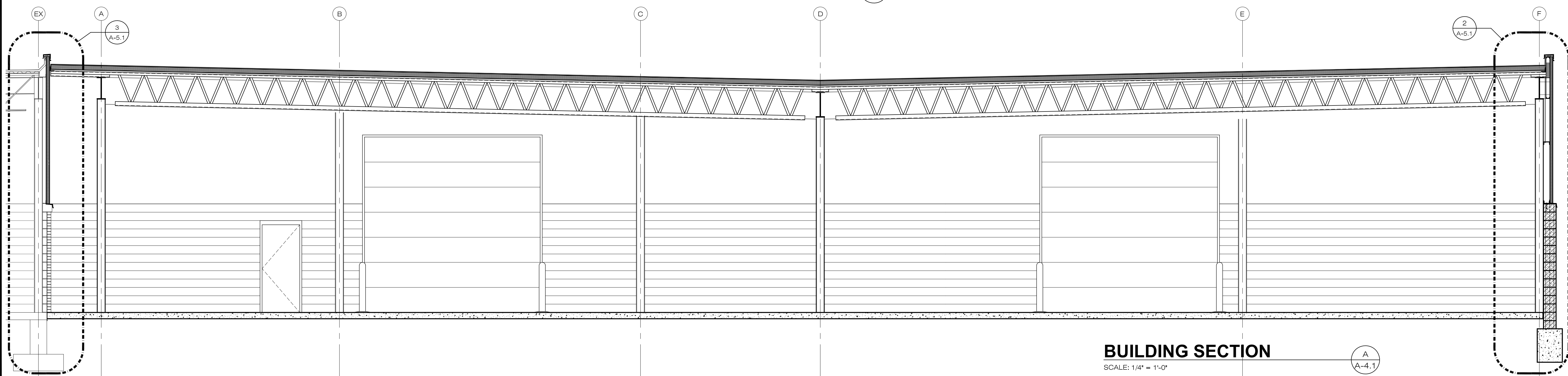
RS-2
A-4.1



RAMP DETAIL PLAN

SCALE: 1/4" = 1'-0"

RD
A-4.1



BUILDING SECTION

SCALE: 1/4" = 1'-0"

A
A-4.1

REVISIONS:

MOTTER & MEADOWS
ARCHITECTS

600 MARKET AVENUE NORTH CANTON OHIO 44702

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO



DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
BUILDING SECTION

COMM 21161-B
DATE 02-01-2024

DWG
A-4.1

REVISIONS:

CANTON OHIO 44702

600 MARKET AVENUE NORTH

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
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2664 HARRISBURG RD. NE
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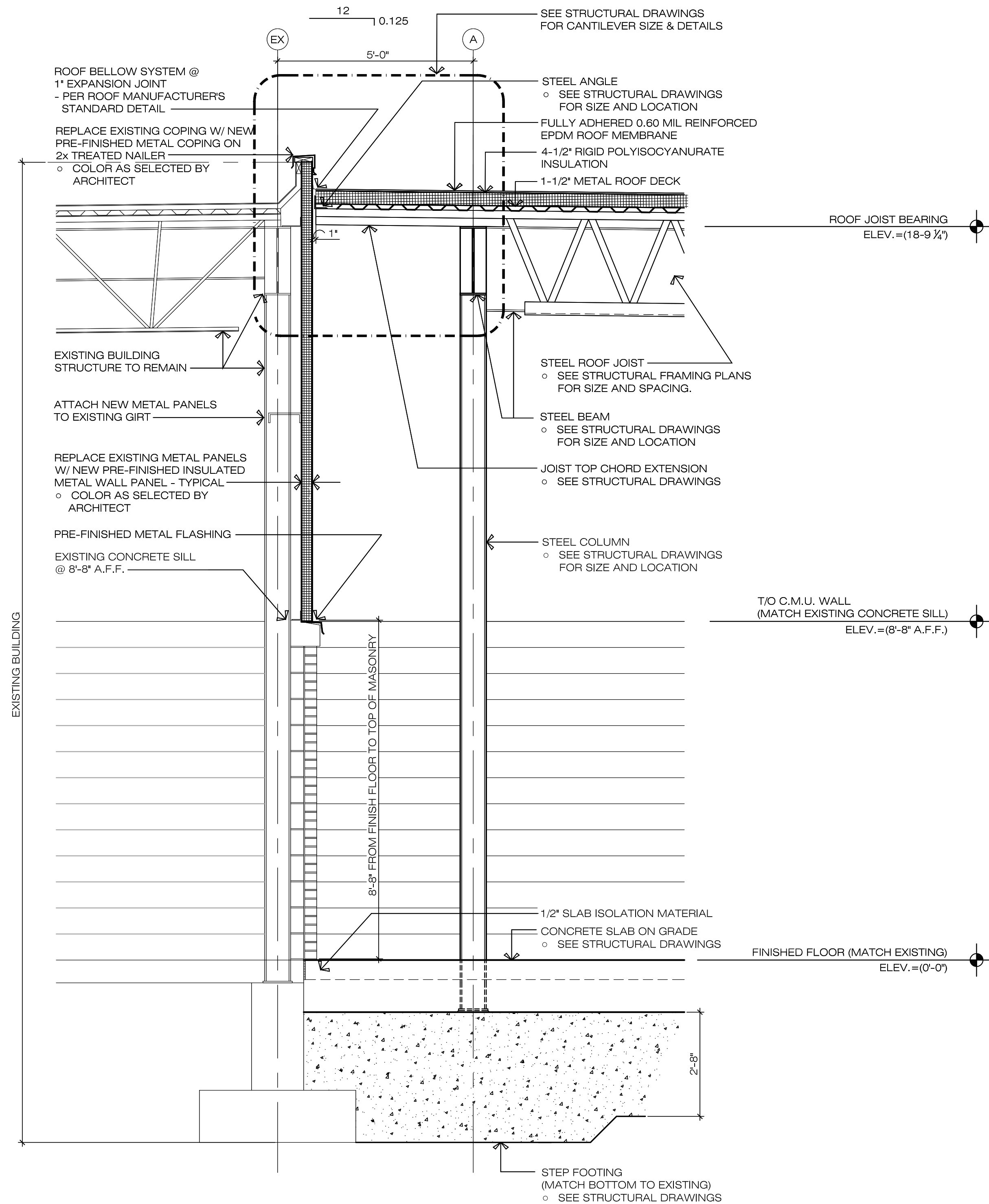


DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
WALL SECTIONS

COMM 21161-B
DATE 02-01-2024

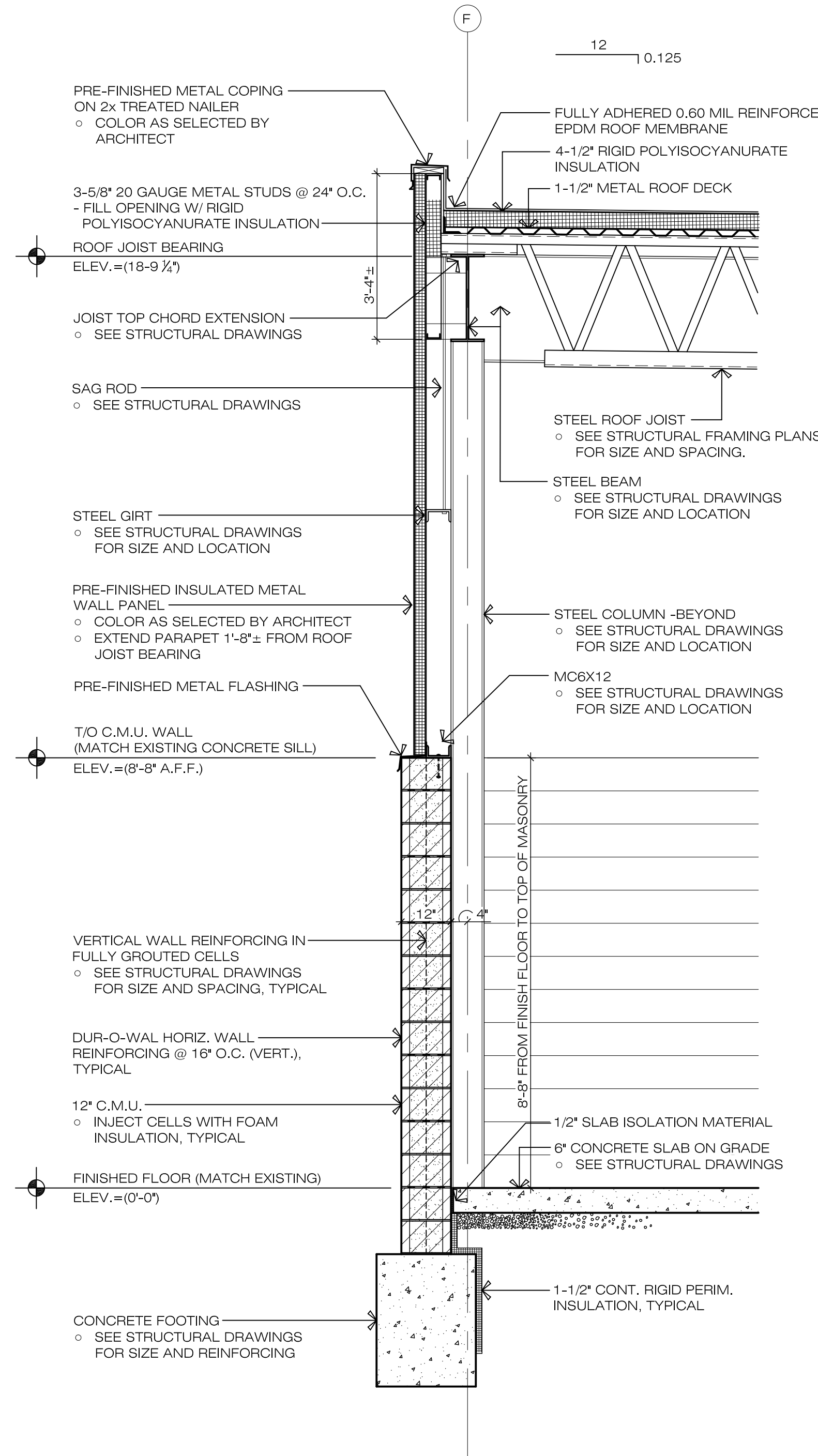
DWG
A-5.1



WALL SECTION

SCALE: 1/2" = 1'-0"

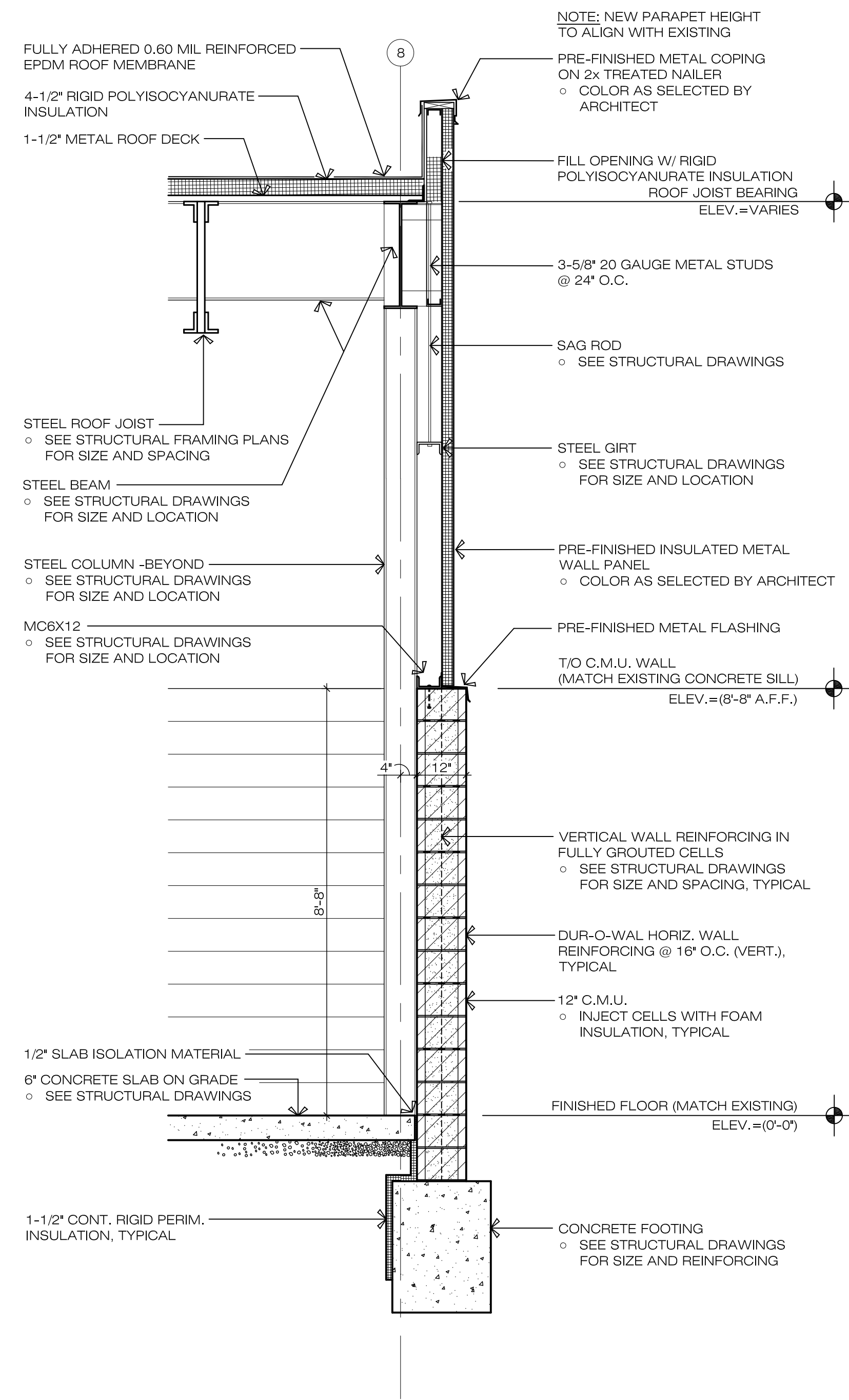
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A-5.1



WALL SECTION

SCALE: 1/2" = 1'-0"

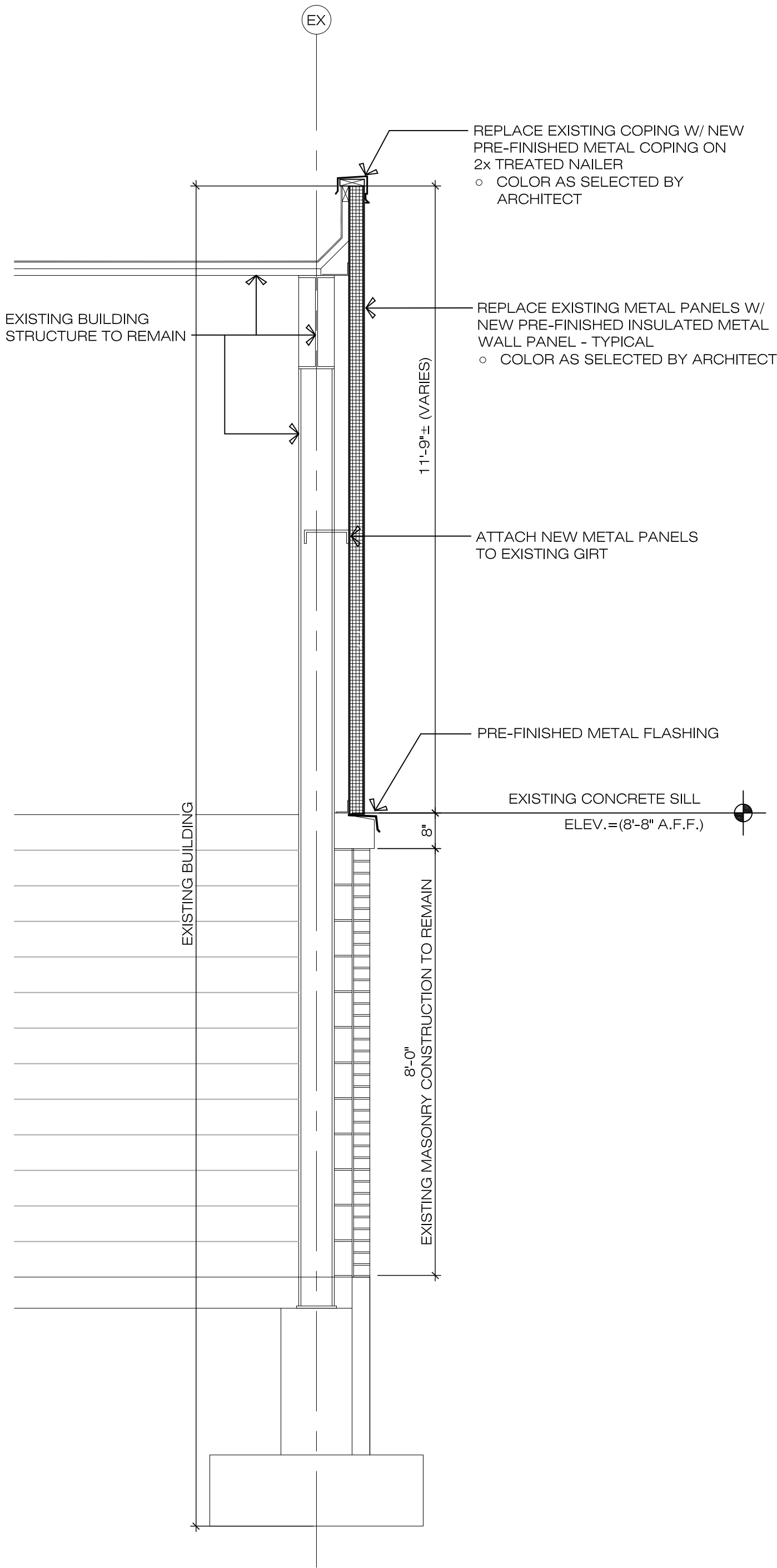
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A-5.1



WALL SECTION

SCALE: 1/2" = 1'-0"

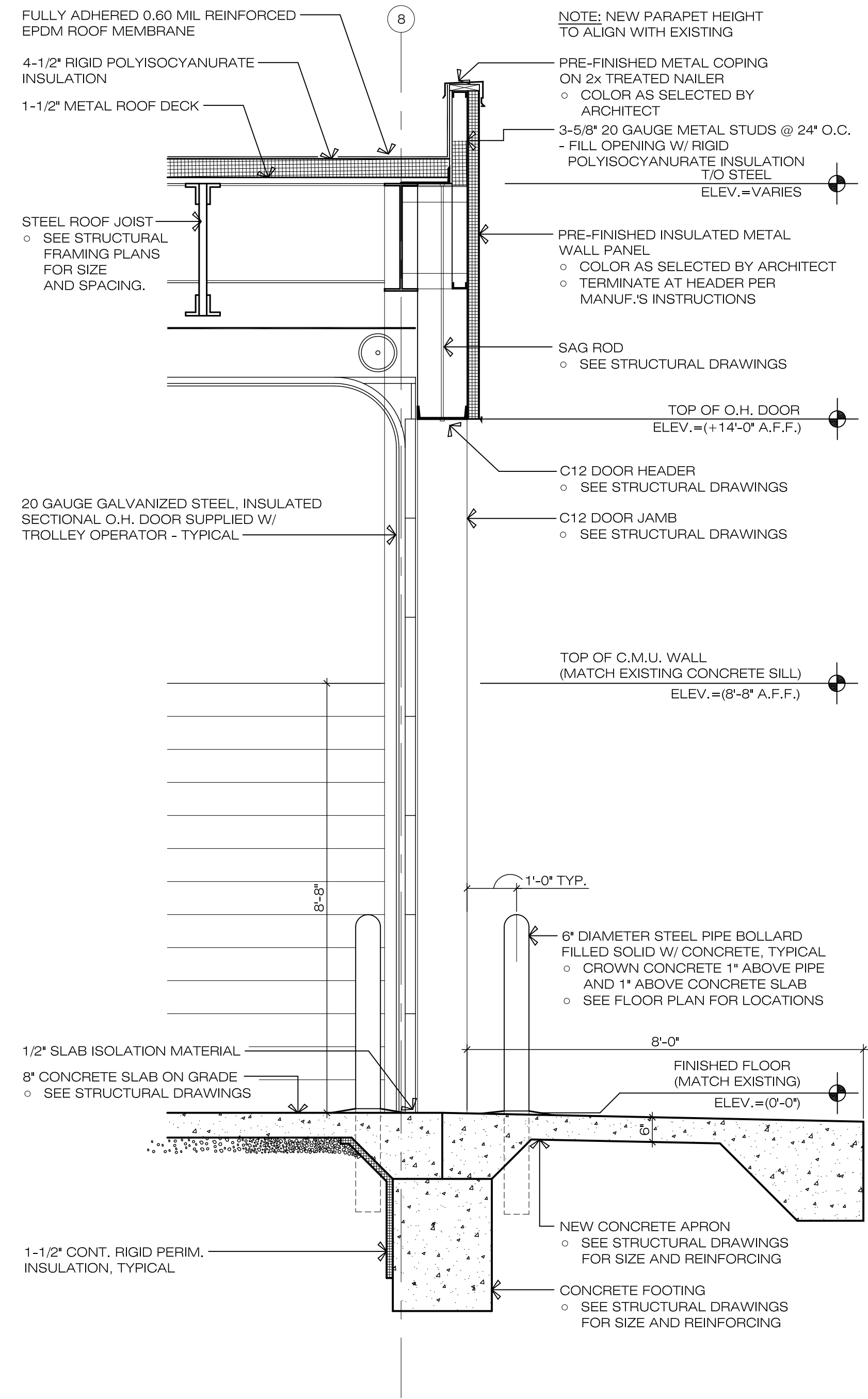
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A-5.1



WALL SECTION

SCALE: 1/2" = 1'-0"

4
A-5.2



WALL SECTION

SCALE: 1/2" = 1'-0"

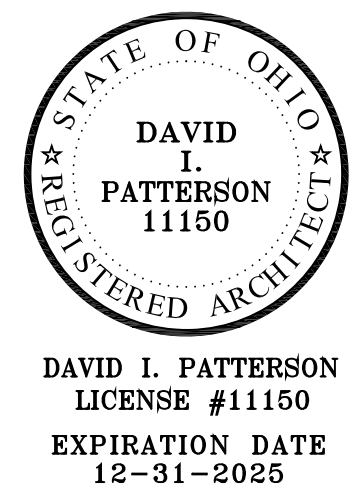
4
A-5.2

REVISIONS:

MOTTER & MEADOWS
ARCHITECTS

600 MARKET AVENUE NORTH CANTON OHIO 44702

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
CANTON, OHIO
2664 HARRISBURG RD. NE



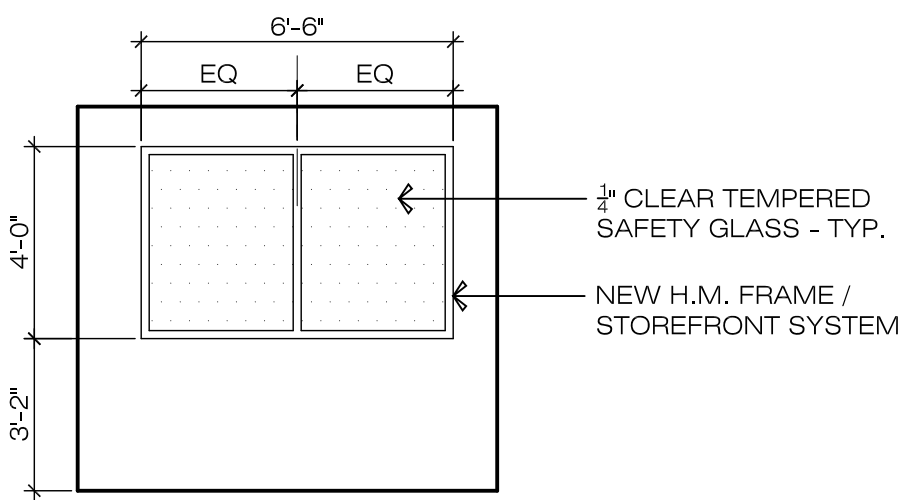
THIS DWG :
WALL SECTIONS

COMM 21161-B
DATE 02-01-2024

DWG
A-5.2

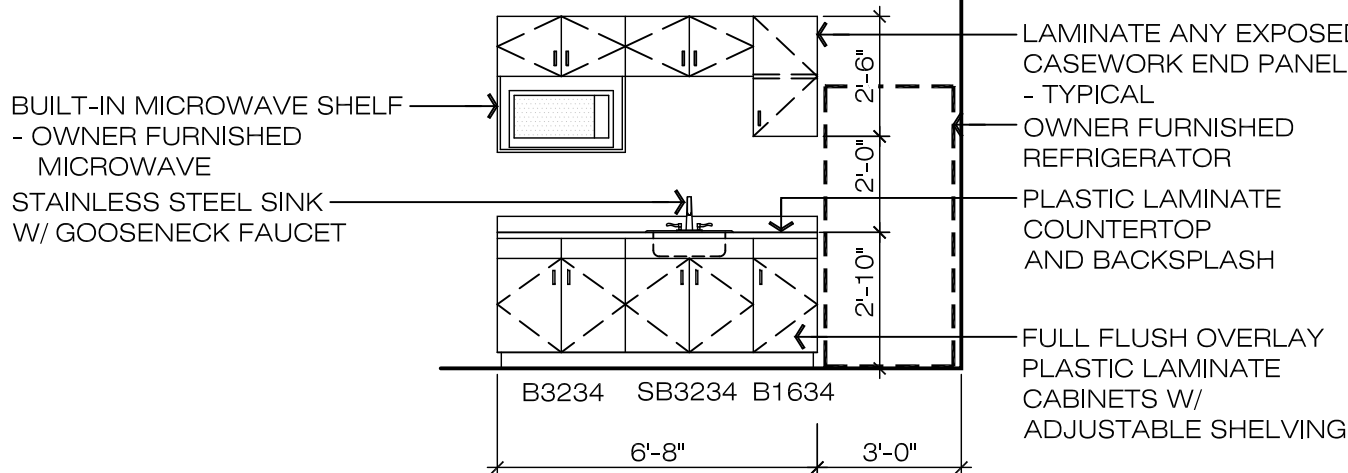
DOOR SCHEDULE													
DOOR NO.	DOOR						FRAME			HARDWARE TYPE	U.L. LABEL	NOTES	
	W	H	T	TYPE	MAT'L	CONSTR	MAT'L	JAMB	HEAD				TYPE
EXISTING BUILDING													
101A	3'-0"	7'-8"	1'-3/4"	D	ALUM.	TUBULAR	ALUM.	2"	4"		1		1,2,3,4,5,7,11
101B	3'-0"	7'-8"	1'-3/4"	C	STEEL	H.M.	STEEL	2"	4"		2		1,2,3,4,7,8
102	3'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		3		1,2,3,7
103	2'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		4		1,2,3,7
104A	3'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		5		1,2,3,4,7,9
104B	3'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		6		1,2,3,9
105A	3'-0"	7'-0"	1'-3/4"	C	STEEL	H.M.	STEEL	2"	4"		3		1,2,3
105B	2'-6"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	2"		4		1,2,3
106	3'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	2"		7		1,2,3
107	3'-0"	7'-0"	1'-3/4"	D	STEEL	H.M.	STEEL	2"	2"		8		1,2,3
109	3'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	2"		3		1,2,3
110	3'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	2"		9		1,2,3
111A	3'-0"	7'-0"	1'-3/4"	C	STEEL	H.M.	STEEL	2"	2"		5		1,2,3,4
111B	3'-0"	7'-0"	1'-3/4"	B	ALUM.	TUBULAR	ALUM.	2"	4"		10		1,2,3,4,5,7,11
111C	3'-0"	7'-8"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		11		1,2,3,4, PAIR
112A	3'-0"	7'-8"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		5		1,2,3,4,7
112B	3'-0"	7'-8"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		5		1,2,3,4,7
112C	3'-0"	7'-8"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		10		1,2,3,4,7, PAIR
112D	3'-0"	7'-0"	1'-3/4"	B	ALUM.	TUBULAR	ALUM.	2"	4"		11		1,2,3,4,5,7,11
113	3'-0"	7'-0"	1'-3/4"	D	STEEL	H.M.	STEEL	2"	2"		8		1,2,3
114A	3'-0"	7'-8"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		11		1,2,3,4,7, PAIR
114B	3'-0"	7'-0"	1'-3/4"	B	ALUM.	TUBULAR	ALUM.	2"	4"		10		1,2,3,4,5,7
118A	3'-0"	7'-8"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		12		1,2,3,4,7
118B	3'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	2"		13		1,2,3,7
119	3'-0"	7'-8"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		14		1,2,3,4,7
120	3'-0"	7'-8"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		12		1,2,3,4,7
121	3'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	2"		12		1,2,3,7
122	3'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	2"		7		1,2,3,4,7
123A	3'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	2"		14		1,2,3,7
123B	3'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	2"		14		1,2,3,7
124A	14'-0"	14'-0"	2"	E	STEEL	INSUL	EXISTING FRAME	TO REMAIN					6
124B	3'-0"	7'-0"	1'-3/4"	B	STEEL	H.M.	STEEL	2"	4"		15		1,2,3,4,5,7
124C	3'-0"	7'-0"	1'-3/4"	B	STEEL	H.M.	STEEL	2"	4"		15		1,2,3,4,5,7
124D	14'-0"	14'-0"	2"	E	STEEL	INSUL	EXISTING FRAME	TO REMAIN					6
124E	3'-0"	7'-0"	1'-3/4"	B	STEEL	H.M.	STEEL	2"	4"		15		1,2,3,4,5,7
124F	14'-0"	14'-0"	2"	E	STEEL	INSUL	EXISTING FRAME	TO REMAIN					6
124G	14'-0"	14'-0"	2"	E	STEEL	INSUL	EXISTING FRAME	TO REMAIN					6
124H	3'-0"	7'-0"	1'-3/4"	B	STEEL	H.M.	STEEL	2"	4"		15		1,2,3,4,5,7,11
125A	10'-0"	8'-0"	2"	-	STEEL	INSUL	STEEL	-	-				10
125B	3'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		3		1,2,3
127	3'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		5		1,2,3, PAIR
C101	3'-0"	7'-8"	1'-3/4"	C	STEEL	H.M.	STEEL	2"	4"		16		1,2,3,4
C103A	3'-0"	7'-0"	1'-3/4"	D	STEEL	H.M.	STEEL	2"	4"		12		1,2,3,4,7
C103B	3'-0"	7'-0"	1'-3/4"	B	STEEL	H.M.	STEEL	2"	4"		17		1,2,3,4,5,7
C103C	3'-0"	7'-0"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	2"		11		1,2,3,7, PAIR
C103D	3'-0"	7'-8"	1'-3/4"	A	STEEL	H.M.	STEEL	2"	4"		18		1,2,3,4, PAIR
NEW ADDITION													
128A	3'-0"	7'-0"	1'-3/4"	B	STEEL	H.M.	STEEL	2"	4"		17		1,2,3,4,5,11
128B	14'-0"	14'-0"	2"	E	STEEL	INSUL	STEEL	-	-				-
128C	14'-0"	14'-0"	2"	E	STEEL	INSUL	STEEL	-	-				-
128D	3'-0"	7'-0"	1'-3/4"	B	STEEL	H.M.	STEEL	2"	4"		17		1,2,3,4,5
128E	3'-0"	7'-0"	1'-3/4"	B	STEEL	H.M.	STEEL	2"	4"		17		1,2,3,4,5
128F	14'-0"	14'-0"	2"	E	STEEL	INSUL	STEEL	-	-				-
128G	14'-0"	14'-0"	2"	E	STEEL	INSUL	STEEL	-	-				-
128H	3'-0"	7'-0"	1'-3/4"	B	STEEL	H.M.	STEEL	2"	4"		17		1,2,3,4,5,11
128I	3'-0"	7'-0"	1'-3/4"	B	STEEL	H.M.	STEEL	2"	4"		19		1,2,3,4,5
128J	14'-0"	14'-0"	2"	E	STEEL	INSUL	STEEL	-	-				-
128K	3'-0"	7'-0"	1'-3/4"	B	STEEL	H.M.	STEEL	2"	4"		19		1,2,3,4,5
128L	3'-0"	7'-0"	1'-3/4"	B	STEEL	H.M.	STEEL	2"	4"		19		1,2,3,4,5

- NOTES:
- ALL DOOR HARDWARE SHALL COMPLY WITH THE OBC CHAPTER 11 AND ICC A117.1 - 2009 EDITION.
 - DOOR HARDWARE SHALL BE STANDARD COMMERCIAL GRADE HARDWARE.
 - DOOR SHALL BE EQUIPPED WITH (3) MEDIUM DUTY HINGES UNLESS OTHERWISE NOTED.
 - CLOSER
 - DOOR THRESHOLD SHALL NOT EXCEED 1/2" IN HEIGHT IN COMPLIANCE WITH O.B.C.1008.1.7
 - INSPECT EXISTING OVERHEAD SECTIONAL DOORS AND REPLACE AGED AND / OR DETERIORATED COMPONENTS, INCLUDING OPERATORS, AS NECESSARY
 - REPLACEMENT OF EXISTING DOOR, CONTRACTOR TO VERIFY EXISTING ROUGH OPENING / DOOR SIZE
 - REPLACEMENT OF EXISTING DOOR & REVERSE DOOR SWING
 - DOOR HARDWARE SHALL BE WIDE THROW HINGES, TO ALLOW FOR 180° OPENING
 - COILING OVERHEAD DOOR
 - BADGE READER ACCESS CONTROL



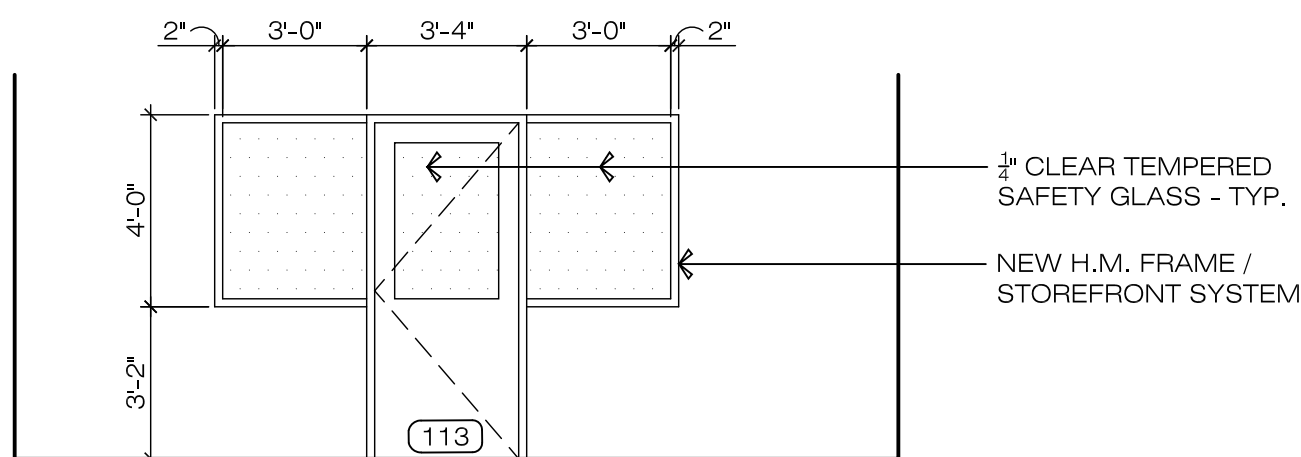
INTERIOR ELEVATION

SCALE: 1/4" = 1'-0"



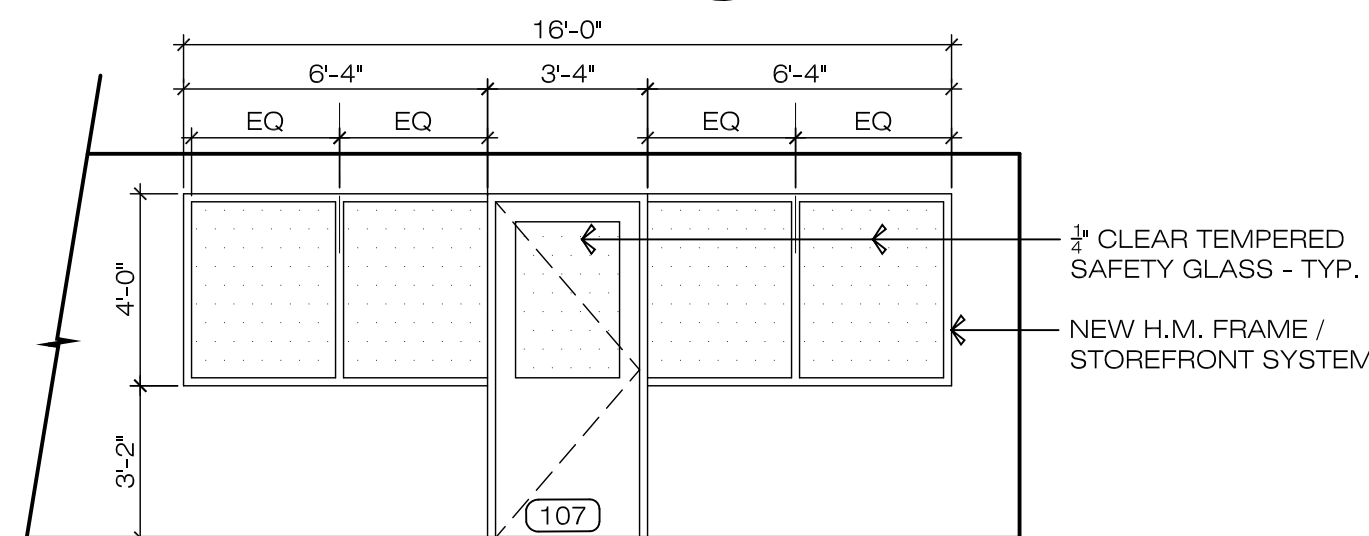
CASEWORK ELEVATION

SCALE: 1/4" = 1'-0"



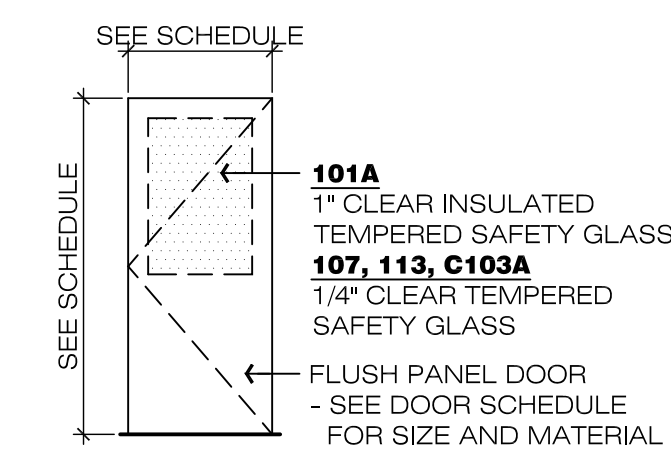
INTERIOR ELEVATION

SCALE: 1/4" = 1'-0"



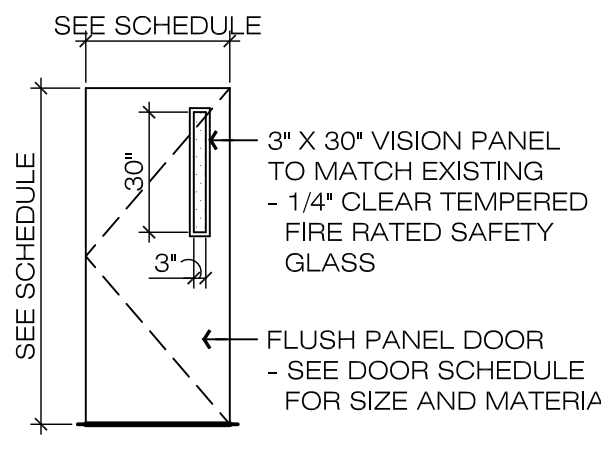
INTERIOR ELEVATION

SCALE: 1/4" = 1'-0"



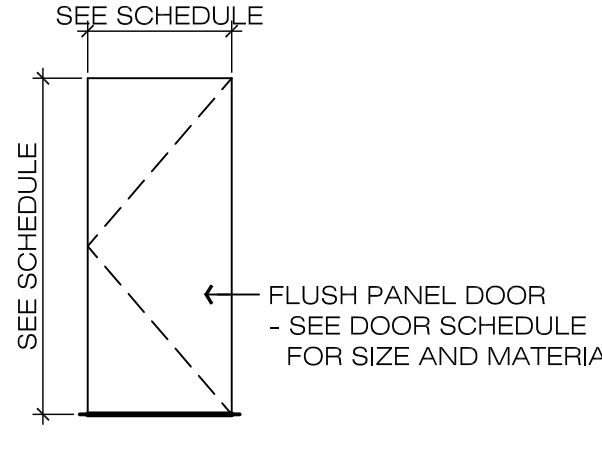
DOOR TYPE 'D'

SCALE: 1/4" = 1'-0"



DOOR TYPE 'C'

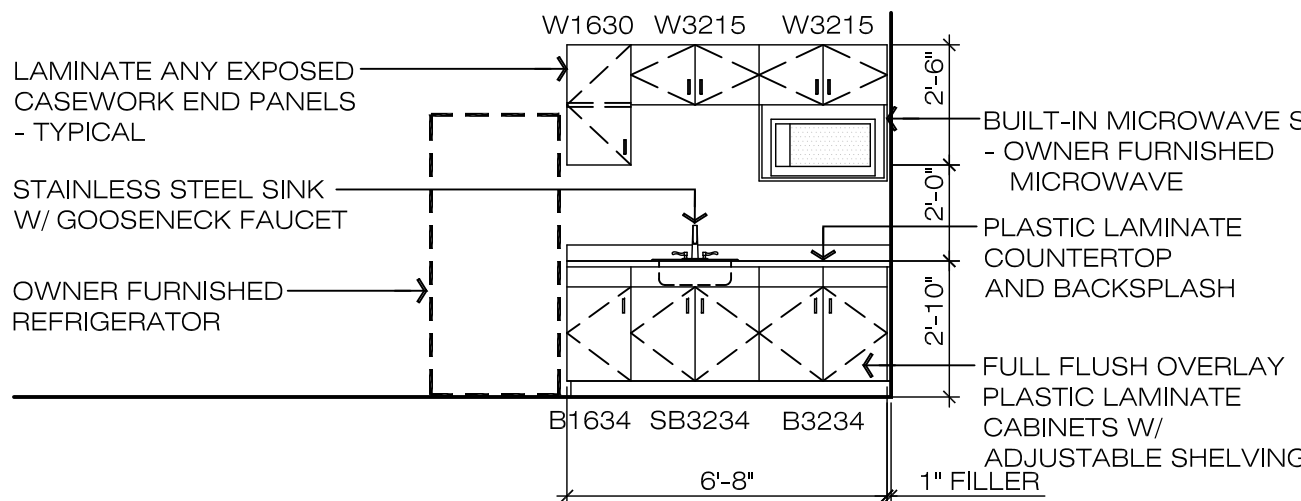
SCALE: 1/4" = 1'-0"



DOOR TYPE 'A' / 'B'

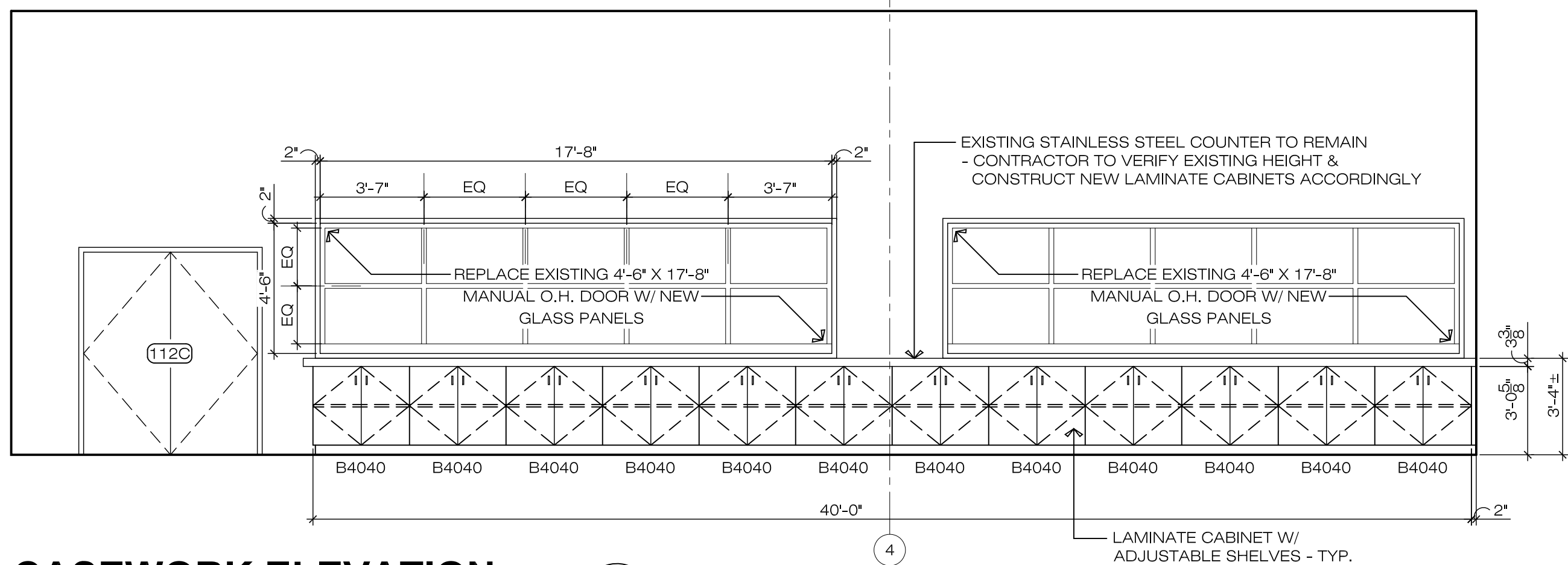
SCALE: 1/4" = 1'-0"

ROOM FINISH SCHEDULE																	
ROOM		FLOOR	BASE	WALLS		CEILING		NOTES									
NO.	NAME	MATERIAL	MATERIAL	MATERIAL	MATERIAL	MATERIAL	HEIGHT										
		RUBBER (SLIP RESISTANT)	EXPOSED CONCRETE	MOSAIC TILE	EXISTING TO REMAIN	4" COVE RUBBER	6" COVE TILE	EXISTING TO REMAIN	GYPSUM DRYWALL	CMU	METAL PANELS (WAINSCOT)	PAINT	EXISTING TO REMAIN	2x4 ACOUSTICAL CEILING TILE	EXISTING TO REMAIN		
EXISTING BUILDING																	
C101	CORRIDOR	○		○				○							8'-0" A.F.F.	1,3	
C102	CORRIDOR		○					○							○	1,3,6,9	
C103	CORRIDOR								○							8'-0" A.F.F.	1,3
101	LOBBY	○	○	○	○	○	○	○	○	○	○	○	○	○		8'-0" A.F.F.	1,3
102	DISPATCH					○									○	8'-0" A.F.F.	1,3
103	STORAGE	○	○	○	○	○	○	○	○	○	○	○	○	○			1,3
104	SERVICE ADMINISTRATION															8'-0" A.F.F.	1,3
105A	SUPERVISOR OFFICE	○	○	○	○	○	○	○	○	○	○	○	○	○		8'-0" A.F.F.	1,3
105B	STORAGE															8'-0" A.F.F.	1,3
106	RESTROOM			○												8'-0" A.F.F.	1,3
107	DOUBLE OFFICE	○	○													8'-0" A.F.F.	1,3
108	CUSTOMER SERVICE	○	○													8'-0" A.F.F.	1,3
109	WORK ROOM	○	○	○	○	○	○	○	○	○	○	○	○	○		8'-0" A.F.F.	1,3
110	STORAGE	○	○	○	○	○	○	○	○	○	○	○	○	○		8'-0" A.F.F.	1,3
111	METER ROOM														○		2,3,4,6
112	PARTS / STORE																2,3,4,6
113	DOUBLE OFFICE	○	○												○	8'-0" A.F.F.	2,3
114	STORAGE																2,3,4,6
115	LOCKER ROOM			○	○	○	○										1,2,3,5,7,10
116	DRYING		○	○	○	○	○										1,2,3,5,7
117	SHOWERS					○	○										1,2,3,5,7
118	ENTRY		○														1,2,3,7
119	JANITOR																1,2,3,4,7
120	ENTRY		○			○	○										1,2,3,7
121	LUNCH ROOM		○	○										○		8'-0" A.F.F.	1,2,3
122	WOMEN'S RESTROOM				○	○									○		1,2,3,4
123	STORAGE																1,2,3,4
124	SERVICE SHOP														○		1,2,3,4,6,8
125	REPAIR SHOP	○	○	○						○							
126	WASH BAY																
127	EQUIPMENT																
NEW ADDITION																	
128	SERVICE SHOP ADDITION	○	○		○				○	○	○						



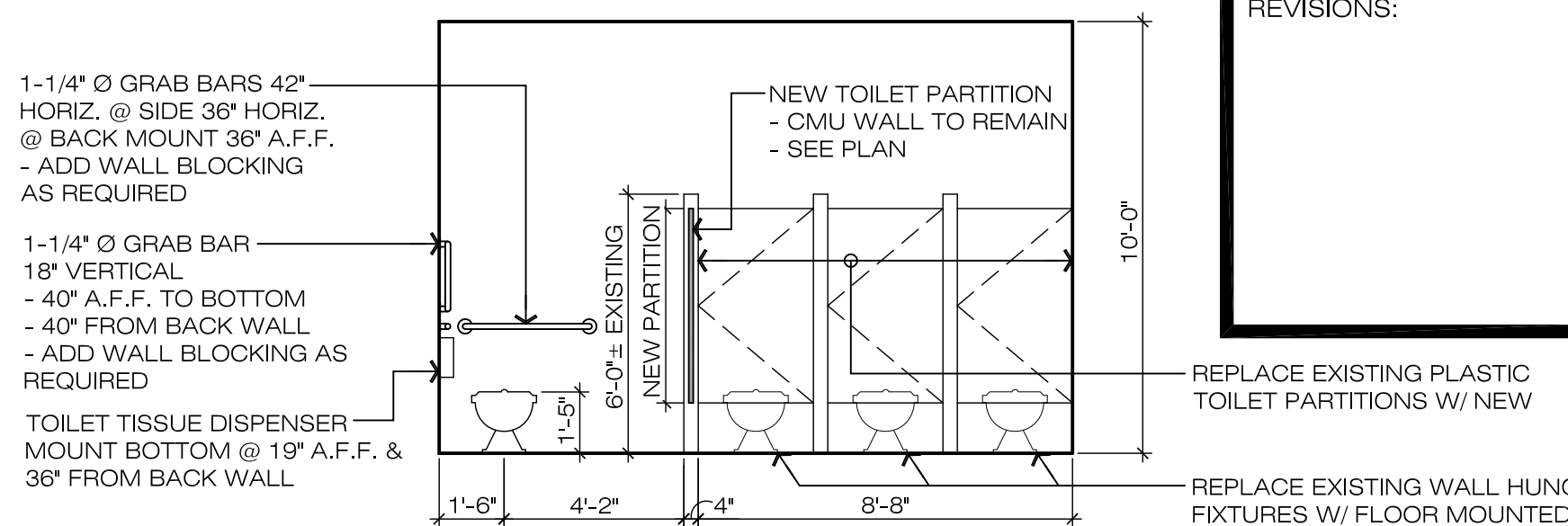
CASEWORK ELEVATION

SCALE: 1/4" = 1'-0"



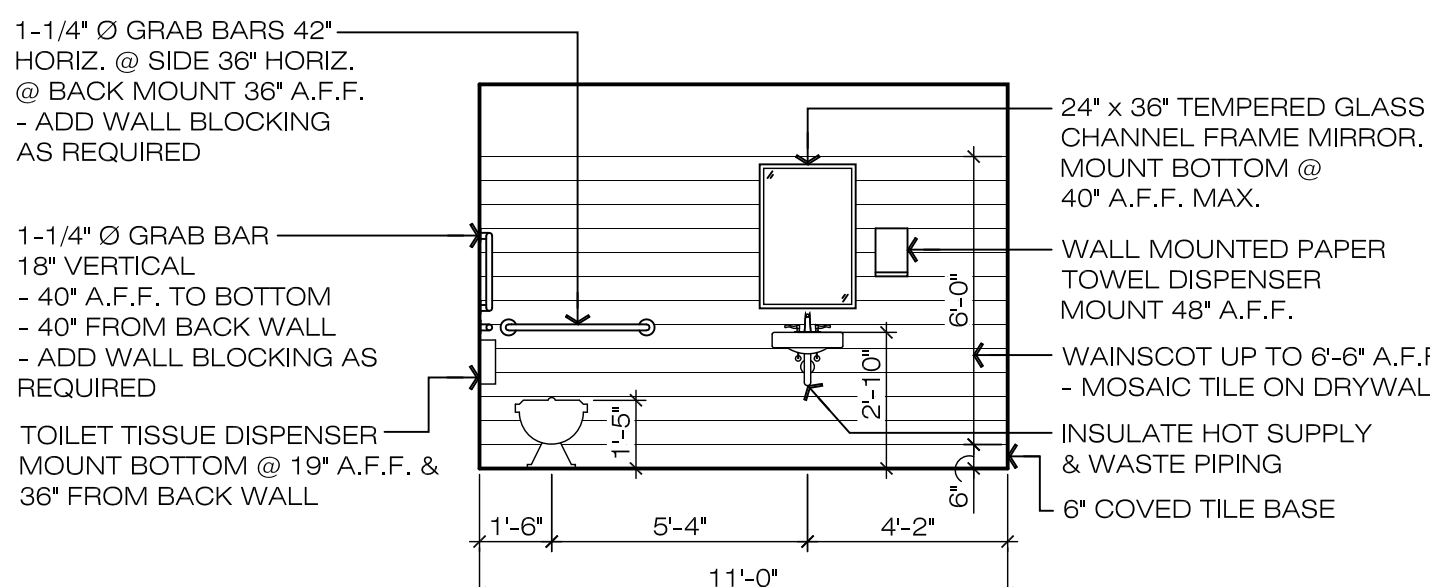
CASEWORK ELEVATION

SCALE: 1/4" = 1'-0"



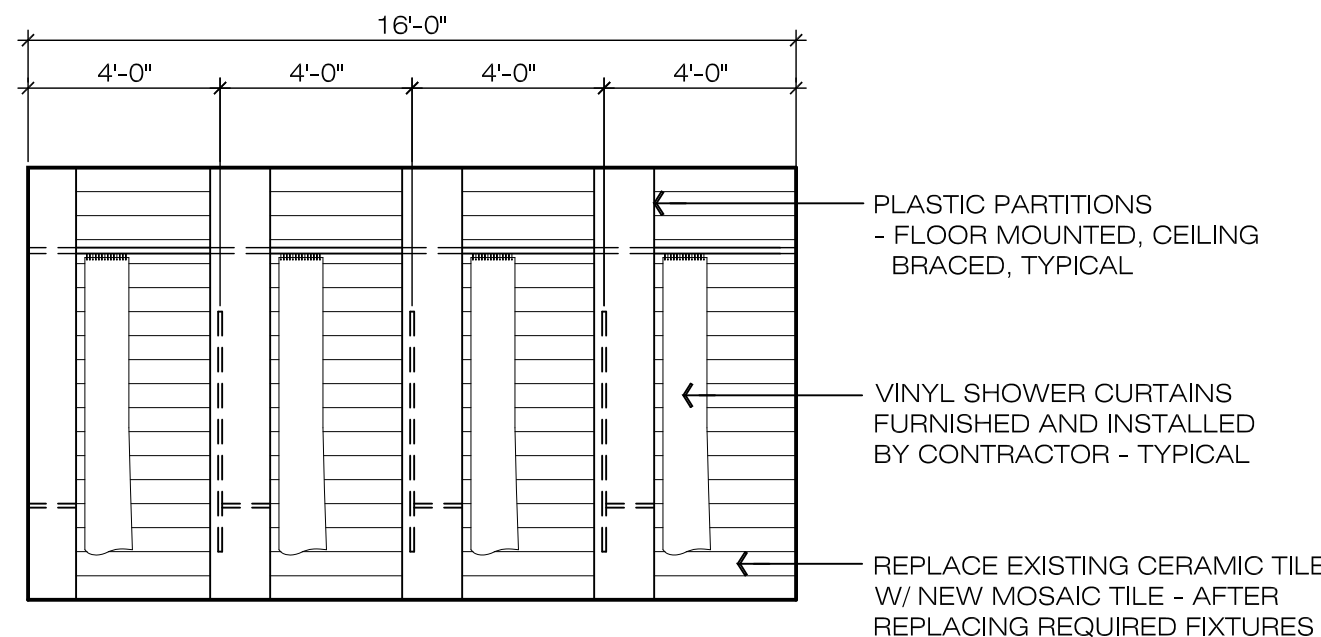
RESTROOM ELEVATION

SCALE: 1/4" = 1'-0"



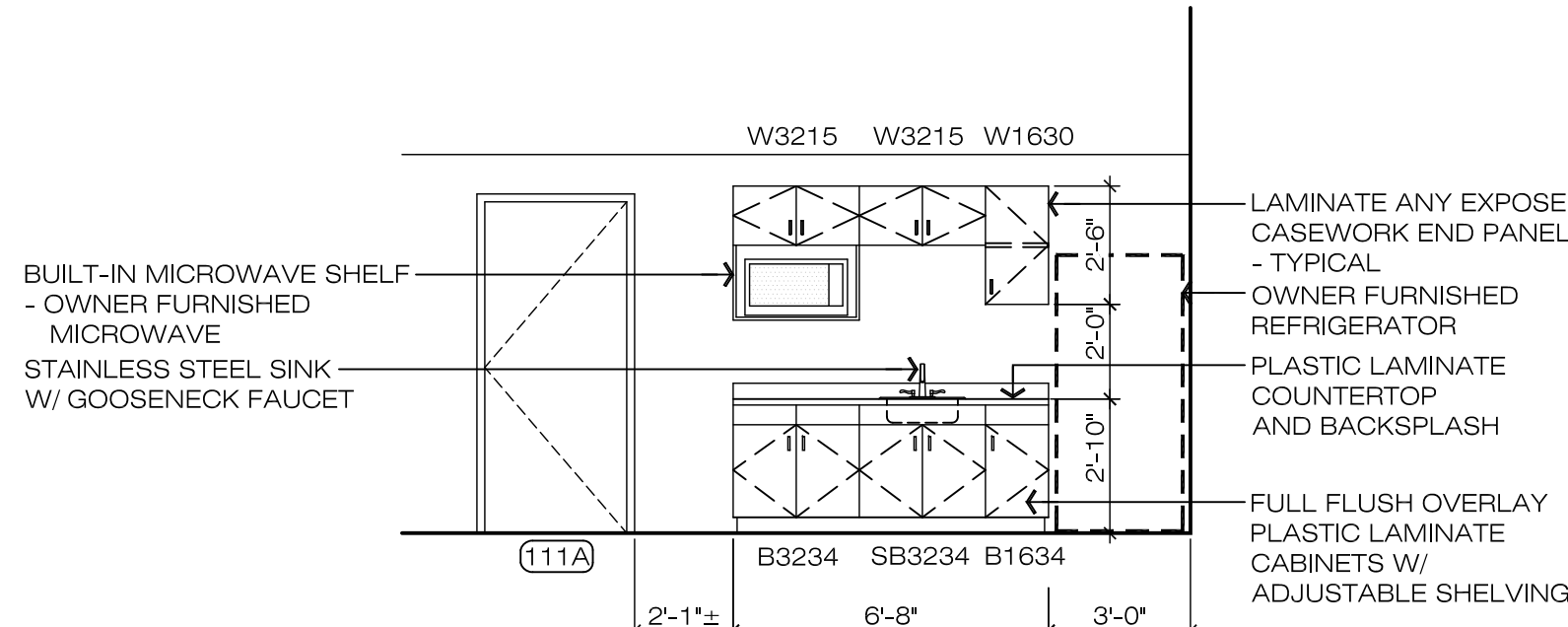
RESTROOM ELEVATION

SCALE: 1/4" = 1'-0"



SHOWER ELEVATION

SCALE: 1/4" = 1'-0"



CASEWORK ELEVATION

SCALE: 1/4" = 1'-0"

MOTTER & MEADOWS

ARCHITECTS

CODES AND STANDARDS

1. New construction has been designed to, and shall be constructed in accordance with the following building codes and standards:
- A. 2017 Ohio Building Code (OBC 2017)
- B. ASCE 7-10, Minimum Design Loads for Buildings and Other Structures
2. Unless explicitly modified in the Contract Drawings and Specifications, the Contractor shall comply with provisions of:
- A. ACI 301-10, Specifications for Structural Concrete
- B. ACI 318-14, Building Code Requirements for Structural Concrete
- C. ACI 530-13, Building Code Requirements for Masonry Structures
- D. ACI 530.1-13, Specification for Masonry Structures
- E. AISC 360-10, Specification for Structural Steel Buildings
- F. AWS D1.1-10, Structural Welding Code - Steel
- G. SDI RDI.0-10, Standard for Steel Roof Deck
- H. SJI LH/DLH-10, Standard Specification for Longspan Steel Joists, LH-series and Deep Longspan Steel Joists, DLH-series

DESIGN LOADS (OBC 2017)

Floor live load (unless otherwise noted)

Slab on ground 200 psf

Roof live load

Roof live load 20 psf

Roof snow load data

Ground snow load (ASCE 7, Figure 7-1) $p_g = 20$ psf

Fat-roof snow load (ASCE 7, 7.3) $p_g = 19$ psf (1)

Minimum snow load (ASCE 7, 7.3.4) $p_g = 20$ psf

Snow exposure factor (ASCE 7, Table 7-2) $C_e = 1.0$

Thermal factor (ASCE 7, Table 7-3) $C_t = 1.0$

Snow importance factor (ASCE 7, Table 1.5-2) $I_s = 1.0$

(1) Increased for snow build-up/unbalanced per ASCE 7, 7.6-7.9

Wind design data

Ultimate design wind speed (ASCE 7, Figure 26.5-1) $V_{ult} = 115$ mph

Nominal design wind speed (OBC 1609.3.1) $V_{ind} = 90$ mph

Risk category (ASCE 7, Table 1.5-1) II

Exposure category (ASCE 7, 26.7.3) B

Internal pressure coefficient (ASCE 7, Table 26.11-1) $GCF = \pm 0.18$

Components and cladding (Ultimate)

Effective Wind Area $10 ft^2$ (2)

Zone 1 (Roof Interior) $+16.0, -23.8$ psf

Zone 2 (Roof Edge) $+16.0, -39.9$ psf

Zone 3 (Roof Corner) $+16.0, -60.1$ psf

Zone 4 (Wall Interior) $+23.8, -25.8$ psf

Zone 5 (Wall Corner) $+23.8, -31.9$ psf

(+) Indicates pressure acting toward the surface

(-) Indicates pressure acting away from the surface

Edge and corner zones are defined as areas within 8'-0" of edge or corners

(2) Components and cladding engineer may calculate wind loads based on actual effective wind area per ASCE 7

Earthquake design data

Risk category (ASCE 7, Table 1.5-1) II

Seismic importance factor (ASCE 7, Table 1.5-2) $I_s = 1.0$

Mapped spectral response acceleration parameters

Short period $S_s = 0.132$ g

1-second period $S_1 = 0.055$ g

Site class (per Geotechnical Report) D

Design spectral response acceleration parameters

Short period $S_{ps} = 0.141$ g

1-second period $S_{p1} = 0.088$ g

Seismic design category B

Basic seismic-force-resisting system (ASCE 7, Table 12.2-1)

Building Frame Systems

Steel ordinary concentrically braced frames

Design base shear (ASCE 7, 12.8.1) $V = 33$ Kips

Seismic response coefficient (ASCE 7, 12.8.1.1) $C_s = 0.046$

Response modification factor (ASCE 7, Table 12.2-1) $R = 3.25$

Analysis procedure Equivalent lateral force procedure

Addition complies with all exceptions listed in ASCE 7, Appendix 11B.3. Further analysis and design of the existing structure for seismic force-resistance are not required.

DESIGN STRESSES

Concrete minimum compressive strength in 28 days:

Footings $f_c = 3,000$ psi

Interior slabs on grade $f_c = 4,000$ psi

Exterior concrete and concrete exposed to weather $f_c = 5,000$ psi

Lean concrete, for use with overexposures $f_c = 1,500$ psi

Reinforcing bars (ASTM A615, Grade 60) $F_y = 60,000$ psi

Welded wire reinforcement (ASTM A1064) $F_y = 70,000$ psi

Structural steel W, WT and S shapes (ASTM A992 or ASTM A572/50) $F_y = 50,000$ psi

Structural steel other shapes (ASTM A36) $F_y = 36,000$ psi

Anchor rods (ASTM F1554, Grade 55, weldable) $F_y = 55,000$ psi

Metal decks (ASTM A653)

Roof deck $F_y = 33,000$ psi

Non-composite form deck $F_y = 60,000$ psi

Masonry Load-bearing CMU (ASTM C55 or C90) $F_m = 2,000$ psi

Mortar (ASTM C270) Type M or S

Grout (ASTM C476) 3,000 psi

Soil bearing pressure for foundations

Fine to coarse sand and gravel 2,000 psf

GENERAL

1. All new construction shall comply with the Contract Documents and the Building Code.
2. Typical details and general notes apply to all parts of the work except where specifically detailed or unless otherwise noted.
3. The structural drawings illustrate structural members. Refer to architectural, mechanical, and electrical drawings for non-structural items which require special provisions during the construction of the structural members.
4. Drawings are not to be scaled.
5. Refer to architectural plans for floor depressions, openings, slopes, drains, curbs, pads, embedded items, non-bearing partitions, etc. Refer to mechanical and electrical plans for sleeves, openings, and hangers for pipes, ducts, and equipment.
6. No pipes or ducts shall be embedded into structural members unless so shown on the plans or approved by the Engineer.
7. The Contractor shall verify and be responsible for all dimensions and conditions which impact the work. Field verify sizes, elevations, hole locations, etc., prior to fabrication.
8. The Contractor shall carefully review the drawings to identify the scope of work required, visit the site to relate the scope of work to existing conditions and determine the extent to which those conditions and physical surroundings will impact the work.
9. Existing conditions as shown on these plans are for reference only. The Contractor is required to field verify all existing conditions prior to construction.
10. Locate existing underground utilities in areas of construction. Coordinate with utility companies for any shut-off requirements of still active lines.
11. The Contractor shall resolve any conflicts on the drawings or in the specifications with the Architect/Engineer before proceeding with the work.
12. Any deviation, modification, or substitution from the approved set of structural drawings shall be submitted to the Owner, Architect, and Engineer for review/approval prior to its use or inclusion on the shop drawings.
13. The Contractor shall provide all necessary shores, braces, and guys required to support all loads to which the building structure and components, soils, other structures, and utilities may be subjected during construction. Shoring systems shall be designed, signed, and sealed by a professional engineer licensed in the jurisdiction where the project is located.
14. The Contractor shall provide means, method, techniques, sequence, and procedure of construction as required.
15. The Contractor shall protect all work, materials, and equipment from damage and shall provide proper storage facilities for materials and equipment during construction.
16. Site visits performed by the Architect/Engineer do not constitute inspections of means and methods of construction performed by the Contractor.
17. Structural observations performed by the Architect/Engineer during construction are not the continuous and special inspection services and do not waive the responsibility for the inspections required of the Building Department Inspector or the testing agency. Observations also do not guarantee the Contractor's performance and shall not be considered as supervision of construction.
18. The Contractor shall review shop drawings for completeness and compliance with contract documents. The Contractor shall stamp shop drawings prior to submission to the Architect and Engineer.
19. Review of the shop drawings by the Architect's Engineers shall not be construed as an authorization to deviate from the Contract Documents.
20. Shop drawings will not be processed if they are incomplete, lack coordination with relevant portion of contract documents, lack calculations if required, or if deviations, modifications, and substitutions are indicated without prior written approval from the Architect/Engineer.

FOUNDATIONS AND SLABS ON GROUND

1. Foundations for this project are designed in accordance with the recommendations made by Wertz Geotechnical Engineering, dated March 15, 2022. All the work regarding site preparation, earth fill construction, backfill requirements, foundation preparations, etc., shall be in strict conformance to the requirements and recommendations of the Geotechnical Engineer's report.
2. Slab elevations given are to top of structural slab. See Architect's drawings for layout of ramps and steps.
3. All footings must be supported on undisturbed soil capable of achieving the design soil bearing pressure without appreciable settlement. Where additional excavation is required to attain the design bearing pressure, backfill the overexcavated area with lean concrete up to the design bearing elevation.
4. Provide (2) #5 minimum continuous in all footings directly under masonry walls.
5. Unless otherwise noted in the geotechnical report or specifications, compact all fill under slabs on ground to 98% of optimum laboratory density in accordance with ASTM D698 Standard Proctor Method. Place fill in 6" to 8" layers and compact with vibratory tamping equipment.
6. Unless otherwise noted in the geotechnical report or specifications, compact all engineered fills under foundations to 95% of the maximum dry density per ASTM D1557 Modified Proctor Method.
7. In granular soils (sands and gravel) the soil shall be mechanically tamped to a hard surface immediately prior to placing footing.
8. Existing foundations:
- A. Existing foundations shown on drawings are approximate. Exact conditions must be verified at time of construction.
- B. When new footings meet existing footings, they shall be stepped at a ratio of 2 horizontal to 1 vertical.
- C. Unless otherwise noted, new footings shall not bear below existing footings.
9. Before backfill, all walls must be adequately braced. For backfill requirements, see specifications and/or geotechnical report.
10. Provide a minimum of (4) #5 vertical bars and #3@12" on center horizontal ties for concrete piers under columns or beams.
11. When excavations approach the ground water level, the water level shall be lowered by an acceptable dewatering system so that the water level is maintained continuously a minimum of 2'-0" below the excavation.
12. The bottom of foundations shall be protected against freezing until backfill or other permanent protective cover is in place.

CONCRETE CONSTRUCTION

1. All concrete construction shall be in accordance with the latest Building Code Requirements for Structural Concrete ACI 318 and ACI Detailing Manual, except that construction and removal of forms and reshoring shall be inspected by the Contractor's engineer.
2. Reinforcing steel shall have the following minimum coverage in accordance with the following table. Place bars as near to the concrete surface as these minima permit wherever possible, unless noted otherwise.

Concrete Exposure	Member	Reinforcement	Specified cover, in.
Cast against and permanently in contact with ground	All	All	3
		No. 6 through No. 18 bars	2
Exposed to weather or in contact with ground	All	No. 5 bar and smaller	1 1/2
		No. 14 and No. 18 bars	1 1/2
Not exposed to weather or in contact with ground	Slabs, joists and walls	No. 11 bar and smaller	3/4
		Beams, columns, pedestals, and tension ties	1 1/2

3. Welded wire reinforcement for slabs on ground shall have a minimum top coverage of 1" and a maximum top coverage of 1 1/2", unless otherwise noted. Reinforcement shall be positively supported and maintained in this position during placement of concrete.
4. Furnish bar supports where necessary during construction.
5. Provide pipe sleeves and inserts in concrete work where required. See architectural and mechanical drawings.
6. Construction joints shall be positioned so as not to change the structural design requirements. Framed floors and roofs shall have construction joints so that the ratio of length to width of a single pour shall not exceed 2. The location and size of all construction joints shall be approved by the Engineer. Submit proposed pour layout for Engineer's review and approval two weeks prior to placing concrete.
7. Welding of reinforcing bars (including tack welding) is not permitted without permission of Engineer in writing. Where and when permitted, welded rebars shall comply with ASTM A706 (Fy=60 ksi) and welding shall conform to AWS D1.4. Welding shall be performed by certified welders.
8. Provide horizontal keyways in construction joints in beams, joists, supported slabs, walls, and wall footings; minimum 1 1/2" depth with height equal to one-third of member depth, unless otherwise shown or noted.
9. Unless noted otherwise in project specifications or drawings, all exposed concrete subjected to freezing and thawing shall have a minimum cement content of 610 pounds per yard, a maximum water/cement ratio of 0.40, and 6%±1.5% of entrained air.
10. At wall and footing corners, innermost reinforcing shall have 1'-0" long hook at far face. For outer reinforcing, provide corner bars with lap length of 36 bar diameters (2'-0" minimum).
11. Key and dowel all awayends and other projecting elements to supporting walls with #4@12" on center extending 1'-0" into supporting wall unless noted.
12. Provide foundation dowels for all walls, piers, and columns same size and spacing as vertical steel.
13. Drawings show typical reinforcing conditions. Contractor shall prepare detailed placement drawings of all conditions showing quantity, spacing, sizes, clearances, laps, intersections, and coverage required by the structural details, applicable code, and trade standards. Contractor shall notify reinforcing inspector of any adjustments from typical conditions which are proposed in placement drawings to facilitate field placement of reinforcing steel and concrete.
14. Bar bends shall be made cold. Bars shall not be bent after any portion of the bar is encased in concrete.
15. Splices (grade 60 deformed bars):
- A. Lap all tension splices in accordance with the following tables. Provide Class B Tension Lap Splices unless otherwise noted.
- B. Top bars are defined as horizontal bars with more than 12" of fresh concrete below.

Bar Size	Class B Tension Lap Splice					
	f _c = 3000 psi		f _c = 4000 psi		f _c = 5000 psi	
	Top	Other	Top	Other	Top	Other
#3	28"	22"	24"	19"	22"	17"
#4	37"	29"	33"	25"	29"	23"
#5	47"	36"	41"	31"	36"	28"
#6	56"	43"	49"	37"	43"	34"
#7	81"	63"	71"	54"	63"	49"
#8	93"	72"	81"	62"	72"	56"
#9	105"	81"	91"	70"	81"	63"
#10	118"	91"	102"	79"	92"	70"
#11	131"	101"	113"	87"	102"	78"

Bar Size	Class A Development Length, l _d					
	f _c = 3000 psi		f _c = 4000 psi		f _c = 5000 psi	
	Top	Other	Top	Other	Top	Other
#3	22"	17"	19"	15"	17"	13"
#4	29"	22"	25"	19"	23"	17"
#5	36"	28"	31"	24"	28"	22"
#6	43"	33"	37"	29"	34"	26"
#7	63"	48"	54"	42"	49"	38"
#8	72"	55"	62"	48"	56"	43"
#9	81"	62"	70"	54"	63"	48"
#10	91"	70"	79"	61"	70"	54"
#11	101"	78"	87"	67"	78"	60"

MASONRY CONSTRUCTION

1. Masonry walls shown on structural drawings have been designed in accordance with ACI 530, Building Code Requirements for Masonry Structures.
2. Masonry walls shall be constructed in accordance with ACI 530.1, Specifications for Masonry Structures, and the project specifications.
3. Determine compressive strength of masonry (F_m) by the unit strength method (Section 1.4.B.2 of ACI 530.1).
- A. Mortar shall meet the Property Specifications' requirements of ASTM C270, and shall be field tested according to ASTM C780.
- B. The strength of grout shall be determined by tests in accordance with ASTM C1019.
4. Intersecting walls shall be anchored by one of the following methods (does not apply at control joints or where non-load-bearing partitions abut bearing walls):
- A. Fifty percent of the units at the intersection shall be laid in an overlapping masonry bonding pattern, with alternate units having a bearing of not less than 3" on the unit below.
- B. Walls shall be tied by galvanized steel straps 1 1/2" x 1/4" x 24" with 2" bend at 90° each end. Grout straps solid into cores of block at 24" maximum vertical spacing.
5. Corners of bearing walls shall be built in running bond.
6. Provide corner bars in bond beams at wall intersections and corners to match bond beam reinforcing.
7. Provide a minimum of 24" depth of solid masonry under the bearing ends of all beams, beam lintels, and LH and DLH Series Joists; 16" depth of solid masonry under the bearing ends of all K Series joists and slabs; and 8" of solid masonry under the bearing ends of loose lintels.
8. Unless otherwise noted, provide galvanized ladder type joint reinforcement at 16" on center vertically per ASTM A82.
9. Welding of reinforcing bars (including tack welding) is not permitted without permission of Engineer in writing.
10. Provide shop drawings which indicate size, spacing, bending details, and type of all reinforcing bars placed in masonry walls.
11. Provide dowels from supporting member (footing, beam, or slab) for all reinforced walls same size, location, and spacing as wall reinforcing.
12. Wall reinforcing shall be held in position during grouting.
13. For bars at face of wall, maintain 1/2" clearance from inside face of CMU to reinforcing.
14. Splices:
- A. Lap all splices in accordance with the following table.
- B. Splice lengths greater than 64" require high lift grouting. The Contractor, at his option, may use open-ended masonry units or mechanical splices for ease of construction.

Bar Size	Reinforcing Centered in Wall Nominal Wall Width					Reinforcing at Face of Wall
	6"	8"	10"	12"	16"	15"
#3	15"	15"	15"	15"	15"	15"
#4	20"	20"	20"	20"	20"	22"
#5	28"	25"	25"	25"	25"	35"
#6	53"	38"	30"	30"	30"	64"
#7		52"	40"	35"	35"	87"
#8		79"	61"	50"	40"	131"
#9			78"	64"	46"	166"

LOOSE LINTEL SCHEDULE

1. Interior lintels shall be shop painted. Lintels exposed to weather shall be 3/8" minimum thickness and hot-dip galvanized.
2. Bottom plates in beam/plate assemblies shall be 1/2" less in width than the supported masonry wall. Stop end of bottom plates 1/2" from edge of opening.
3. Weld bottom plates to lintels with continuous fillet welds (exterior side).
4. Steel lintels and lintel plates in exterior walls shall be fabricated, followed by hot-dip galvanizing of the complete assembly.
5. Lintels shall have minimum bearing at each end of 1" per foot of opening (6" minimum) except as detailed.
6. Lintels shall have 8" minimum solid masonry below bearing points and shall extend beyond the full bearing area.
7. Lintel bearing plates shall be held back 1/2" minimum from face of masonry at opening. Provide flexible caulk between lintel and masonry at this location. Match mortar color.
8. The following schedules apply to all non-bearing masonry walls and to bearing walls where lintels are not indicated on the structural drawings. See drawings for other lintels in bearing walls.
- A. For 4", 8", 12", and 16" walls, provide one angle for each 4" of masonry wall thickness with 3 1/2" leg horizontal as follows:
- | Span Limits | Angle Size |
|----------------|-------------------|
| 0'-0" to 4'-0" | L3 x 3 1/2 x 1/4 |
| 4'-1" to 5'-6" | L4 x 3 1/2 x 5/16 |
| 5'-7" to 7'-6" | L5 x 3 1/2 x 5/16 |
| 7'-7" to 9'-6" | L6 x 3 1/2 x 3/8 |

STEEL CONSTRUCTION

1. Steel detailing, fabrication, and erection shall conform to the AISC Specification for Structural Steel Buildings and Code of Standard Practice, and the AWS Structural Welding Code.
2. Stresses occurring during fabrication, shipment, and erection shall be temporary and not excessive. Stresses at all times shall be less than design and allowable stresses. The full design and load-carrying capacity of the steel work shall not be impaired due to fabrication, shipment, or erection procedures. Throughout the complete process, the stability of all individual members and assemblies shall be maintained.
3. The Contractor shall be responsible for the control of all erection procedures and sequences with relation to temperature differentials and weld shrinkage.
4. All additional steel required for erection purposes shall be provided at no additional cost and shall be removed unless approved by the Owner in writing.
5. Connections:
- A. Bolts shall be ASTM F3125 and shall be installed in accordance with "Specifications for Structural Joints Using High-Strength Bolts".
- B. Provide slip critical bolts for all moment connections, wind connections, hangers, and other connections as noted on drawings.
- C. Provide bearing type connections with thread included in the shear plane for all connections other than slip critical connections.
- D. Provide hardened washers under nuts at all high-strength bolts, except where plate washers are used per AISC Specifications.
- E. Unless snug tight connections are noted on the drawings as being permitted, all bolts should be tightened to full pretensioning load.
- F. Use standard holes with the following exceptions: oversize holes are permitted when bolts are loaded in tension; short slotted holes are permitted for shear loading perpendicular to the slot.
- G. Where minimum AISC fillet weld thickness requirement exceeds welds shown on details, or weld size is not specified, provide minimum AISC weld.
- H. The length of connection shall not be less than one-half of the T distance of the beam web.
- I. Where reaction is noted, develop same. Where not noted, for non-composite beams, connections shall develop one-half of the total uniform load capacity of the beam; for composite beams, see table listed in typical details.
6. Welding electrodes shall be E70XX except where other electrodes are required for compatibility with material being welded.
7. All slip connections shall be provided with a means of preventing the nuts from unthreading.
8. Shop drawings are required and shall note type of electrodes, size of all welds, and type and size of all bolts. Shop drawings shall be prepared under the supervision of a professional engineer licensed in the jurisdiction where the project is located.
9. Primer, unless otherwise noted:
- A. Clean surfaces to remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards: SSPC-SP 2, "Hand Tool Cleaning" for all steel other than
- B. Omit paint at slip critical connections and areas to be welded.
- C. Interior steel: Provide chemically active, modified alkyl primer at 2.5 mils dry thickness.
10. Beams bearing on masonry shall have angle wall anchors and bear a minimum of 8" onto the wall. Masonry shall be built tightly around beam unless otherwise noted.
11. Beams (16" or greater in depth) and columns that are encased in masonry shall have adjustable masonry anchors spaced at 2'-0" on center.
12. See all contract drawings for miscellaneous steel requirements.
13. All shop and field welding shall be performed by a recently certified welder.
14. All welding and high strength bolting must be inspected by a qualified testing laboratory. Laboratory shall be approved by the Architect and/or Engineer.
15. At column base plates, provide a minimum of 1" grout with (4) 3/4" diameter anchor bolts with 1'-0" embedment, unless otherwise noted on contract documents.
16. Miscellaneous hanging loads such as stair stringers, pipes, mechanical units, etc., supported by steel members shall be applied in such a manner that no torsional forces are induced in the steel members, i.e., loads shall pass through the centerline of wide flange sections and through the shear center of channels.

STRUCTURAL STEEL WELDING

1. All welding shall be in strict conformance with the latest building code and AWS D1.1.
2. The Contractor shall provide welding procedure specification (WPS) and detailed sequence of welding sketch for review and approval prior to starting of fabrication. The sequence of welding shall be planned to minimize locked-in stresses and distortion.
3. All welding electrodes (filler metal) shall be E70XX (70 ksi), unless otherwise noted.
4. Complete penetration groove welds shall have filler metal with Charpy V-notch toughness of 20 ft.-lbs. average at 40° F.
5. Certify conformance to Charpy V-notch toughness requirements with tests by an independent testing laboratory for each AWS classification, manufacturer, and trade name. The sizes as specified by AWS shall be tested.
6. Lengths of welds are effective lengths. Where length of weld is not shown, it shall be full length of joint. All butt welds shall be full penetration unless otherwise noted.
7. Welders shall be qualified and certified for the work they will be performing and shall have current certifications.
8. Faces of fillet welds exposed to view shall have as-welded surfaces that are reasonably smooth and uniform. No finishing or grinding shall be required, except where clearances or fit of other items may so necessitate.
9. All partial and full penetration welds which are exposed to view shall be ground smooth and flush with finish surface of steel. Holes shall be filled with weld metal or body solder and smoothed by grinding or filing.
10. Clean groove preparation thermal cuts by grinding.
11. Welds shall be terminated at the end of a joint in a manner that will ensure sound welds. Whenever necessary, this shall be done by the use of extension bars and run-off tabs.
12. To assure the proper amperage and voltage of the welding process, a hand-held calibrated amp and volt meter shall be used. This equipment shall be used by the fabricator, erector, and inspectors. Amperage and voltage shall be measured at the arc with this equipment. Travel speed and electrode stick out shall be verified to be in compliance with the electrode manufacturer's recommendations and with the approved WPS.

REVISIONS:

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTED MEADOWS ARCHITECT &

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO

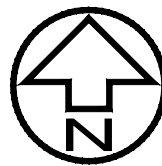
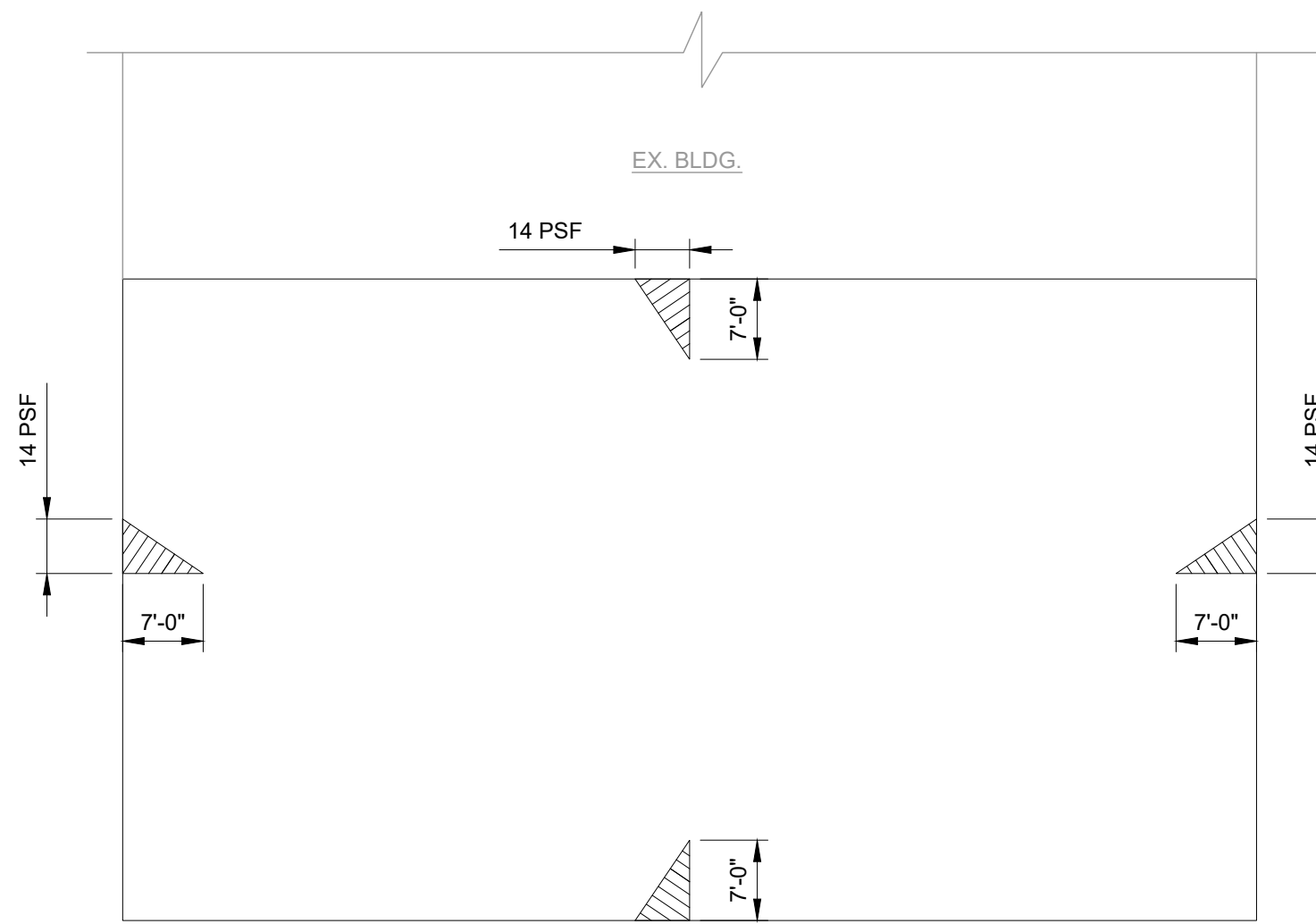


DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

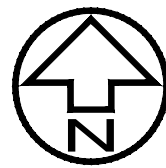
THIS DWG :
GENERAL NOTES

COMM 21161-B
DATE 02-01-2024

DWG
S-0.1



SNOW DRIFT PLAN
N.T.S.



JOIST (ALLOWABLE) NET UPLIFT PLAN
N.T.S.

- ZONE 1 - 11 PSF
▨ ZONE 2 - 21 PSF
▩ ZONE 3 - 33 PSF

STEEL JOIST CONSTRUCTION

- Steel joist construction shall conform to the Standard Specifications and Code of Standard Practice for Steel Joists and Joist Girders of the Steel Joist Institute, latest edition.
- Provide steel joist end anchorage, bridging, and bridging anchorage in accordance with Standard Specifications of the Steel Joist Institute, latest edition. Weld steel joist bearing ends to steel supports or bearing plates.
- When horizontal bridging is used at the top and bottom chords of steel joists, provide additional angle x-bridging as follows:
 - For bridging attached to masonry walls, provide additional angle x-bridging between the second, third, and fourth joists from exterior walls (second and third joist spaces).
 - For bridging attached to steel beams, provide additional angle x-bridging between the first, second, and third joists from spandrel beams (first and second joist spaces).
- Provide header angles and double joists as required for openings. See structural and mechanical drawings.
- Provide sloped end bearing where required.
- In addition to the horizontal bridging required by the Steel Joist Institute for roof joists, provide a single line of bottom chord bridging near the first bottom chord panel point.
- See drawings for uplift loads. Design joists and furnish bridging as required to resist and support uplift loads.

STEEL DECK

- The metal decking shall be of the type and gauge as indicated on the drawings. Decking and all accessories shall be formed from steel sheets conforming to ASTM A653. The steel shall be zinc coated conforming to ASTM A924, Class G60 as required in the specifications. Deck units shall be continuous over three or more spans where possible.
- Diaphragm action shall be provided for in all areas with welding pattern in accordance with manufacturer's recommendations.
- All welding of metal deck shall be in accordance with AWS D1.3.
- Hanging directly from roof deck shall not be permitted.
- All metal deck shall be welded to structural steel by qualified welders experienced in welding light-gauge steel, and using prequalified procedures. The erector shall establish a welding procedure for the arc spot welding weld of the steel decking to the structural steel of a particular gauge used. Prior to the start of erection of steel deck, each welder shall be qualified using this procedure and witnessed by the Owner's testing agency.
- Section properties shall be determined according to the Light Gauge Steel Institute.
- Headed studs used as shear connectors shall be 3/4" diameter Nelson studs unless otherwise noted.
- Comply with Steel Deck Institute Specifications for deck attachment and connectors.
- Steel deck shall be erected and fastened in accordance with the manufacturer's specifications and erection layouts.

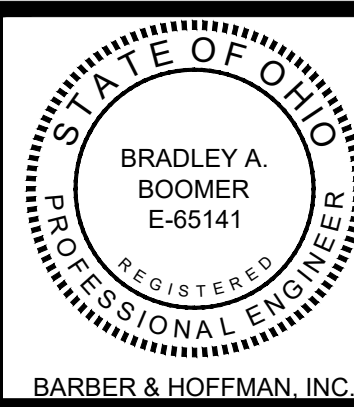
POST-INSTALLED ANCHORS

- Anchorage to hardened concrete or masonry shall include torque controlled expansion anchors and adhesive anchors of size, number and spacing as shown on the drawings.
- All anchors shall be installed in accordance with the Manufacturer's Printed Installation Instructions (MPII).
- Existing reinforcing bars in the concrete or masonry may conflict with specific anchor locations. Reinforcing bars shall not be cut unless specifically noted on the drawings or approved by the Engineer of Record. The contractor shall review the structural drawings and shall locate the position of reinforcing bars in the vicinity of the anchors, by ground penetrating radar (GPR), x-ray, or other means.
- Anchors shall be installed in holes drilled with a rotary impact hammer drill. Core drilling of holes is not permitted. Holes and anchor shall be thoroughly cleaned per the MPII prior to installation of the anchor.
- Stainless steel anchors shall be used at all exterior locations and where specifically noted on the drawings.
- Remove and replace misplaced or malfunctioning anchors. Patch failed anchor locations with high-strength non-shrink, non-metallic grout.
- Installed adhesive anchors shall be securely held in-place to prevent displacement while the adhesive cures.
- All anchors supporting structural elements shall be enclosed with a fire-resistance-rated envelope or protected by approved fire-resistance rated materials.
- Quality Control:
 - All anchors shall be periodically inspected to meet the requirements of MPII and the ICC-ES ESR report for the product.
 - All anchor installers shall be trained by the manufacturer or manufacturer's representative for each individual product being installed.
- Submittals:
 - Technical product literature, highlighting each anchor and size to be used on the project.
 - Manufacturer's Printed Installation Instructions (MPII) for each anchor type.
 - Engineering Design Data: For each substitution request, provide calculations substantiating specified design requirements, sealed by a professional engineer licensed in the jurisdiction where project is located.
- Where a specific type of anchorage is indicated on the drawings, substitution for a different type of anchorage shall meet the requirements of ACI 308.4 Category 1 or ACI 308.4 Category 1 for anchorage into concrete or shall have an ICC-ES ESR report for anchorage into masonry. Substitution shall not be permitted without prior written approval of the Engineer of Record.
- Anchors to hardened concrete shall be supplied as an entire system and shall be as follows:
 - Torque Controlled Expansion Anchors (Expansion Anchors) in cracked and un-cracked concrete as indicated on the drawings shall be Hilti KWIK Bolt TZ Expansion Anchor (ICC-ES Evaluation Report: ESR# 1917).
 - Adhesive anchors in cracked and un-cracked concrete indicated on the drawings shall be Hilti HIT-HY 200 Safe Set Adhesive Anchoring System (ICC-ES Evaluation Report: ESR# 3187). The following anchor rods shall be used with the system:
 - Reinforcing bar meeting the requirements of ASTM A615/A706 Grade 60.
 - All-threaded rod shall be Hilti HIT-Z rods.
- Requirements and design parameters of post-installed anchors into hardened concrete:
 - Concrete shall have a minimum compressive strength of 2,500 psi and a minimum age of 21-days at the time of installation for adhesive anchors and 7-days for expansion anchors.
 - Concrete temperature at the time of installation of adhesive anchors shall be a minimum of 50°F.
 - Concrete may be water saturated or dry; water filled holes shall not be allowed.
 - Embedment depth and anchor projection shall be as detailed on the drawings. Unless otherwise noted, minimum embedment depths, spacing, and edge distance shall be by the table below.
- Anchors into masonry shall be supplied as an entire system and shall be as follows:
 - Torque Controlled Expansion Anchors (Expansion Anchors) in solid or grout filled masonry as indicated on the drawings shall be Hilti KWIK Bolt 3 Expansion Anchor (ICC-ES Evaluation Report: ESR# 1385).
 - Adhesive anchors in hollow, solid or grout filled masonry as indicated on the drawings shall be Hilti HIT-HY 70 Hybrid for Masonry Construction (ICC-ES Evaluation Report: ESR# 3342). Screen tubes shall be used for all connections to hollow masonry. The following anchor rods shall be used with the system:
 - All-threaded rod shall be Hilti HAS-E rod.
 - Stainless steel anchor rods shall be AISI Type 304 or 316.
- Requirements and design parameters of post-installed anchors into masonry:
 - Masonry grout shall have a minimum compressive strength of 2,000 psi and a minimum age of 21-days at the time of installation for adhesive anchors and 7-days for expansion anchors.
 - Masonry temperature at the time of installation of adhesive anchors shall be between 41°F, and 104°F.
 - Masonry may be water saturated or dry; water filled holes shall not be allowed.
 - Embedment depth and anchor projection shall be as detailed on the drawings. Unless otherwise noted, minimum embedment depths, spacing, and edge distance shall be by the table below.

Post-installed Concrete Anchors						
Diameter	Torque-controlled Anchors			Adhesive Anchors		
	Minimum Embed.	Min. Edge Distance	Minimum Spacing	Minimum Embed.	Min. Edge Distance	Minimum Spacing
3/8" #3	2"	4 1/2"	5"	4 1/2"	3 1/2"	4 1/2"
1/2" #4	3 1/4"	7 1/2"	5 3/4"	6"	4 1/2"	6"
5/8" #5	4"	8 3/4"	6"	7 1/2"	5 1/2"	7 1/2"
3/4" #6	4 3/4"	10"	9"	8 1/2"	7"	8 1/2"
#7				10 1/2"	10 1/2"	10 1/2"
#8				12"	12"	12"
#9				13 1/2"	13 1/2"	13 1/2"

Post-installed Masonry Anchors						
Diameter	Torque-controlled Anchors			Adhesive Anchors		
	Minimum Embed.	Min. Edge Distance	Minimum Spacing	Minimum Embed.	Min. Edge Distance	Minimum Spacing
3/8"	2 1/2"	5"	6"	3 1/2"	12"	13 1/2"
1/2"	3 1/2"	7 1/4"	7 3/4"	4 1/2"	12"	18"
5/8"	4"	8 1/2"	9"	5 3/4"	20"	22 1/2"
3/4"	4 3/4"	9 3/4"	10 3/4"	6 3/4"	20"	27"

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600 MARKET AVENUE NORTH

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WATER DEPARTMENT SERVICE CENTER
CANTON, OHIO
2664 HARRISBURG RD. NE



DAVID L. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

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GENERAL NOTES

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DATE 02-01-2024

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STRUCTURAL TESTING AND SPECIAL INSPECTIONS

Structural testing and special inspections are required. The owner shall engage a qualified independent testing agency to conduct structural testing and special inspections. Special inspectors shall be employed or retained by the approved testing agency and have the recommended experience and certifications as summarized in Appendix C of the current International Code Counsel (ICC) Special Inspection Manual. The testing agency may employ or retain multiple special inspectors with differing areas of expertise as required for the project.

At or before project completion, the qualified testing agency shall submit a written summary statement indicating that applicable structural testing and special inspections have been completed. The written summary statement shall clearly identify non-compliant test and inspection results. The written summary statement shall be sealed by the testing agencies supervising professional engineer and be submitted to the owner, building official, and design professionals. The required testing and inspections are indicated in the following table.

Description of Structural Special Inspection & Testing Requirements				
Verification and Inspection	Frequency	Referenced Standard	BC Reference	Additional Notes

Soils				
Foundation Bearing & Fill Placement				
Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	Periodic	Geotechnical Report	N/A	
Verify excavations are extended to proper depth and have reached proper material.	Periodic	Geotechnical Report	N/A	
Perform classification and testing of compacted fill materials.	Periodic	Geotechnical Report	N/A	
Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	Continuous	Geotechnical Report	N/A	
Prior to placement of compacted fill, observe subgrade and verify that site has been prepared properly.	Periodic	Geotechnical Report	N/A	
Verify all requirements of geotechnical report are met.	Periodic	Geotechnical Report	N/A	

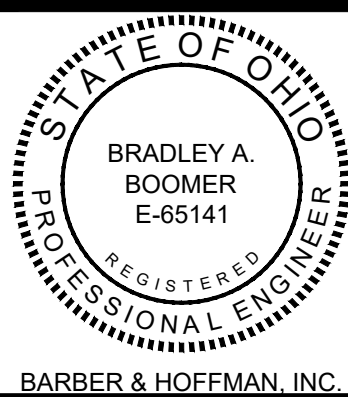
Description of Structural Special Inspection & Testing Requirements				
Verification and Inspection	Frequency	Referenced Standard	BC Reference	Additional Notes

Concrete				
Cast-In-Place Concrete				
Inspect reinforcing steel including prestressing tendons: a. Verify reinforcing bar grade. b. Verify reinforcing bars are free of dirt, excessive rust, and damage. c. Verify reinforcing bars are adequately tied, chaired, and supported to prevent displacement during concrete placement. d. Verify proper clear distances between bars and to surfaces of concrete. e. Verify reinforcing bar size and placement. f. Verify bar laps for proper length and stagger. g. Verify mechanical splices placement and attachment. h. Verify epoxy or galvanized coating and coating damage is repaired.	Periodic - Prior to each pour.	ACI 318: Ch 20, 25.2, 25.3, 26.1-26.6.3	1908.4	
Inspection of reinforcing steel welding: a. Verify weldability of reinforcing steel. b. Verify proper electrodes and storage of electrodes. c. Verify proper joint preparation. d. Inspect single- pass fillet welds, maximum 5/16". e. Inspect all other welds. d. Review welder certifications for both fabricator's shop staff and field erectors.	Periodic	AWS D1.4 ACI 318: 26.6.4		
Inspect embedments, bolts, headed bolts, and headed studs to be installed in concrete prior to and during concrete placement.	Periodic	ACI 318: 17.8.2	N/A	
Verify use of required mix design: a. Verify mixer truck trip ticket conforms to approved mix design. b. Verify that total water added to mix on site does not exceed that allowed by the concrete mix design. c. Verify that concrete quality is indicative of adequate mixing time, consistency, and relevant time limits.	Periodic - Prior to each pour.	ACI 318: 26.4.3 ACI 301, ACI 214R	1904.1 1904.2 1908.2 1918.3	
Inspect formwork for cleanliness, shape, location and dimensions of the concrete member being formed.	Periodic - Prior to each pour.	ACI 318: 26.11.1.2(b)	N/A	
Inspect concrete and shotcrete placement for proper application techniques, including proper consolidation, reinforcement remains at proper location, and conveyance and depositing avoid segregation and contamination.	Continuous	ACI 318: 26.5	1908.6 1908.7 1908.8	
Sample fresh concrete:	Obtain one composite sample of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 150 cy. of concrete nor less than once for each 5,000 sqft. of surface area for slabs or walls. If the total volume of concrete is such that frequency of testing required would provide less than five composite samples for a given class of concrete, tests shall be made from at least five randomly selected batches (per ASTM D3665) or from each batch if fewer than five batches are used.	ACI 318: 26.4 ASTM C 172	1908.10	A composite sample shall consist of the following: five 4" diameter cylinders, or four 6" diameter cylinders.
Obtain test cylinders of concrete.	One set of five 4" diameter cylinders or four 6" diameter cylinders for each composite sample.	ACI 318: 26.12 ASTM C 31	N/A	Cast additional cylinders at contractor's request and expense for field cured specimens to determine shoring removal, early strength for post-tensioning, etc.
Obtain grout cubes for deferred placed concrete toppings	One set of three 2" molded-cube for each composite sample.	ASTM C 109	N/A	
Perform slump tests.	One test at point of discharge for each composite sample.	ASTM C 143	N/A	
Perform air content tests.	One test at point of discharge for each composite sample.	ASTM 231 pressure method for normalweight concrete; ASTM C 173, volumetric method for lightweight concrete	N/A	
Determine the temperature of fresh concrete.	One test for each composite sample, and test hourly and when air temperature is below 40 F or when above 80 F.	ASTM C 1064	N/A	
Determine the unit weight of fresh lightweight concrete.	One test at point of discharge for each composite sample of lightweight concrete.	ASTM C567	N/A	
Review and inspect cold weather concrete procedures and placement.	Periodic - Prior to each pour.	ACI 306.1 ACI 318 26.5.4		
Review and inspect hot weather concrete procedures and placement.	Periodic - Prior to each pour.	ACI 305.1 ACI 318 26.5.5		
Inspect for maintenance of specified curing temperature and techniques.	Periodic - After each pour.	ACI 318: 26.5.3	1908.9	
Laboratory test concrete cylinders for compressive strength.	One specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.	ACI 318: 26.12 ASTM C 39	N/A	Three specimens shall be tested at 28 days if using 4" diameter cylinders. Test additional cylinders at contractor's request and expense.
Laboratory test concrete cubes for compressive strength for deferred placement toppings.	Test one set of three specimens at 28 days.	ASTM C 109	N/A	
Inspect anchors post- installed into hardened concrete a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads. b. All other Mechanical anchors and adhesive anchors not defined in a.	Continuous Periodic	ACI 318: 17.8.2.4 ACI 318: 17.8.2	N/A	
Measure & report floor slab levelness (FL) and flatness (FF) for shored, non-cambered, and non-inclined surfaces.	Measure all floors within 24 hours of finishing.	ACI 117 4.8.5 ASTM E1155	N/A	
Measure & report floor slab flatness for cambered, unshored, and inclined surfaces.	Measure the gap under a freestanding (unleveled) 10 ft. straightedge.	ACI 117: 4.8.6	N/A	
Deferred placement floor toppings shall be tested for delamination by dragging a steel chain over the surface.	All floor areas after 28 days.	N/A	N/A	

Description of Structural Special Inspection & Testing Requirements				
Verification and Inspection	Frequency	Referenced Standard	BC Reference	Additional Notes

Masonry				
Level B Inspection of Masonry				
Verification of fm and fAAC prior to construction.	Periodic	ACI 530.1: Art. 1.4B	N/A	
Verify slump flow and VSI delivered to the site for self-consolidating grout.	Continuous	ACI 530.1: Art. 1.5B.1.b.3	N/A	
Verify compliance with approved submittals.	Periodic	ACI 530.1: Art. 1.5	N/A	
As masonry construction begins, the following shall be verified to ensure compliance:				
Verify proportions of site-prepared mortar.	Periodic	ACI 530.1: Art. 2.1, 2.6A	N/A	
Verify construction of mortar joints.	Periodic	ACI 530.1: Art. 3.3B	N/A	
Verify location of reinforcement and connectors.	Periodic	ACI 530.1: Art. 3.4	N/A	
During construction the inspection program shall verify:				
Verify size and location of structural elements.	Periodic	ACI 530.1: Art. 3.3F	N/A	
Verify type, size, and location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction.	Periodic	ACI 530: 1.2.1(e), 6.1.4.3, 6.2.1	N/A	
Verify specified size, grade, and type of reinforcement and anchor bolts.	Periodic	ACI 530: 6.1 ACI 530.1: Art. 2.4	N/A	
Verify welding of reinforcing bars.	Continuous	ACI 530: 8.1.6.7.2, 9.3.3.4 (c) 11.3.3.4 (b)	N/A	
Verify preparation, construction and protection of masonry during cold weather (temperature below 40° F)	Periodic	ACI 530.1: Art. 1.8C	N/A	
Verify preparation, construction and protection of masonry during hot weather (temperature above 90° F)	Periodic	ACI 530.1: Art. 1.8D	N/A	
Prior to grouting, the following shall be verified to ensure compliance:				
Verify grout space is clean.	Periodic	ACI 530.1: Art. 3.2D, 3.2F	N/A	
Verify placement of reinforcement and connectors.	Periodic	ACI 530: 6.1 ACI 530.1: Art. 2.4	N/A	
Verify proportions of site-prepared grout.	Periodic	ACI 530.1: Art. 2.6B, 2.4 G.1.b	N/A	
Verify construction of mortar joints.	Periodic	ACI 530.1: Art. 3.3B	N/A	
Verify grout placement.	Continuous	ACI 530.1: Art. 3.5	N/A	
Observe preparation of any required grout specimens, mortar specimens and/or prisms.	Periodic	ACI 530.1: Art. 1.4 B.2.a.3, 1.4 b.2.b.3, 1.4 b.2.c.3, 1.4 B.3, 1.4 B.4	N/A	

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CANTON, OHIO



DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

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SPECIAL INSPECTIONS

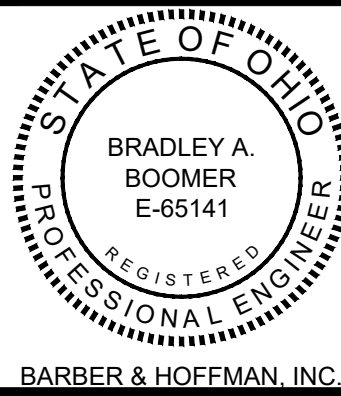
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Description of Structural Special Inspection & Testing Requirements				
Verification and Inspection	Frequency	Referenced Standard	BC Reference	Additional Notes
Metals				
Structural Steel				
Inspection Tasks Prior to Welding:		AISC 360 Table N5.4-1	2204.1	
Verify procedure specifications (WPS) available	Perform	AISC 360 Section N5.4		
Manufacturer certifications for welding consumables available.	Perform	AISC 360 Section N5.4		
Material identification (type/grade)	Observe	AISC 360 Section N5.4		
Check identification system	Observe	AISC 360 Section N5.4		
Fit up of groove welds a. Joint preparation b. Dimensions (alignment, root opening, root face, bevel) c. Cleanliness (condition of steel surface) d. Tacking (tack weld quality and location) e. Backing type and fit	Observe	AISC 360 Section N5.4		
Configuration and finish of access holes	Observe	AISC 360 Section N5.4		
Fit up of fillet welds a. Dimensions (alignment,gaps at root) b. Cleanliness (condition of steel surface) c. Tacking(tack weld quality and location)	Observe			
Inspection Tasks During Welding:		AISC 360 Table N5.4-2	2204.1	
Use of qualified welders	Observe	AISC 360 Section N5.4		
Control and handling of welding consumables a. Packing b. Exposure control	Observe	AISC 360 Section N5.4		
No welding over cracked tack welds	Observe	AISC 360 Section N5.4		
Environmental conditions a. Wind speed within limits b. Precipitation and temperature	Observe	AISC 360 Section N5.4		
WPS followed a. Settings on welding equipment b. Travel speed c. Selected welding material d. Shielding gas type/flow rate e. Preheat applied f. Interpass temperature maintained g. Proper position (F,V,H,OH)	Observe	AISC 360 Section N5.4		
Welding techniques a. Interpass and final cleaning b. Each pass within profile limitations c. Each pass meets quality requirements	Observe	AISC 360 Section N5.4		
Inspection Tasks After Welding:		AISC 360 Table N5.4-3	2204.1	
Welds cleaned	Observe	AISC 360 Section N5.4		
Size,length and location of welds	Perform	AISC 360 Section N5.4		
Welds meet visual acceptance criteria a. Crack prohibition b. Weld/base-metal fusion c. Crater cross section d. Weld profiles e. Weld size f. Undercut g. Porosity	Perform	AISC 360 Section N5.4		
Arc strikes	Perform	AISC 360 Section N5.4		
k-Area (When welding of doubler plate, continuity plates or stiffeners in k-area, visually inspect the wed k-area for crack with in 3 in.)	Perform	AISC 360 Section N5.4		
Backing removed and weld tabs removed (if required)	Perform	AISC 360 Section N5.4		
Repair activities	Perform	AISC 360 Section N5.4		
Document acceptance or rejection of welded joint or member	Perform	AISC 360 Section N5.4		
Inspection of Welding in Field and in Non AISC Certified Shops: a. Complete joint penetration groove welds subject to transversely applied tension loading in butt, T and corner joints with materials 5/16 inches or thicker. b. Welder qualifications.	Test 100% of welds by ultrasonic testing for risk category III or IV. Test 10% of welds by ultrasonic testing for risk category II.	AISC 360 Section N5.5		All welds subject to non-destructive testing shall also meet visual acceptance criteria per AWS Table 6.1.
Inspection Tasks Prior to Bolting:		AISC 360 Table N5.6-1	2204.2	
Manufacturer's certifications available for fastener materials	Perform	AISC 360 Section N5.6		
Fasteners marked in accordance with ASTM requirements	Observe	AISC 360 Section N5.6		
Proper fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane)	Observe	AISC 360 Section N5.6		
Proper bolting procedure selected for joint detail	Observe	AISC 360 Section N5.6		
Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements	Observe	AISC 360 Section N5.6		
Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used	Observe	AISC 360 Section N5.6		
Proper storage provided for bolts,nuts washers and other fastener components	Observe	AISC 360 Section N5.6		
Inspection Tasks During Bolting:		AISC 360 Table N5.6-2	2204.2	
Fastener assemblies, of suitable condition, placed in all holes and washers (if required) are positioned as required	Observe	AISC 360 Section N5.6		
Joint brought to the snug- tight condition prior to the pretensioning operation	Observe	AISC 360 Section N5.6		
Fastener component not turned by the wrench prevented from rotating	Observe	AISC 360 Section N5.6		
Fasteners are pretensioned in accordance with the RCSC specification, progressing systematically from the most rigid point toward the free edges	Observe	AISC 360 Section N5.6 AISC 348		
Inspection Tasks After Bolting:		AISC 360 Table N5.6-3	2204.2	
Document acceptance or rejection of bolted connections	Perform	AISC 360 Section N5.6		
Inspection of Steel Frame: a. Verify installation of all members. b. Verify proper application of details to each joint and connection. c. Verify bracing and stiffening of framing members. d. Verify members and detail critical to frame stability.	Perform	AISC 360 Section N5.7		
Verify Material Grade of Structural Steel: a. Verify identification markings conform to AISC 360 for materials specified in the approved construction documents. b. Manufacturer's certificate of compliance required.	Observe	AISC 360 Section N5.7		
Inspection of anchor rods and other embedments supporting structural steel: a. Verify the diameter, grade, type and length of anchor rod or embedded item b. Verify the extent or depth of embedment into concrete prior to placement of concrete.	Observe	AISC 360 Section N5.7		
Inspection of Welding and Bolting in AISC Certified Shop: a. Review Fabricator's Certificate of Compliance for certified fabricators shop.	Once for Each Fabricator	AISC 360 Section N7	1704.2	

Description of Structural Special Inspection & Testing Requirements				
Verification and Inspection	Frequency	Referenced Standard	BC Reference	Additional Notes
Open-Web Steel Joists				
Review manufacturer's Certificate of Compliance for certified fabricators.	Once per manufacturer.	N/A	1704.2	Joist Manufacturer to be SJI Certified Manufacturer, or shop inspection is required.
Inspection of Welding in Field: a. Welder qualifications. b. Joist and Joist Girder welding.	Each Welder Requirements same as structural steel welding.	AWS D1.1 AWS D1.1	1704.3.1 1704.3.1	
End connections welded or bolted	Periodic	SJI specs listed in section 2207.1.		
Bridging horizontal or diagonal: a. Standard bridging. b. Bridging that differs from SJI specs listed in section 2207.1.	Periodic Periodic	SJI specs listed in section 2207.1.		
Metal Decking				
Review manufacturer's Certificate of Compliance for certified fabricators.	Once per manufacturer.	N/A	1704.2	Deck Manufacturer shall be SDI Certified Manufacturer, or shop inspection is required.
Inspection or Execution Tasks Prior to Deck Placement: a. Verify compliance of materials (deck and all deck accessories) with construction documents, including profiles, material properties, and base metal thickness b. Document acceptance or rejection of deck and deck accessories	Perform Perform	SDI QA/QC 2017 Table 1.1	N/A	
Inspection or Execution Tasks After Deck Placement: a. Verify compliance of deck and all deck accessories with construction documents. b. Verify deck materials are represented by mill certifications that comply with the construction documents. c. Document acceptance or rejection of installation of deck and deck accessories.	Perform Perform Perform	SDI QA/QC 2017 Table 1.2	N/A	
Inspection or Execution Tasks Prior to Welding: a. Verify procedure specifications (WPS) available b. Manufacturer certifications for welding consumables available. c. Material identification (type/grade) d. Check welding equipment	Observe Observe Observe Observe	SDI QA/QC 2017 Table 1.3	N/A	
Inspection or Execution Tasks During Welding: a. Use of qualified welders b. Control and handling of welding consumables c. Environmental conditions (wind speed, moisture, temperature) d. WPS followed	Observe Observe Observe Observe	SDI QA/QC 2017 Table 1.4	N/A	
Inspection or Execution Tasks After Welding: a. Verify size and location of weld, including support, sidelap, and perimeter welds. b. Welds meet visual acceptance criteria c. Verify repair activities d. Document acceptance or rejection of welds	Perform Perform Perform Perform	SDI QA/QC 2017 Table 1.5	N/A	
Inspection or Execution Tasks Prior to Mechanical Fastening: a. Manufacturer installation instructions available for mechanical fasteners b. Proper tools available for fastener installation c. Proper storage for mechanical fasteners	Observe Observe Observe	SDI QA/QC 2017 Table 1.6	N/A	
Inspection or Execution Tasks During Mechanical Fastening: a. Fasteners are positioned as required b. Fasteners are installed in accordance with manufacturer's instructions	Observe Observe	SDI QA/QC 2017 Table 1.7	N/A	
Inspection or Execution Tasks After Mechanical Fastening: a. Check spacing, type, and installation of support fasteners b. Check spacing, type, and installation of sidelap fasteners c. Check spacing, type, and installation of perimeter fasteners d. Verify repair activities e. Document acceptance or rejection of mechanical fasteners	Perform Perform Perform Perform Perform	SDI QA/QC 2017 Table 1.8	N/A	

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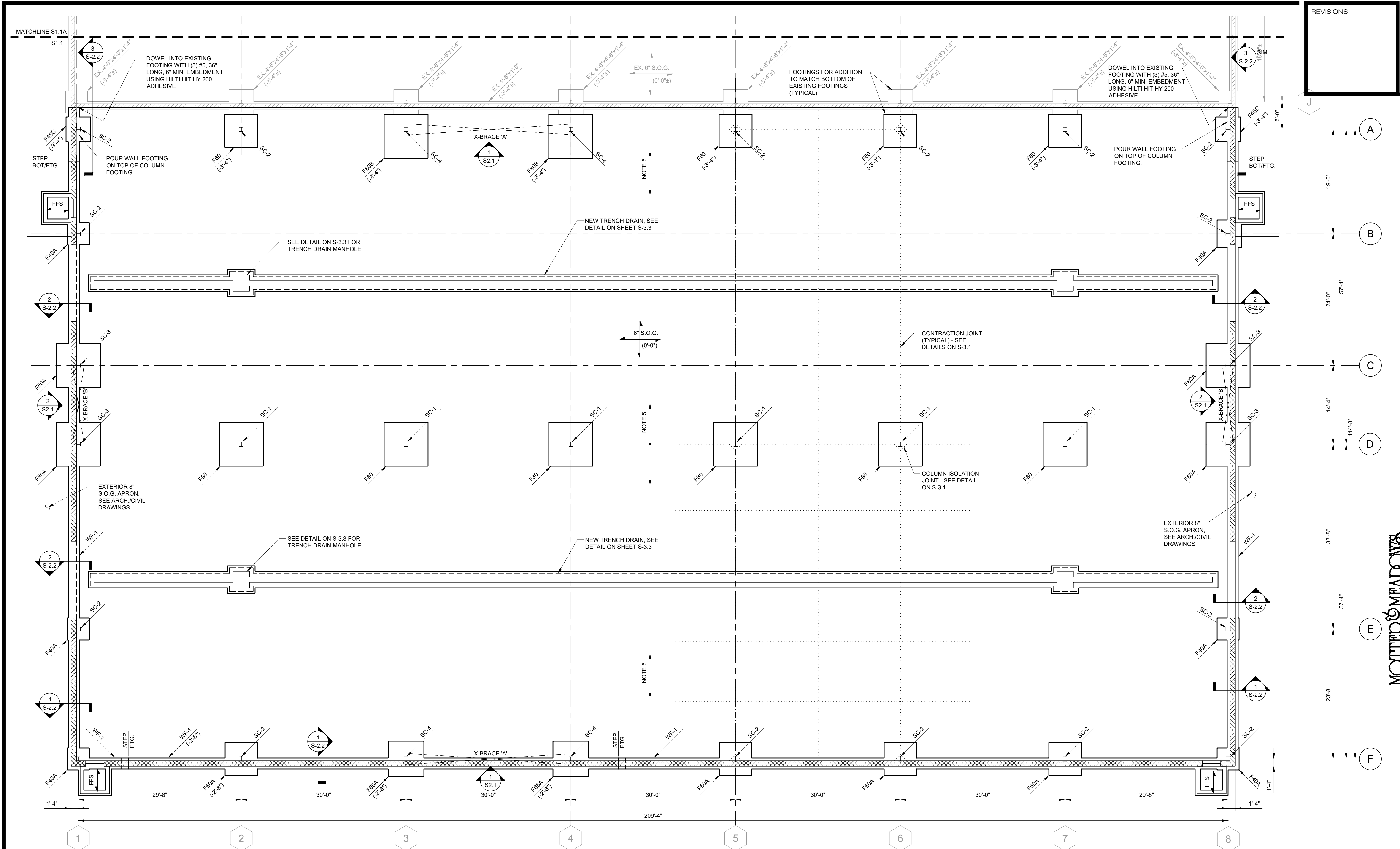


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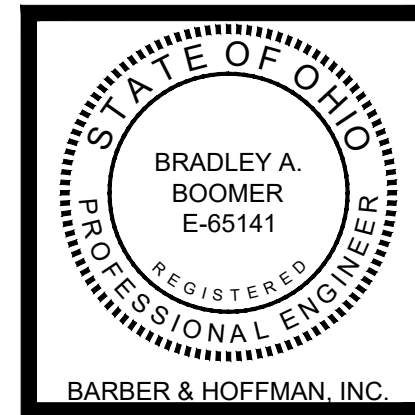
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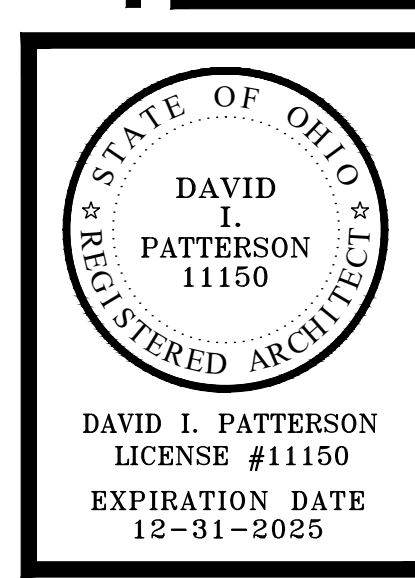
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THIS DWG :
FOUNDATION PLAN -
ADDITION

COMM 21161-B
DATE 02-01-2024

DWG
S-1.1

FOOTING SCHEDULE		
MARK	SIZE	REINFORCEMENT TOP & BOTTOM (EACH WAY)
F40A	4'-0" x 4'-0" x 2'-8"	(4) #4
F45C	4'-6" x 4'-6" x 3'-4"	(5) #4
F55A	5'-6" x 5'-6" x 2'-8"	(4) #5
F60A	6'-0" x 6'-0" x 2'-8"	(5) #5
F65A	6'-6" x 6'-6" x 2'-8"	(5) #5
F80	8'-0" x 8'-0" x 2'-0"	(6) #6
F80A	8'-0" x 8'-0" x 2'-8"	(6) #6
F80B	8'-0" x 8'-0" x 1'-4"	(6) #6

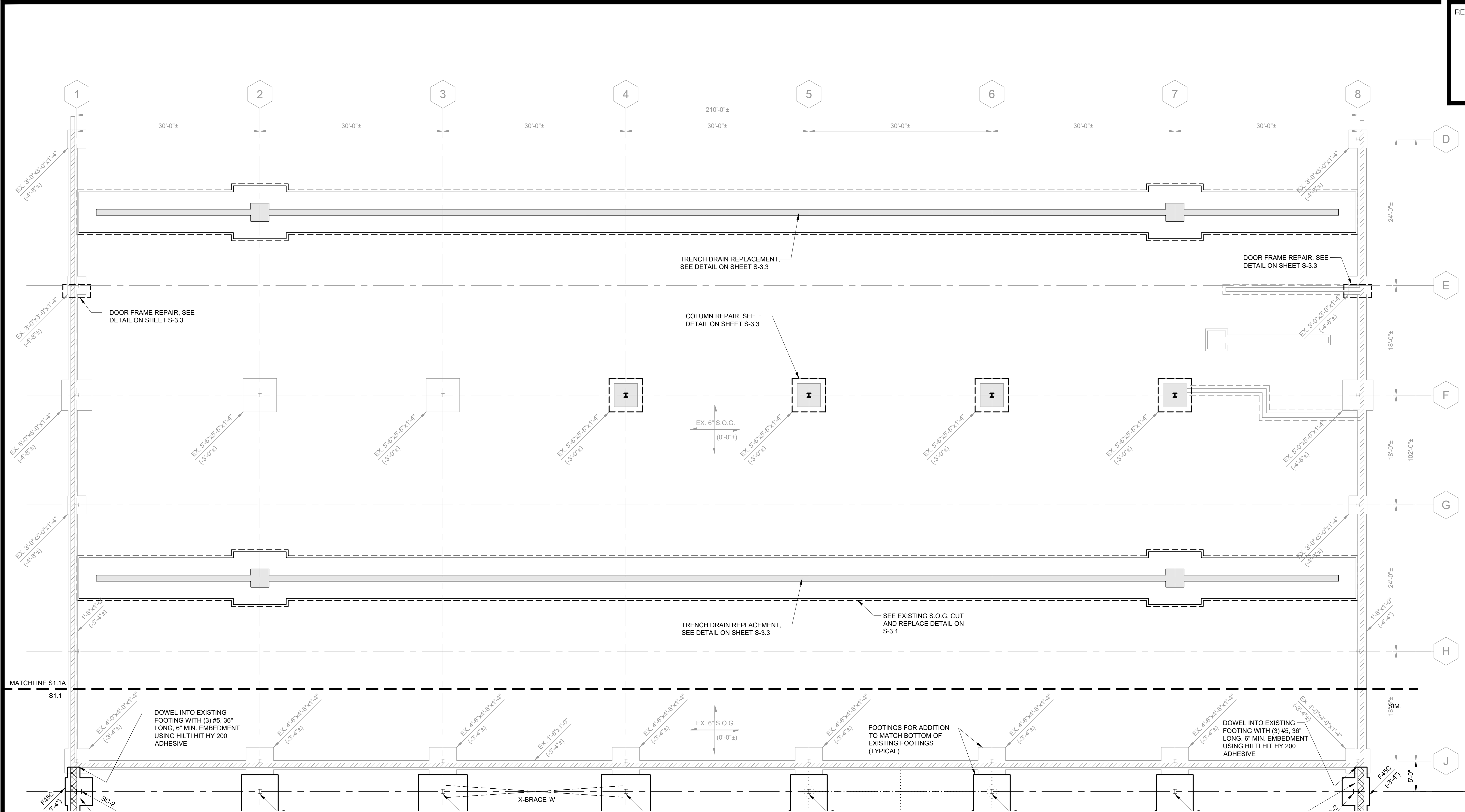
- PLAN NOTES:**
- FIRST FLOOR ELEVATION = (1060.6') = REFERENCE ELEVATION (0'-0") UNLESS OTHERWISE NOTED.
 - ELEVATIONS GIVEN ARE TO TOP OF SLAB AND ARE REFERENCED FROM FIRST FLOOR ELEVATION (0'-0").
 - TOP OF FOOTING ELEVATIONS ARE AT (-1'-4") AND ARE REFERENCED FROM FIRST FLOOR ELEVATION (0'-0"), UNLESS OTHERWISE NOTED.
 - EXISTING CONDITIONS SHOWN ARE FOR REFERENCE ONLY. FIELD VERIFY ALL EXISTING CONDITIONS.
 - SLOPE SLAB TO DRAINS. MAINTAIN SLAB THICKNESS INDICATED AS MINIMUM.

FOUNDATION PLAN - ADDITION
1/8"=1'-0"

- PLAN LEGEND:**
- 6" S.O.G. 6" CONCRETE SLAB ON GRADE WITH 6x6-W2.9 x W2.9 WELDED WIRE REINFORCING.
 - FFS FROST FREE SLAB. SEE TYPICAL DETAIL ON S-3.1. COORDINATE DIMENSIONS W/ ARCHITECTURAL & SITE PLANS.
 - 12" CMU WALL WITH #5 @ 48" O.C. FULL HEIGHT. GROUT REINFORCED CELLS AND PORTION OF WALL BELOW GRADE SOLID UNLESS OTHERWISE NOTED. SEE SHEET S-3.2 FOR ADDITIONAL REINFORCING REQUIREMENTS.
 - FXX SPREAD FOOTING. SEE SCHEDULE THIS SHEET.

- PLAN LEGEND (CONT.):**
- SC-1 W10x39 WITH 1"x18"x1'-6" BASE PLATE WITH 3/4"Ø ANCHOR RODS
 - SC-2 W10x33 WITH 1"x18"x1'-6" BASE PLATE WITH 3/4"Ø ANCHOR RODS, TYPICAL UNLESS OTHERWISE NOTED ON PLAN.
 - SC-3 W10x33 WITH 1 3/4"x20"x1'-8" BASE PLATE AND 1"Ø ANCHOR RODS - SEE X-BRACING DETAILS ON SHEET S-2.1 FOR ADDITIONAL INFORMATION.
 - SC-4 W10x33 WITH 1 1/2"x20"x1'-8" BASE PLATE AND 1"Ø ANCHOR RODS - SEE X-BRACING DETAILS ON SHEET S-2.1 FOR ADDITIONAL INFORMATION.
 - WF-1 2'-0"x2'-8" WALL FOOTING WITH (3) #5 TOP AND BOTTOM

2217 East 9th Street, Suite 350
Cleveland OH 44115-1257
216-875-0100 (F) 216-875-0111
barberhoffman.com
BARBER & HOFFMAN, INC.
Consulting Engineers





FOUNDATION PLAN - EXISTING
1/8"=1'-0"

PLAN NOTES:

- FIRST FLOOR ELEVATION = (1060.6') = REFERENCE ELEVATION (0'-0") UNLESS OTHERWISE NOTED.
- EXISTING CONDITIONS SHOWN ARE FOR REFERENCE ONLY. FIELD VERIFY ALL EXISTING CONDITIONS.

PLAN LEGEND:

EX. 6" S.O.G. EXISTING 6" CONCRETE SLAB ON GRADE.

REVISIONS:

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BRADLEY A. BOOMER
E-65141
REGISTERED PROFESSIONAL ENGINEER
BARBER & HOFFMAN, INC.

MOTTED MEADOWS
ARCHITECT &

600 MARKET AVENUE NORTH CANTON OHIO 44702

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
CANTON, OHIO
2664 HARRISBURG RD. NE

STATE OF OHIO
DAVID L. PATTERSON
11150
REGISTERED ARCHITECT

DAVID L. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
FOUNDATION PLAN -
EXISTING

COMM 21161-B
DATE 02-01-2024

DWG
S-1.1A

BRADLEY A.
BOOMER
E-65141
REGISTERED
PROFESSIONAL ENGINEER
STATE OF OHIO

BARBER & HOFFMAN, INC.

600 MARKET AVENUE NORTH

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
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CANTON, OHIO

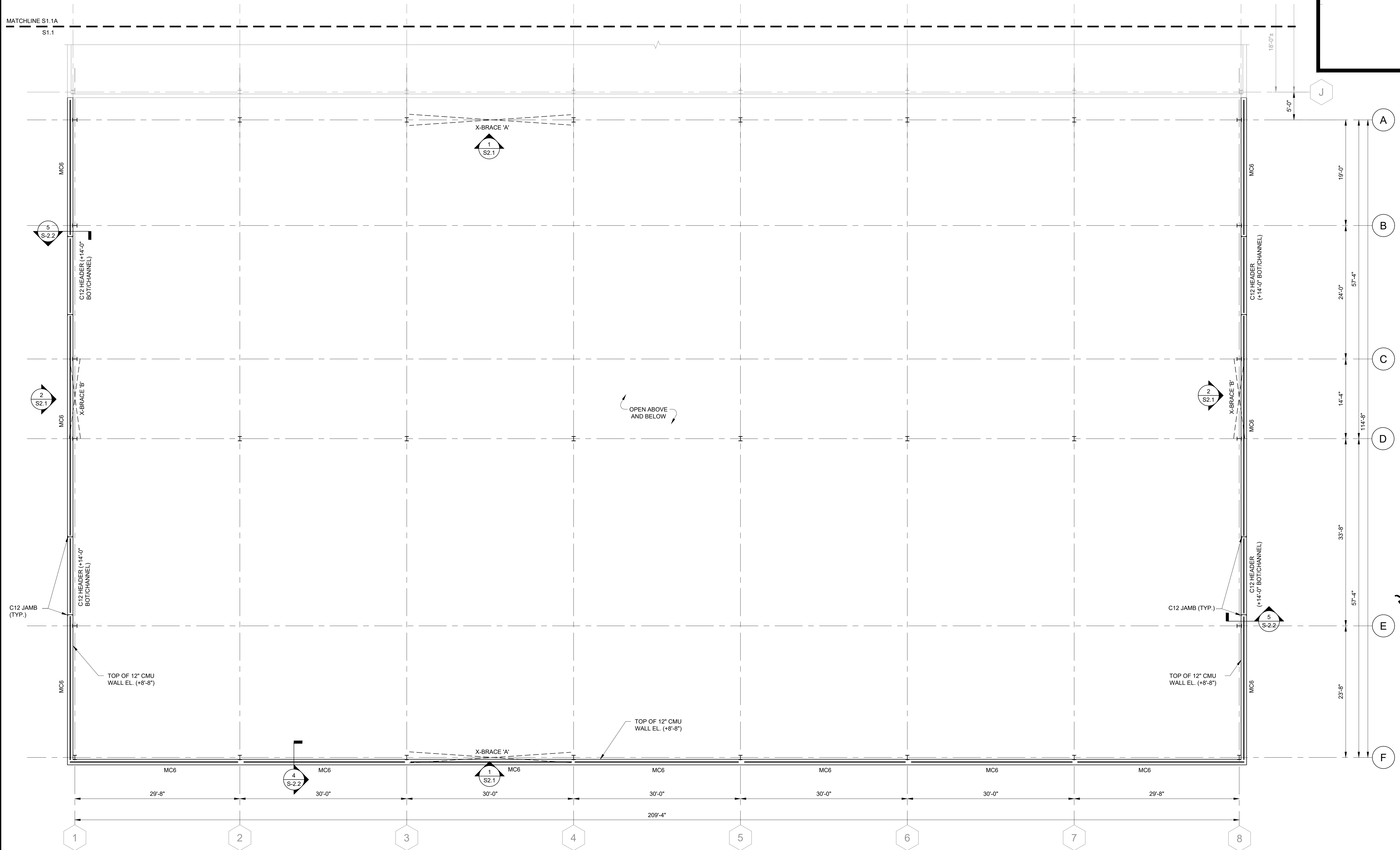
STATE OF OHIO
★
DAVID
I.
PATTERSON
11150
★
REGISTERED ARCHITECT

DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
FRAMING PLAN AT
ELEVATION 8'-8"

COMM	21161-B
DATE	02-01-2024

SWG S-1.2

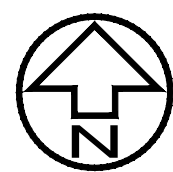
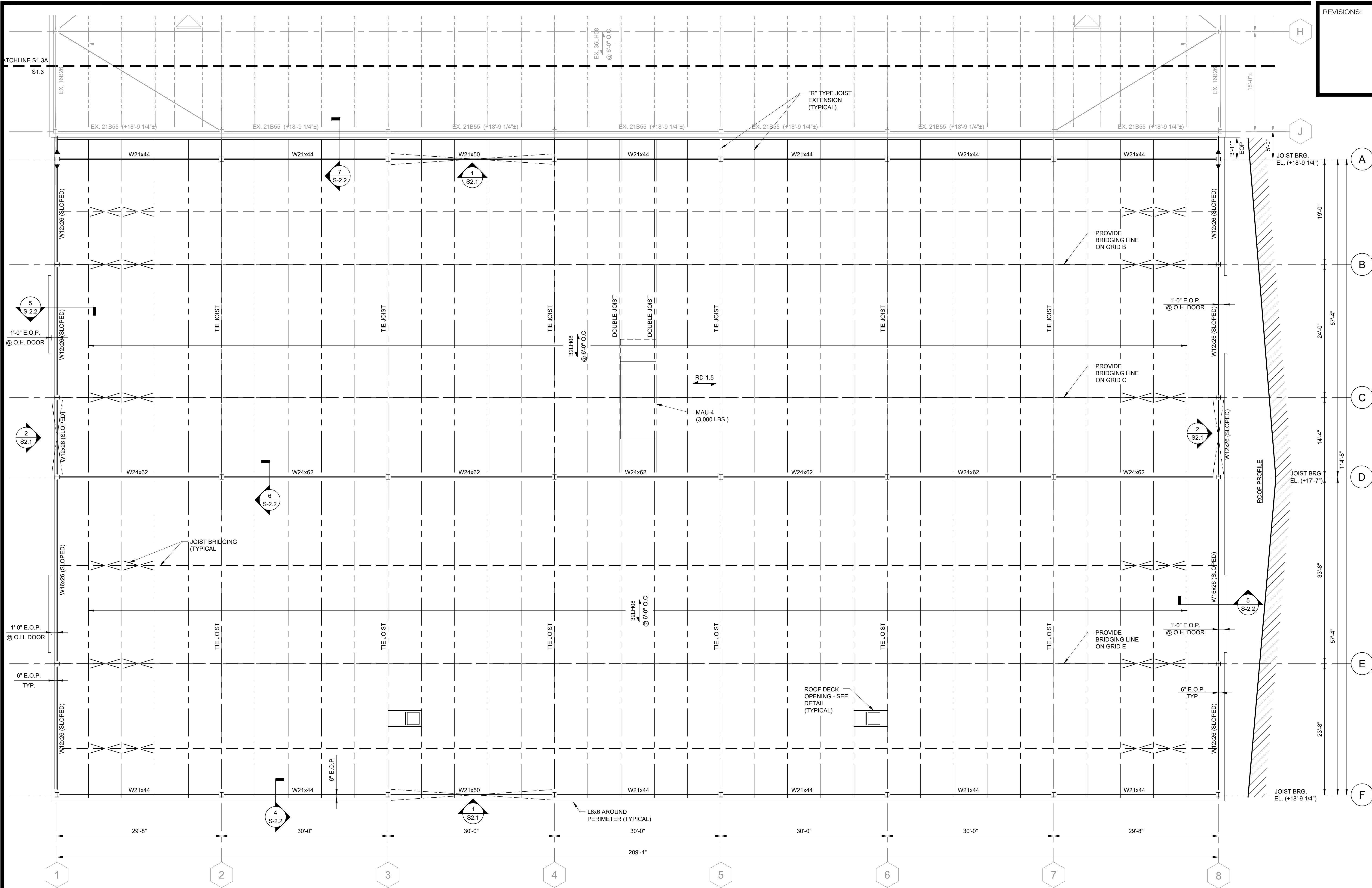


FRAMING PLAN AT ELEVATION 8'-8"

1. ELEVATIONS NOTED ARE REFERENCED FROM FIRST FLOOR ELEVATION (0'-0").
2. TOP OF STEEL ELEVATION IS (+8'-8") UNLESS NOTED OTHERWISE.

MC6 DENOTES 6" STEEL CHANNEL GIRTS. SEE ELEVATIONS ON SHEET S-1.5.

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ROOF FRAMING PLAN - ADDITION

1/8"=1'-0"

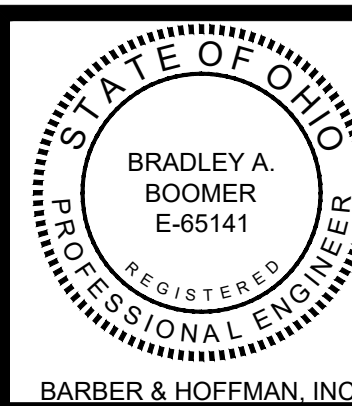
ROOF PLAN NOTES:

- FIRST FLOOR ELEVATION = (1060.6') = REFERENCE ELEVATION (0'-0") UNLESS OTHERWISE NOTED.
- JOIST BEARING ELEVATIONS NOTED ON PLAN.
- SLOPE STEEL UNIFORMLY BETWEEN BEARING ELEVATIONS GIVEN.
- JOIST BRIDGING SHOWN IS SCHEMATIC, EXCEPT WHERE NOTED AT GRIDLINES. FINAL DESIGN BY JOIST SUPPLIER IN ACCORDANCE WITH SJI REGULATIONS.
- UNIFORMLY SPACE JOISTS UNLESS OTHERWISE NOTED.

ROOF PLAN LEGEND:

- 1 1/2", 20 GAUGE, WIDE RIB GALVANIZED METAL ROOF DECK. CONNECT ROOF DECK USING 5/8" PUDDLE WELDS IN A 36/4 PATTERN, WITH (4) #10 TEK SCREWS PER SPAN, AT EDGE CONDITIONS, ATTACH WITH 5/8" PUDDLE WELDS AT 6" O.C.
- RD-1.5
- FULL MOMENT CONNECTION. SEE DETAIL ON S-3.2.

REVISIONS:



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DAVID I. PATTERSON
LICENSE #111150
EXPIRATION DATE
12-31-2025

THIS DWG :
ROOF FRAMING PLAN -
ADDITION

COMM 21161-B
DATE 02-01-2024

DWG
S-1.3

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MOTTLED MEADOWS
ARCHITECTS

STATE OF OHIO
★
REGISTERED ARCHITECT
★
DAVID
I.
PATTERSON
11150

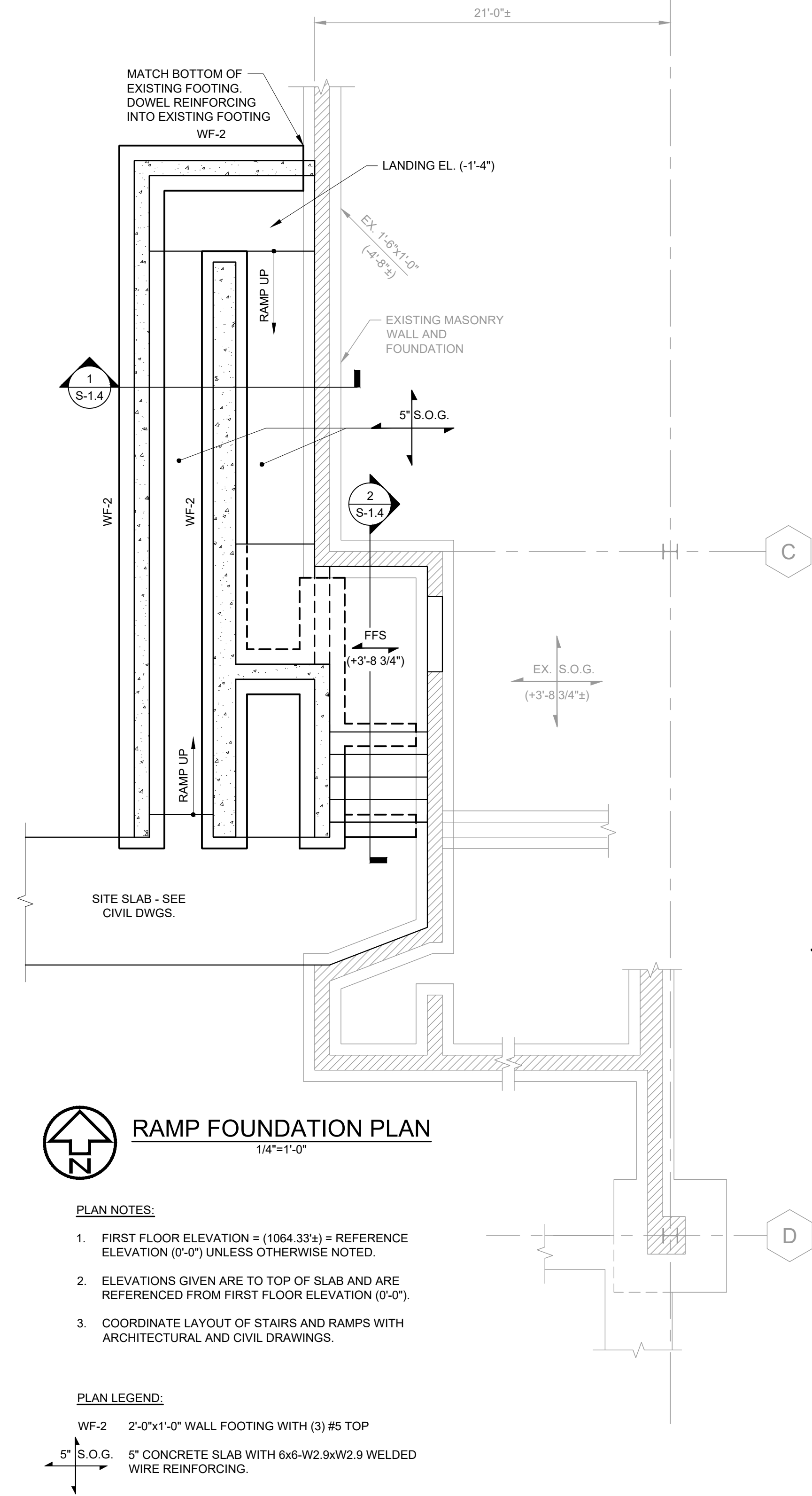
S-1.3A



EX. RD-1.5 EXISTING 1.5" METAL ROOF DECK.

1. FIRST FLOOR ELEVATION = (1060.6') = REFERENCE ELEVATION (0'-0") UNLESS OTHERWISE NOTED.
2. EXISTING CONDITIONS SHOWN ARE FOR REFERENCE ONLY. FIELD VERIFY ALL EXISTING CONDITIONS.

STATE OF OHIO
BRADLEY A. BOOMER
E-65141
REGISTERED PROFESSIONAL ENGINEER



MOTT & MEADOWS
600 MARKET AVENUE NORTH
CANTON OHIO 44702

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO

DAVID I. PATTERSON
11150

STATE OF OHIO
REGISTERED ARCHITECT

DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
PUMP FOUNDATION
PLAN AND SECTIONS

COMM	21161-
DATE	02-01-20

S-1.4

REVISIONS:



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CANTON OHIO

600 MARKET AVENUE NORTH

MOTTED MEADOWS
ARCHITECT &

GARAGE ADDITION
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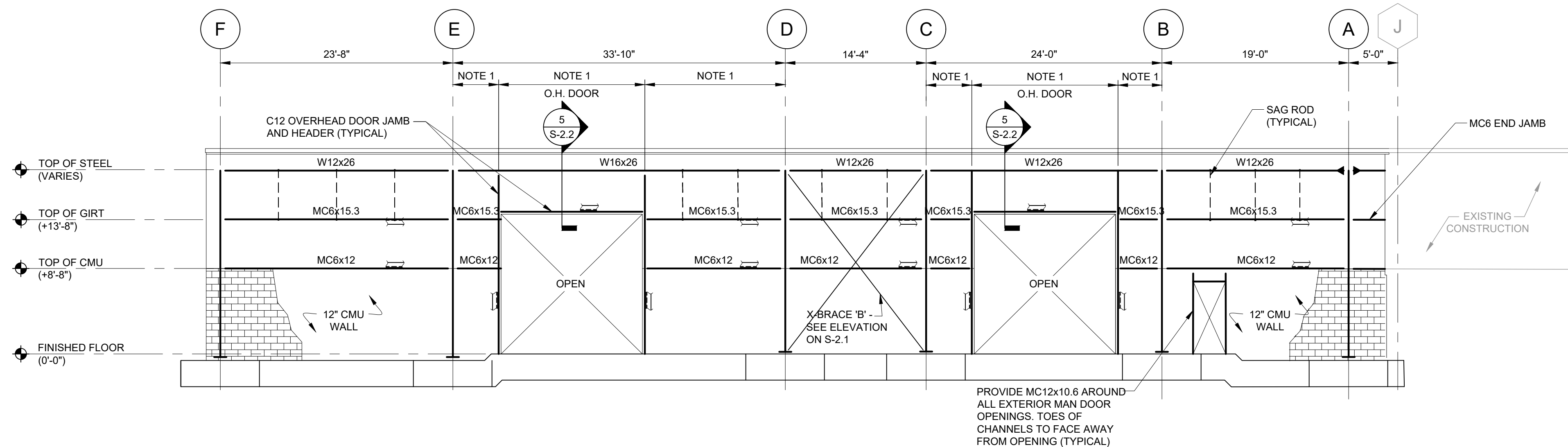
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LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
EXTERIOR FRAMING
ELEVATIONS

COMM 21161-B
DATE 02-01-2024

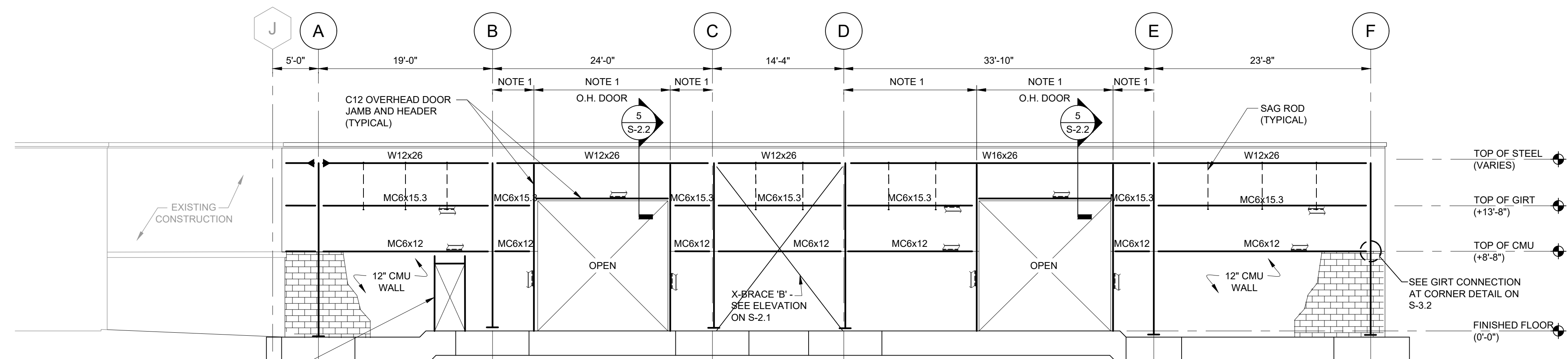
DWG
S-1.5

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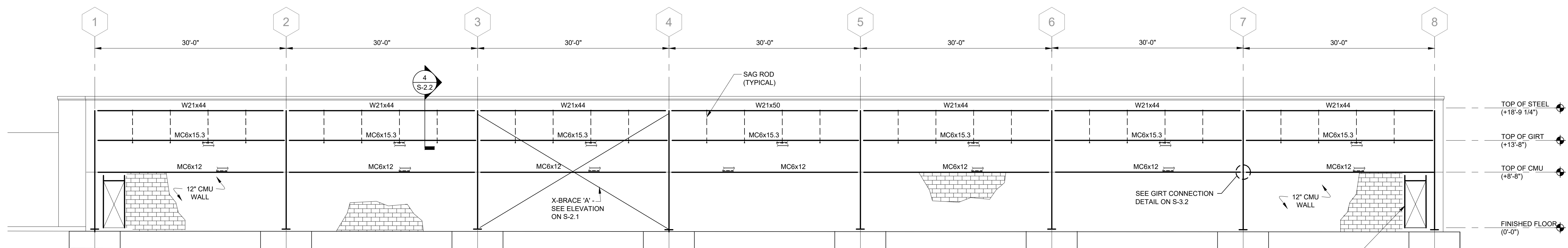
EAST ELEVATION

1/8"=1'-0"



WEST ELEVATION

1/8"=1'-0"



SOUTH ELEVATION

1/8"=1'-0"

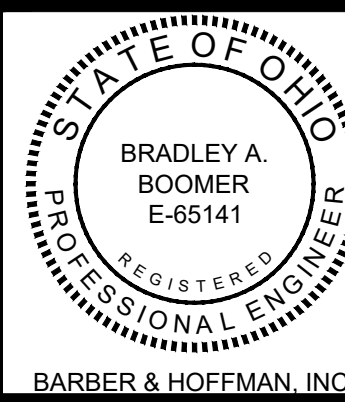
- NOTES:
- COORDINATE LOCATIONS AND DIMENSIONS OF OVERHEAD (O.H.) DOORS AND MAN DOORS WITH ARCHITECTURAL DRAWINGS.
 - SEE TYPICAL GIRT CONNECTION DETAILS ON SHEET S-3.2.

PROVIDE MC12x10.6 AROUND ALL EXTERIOR MAN DOOR OPENINGS. TOES OF CHANNELS TO FACE AWAY FROM OPENING (TYPICAL)

PROVIDE MC12x10.6 AROUND ALL EXTERIOR MAN DOOR OPENINGS. TOES OF CHANNELS TO FACE AWAY FROM OPENING (TYPICAL)

PROVIDE MC12x10.6 AROUND ALL EXTERIOR MAN DOOR OPENINGS. TOES OF CHANNELS TO FACE AWAY FROM OPENING (TYPICAL)

REVISIONS:



600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTED MEADOWS ARCHITECT &

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
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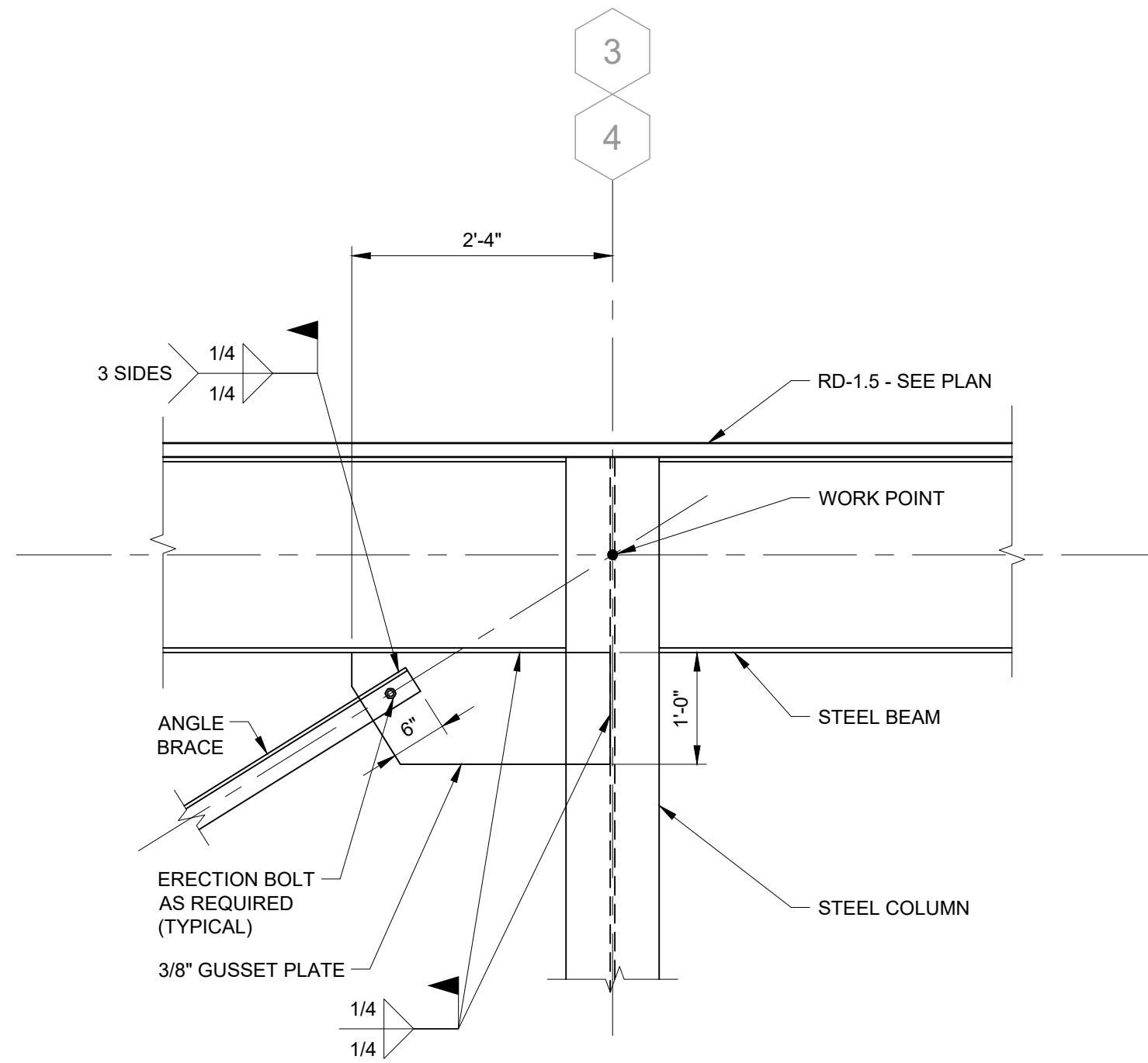
DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
X-BRACING
ELEVATIONS AND
DETAILS

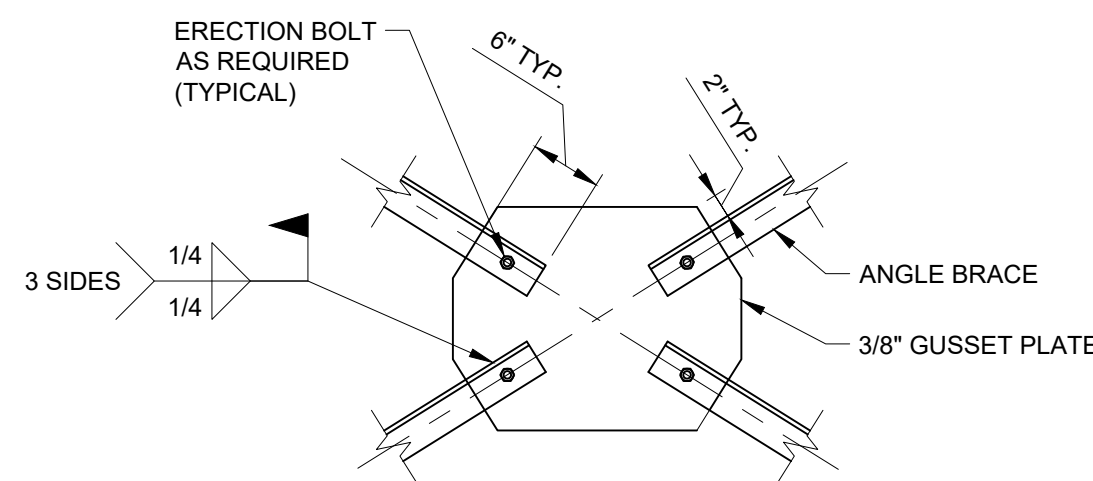
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DATE 02-01-2024

DWG
S-2.1

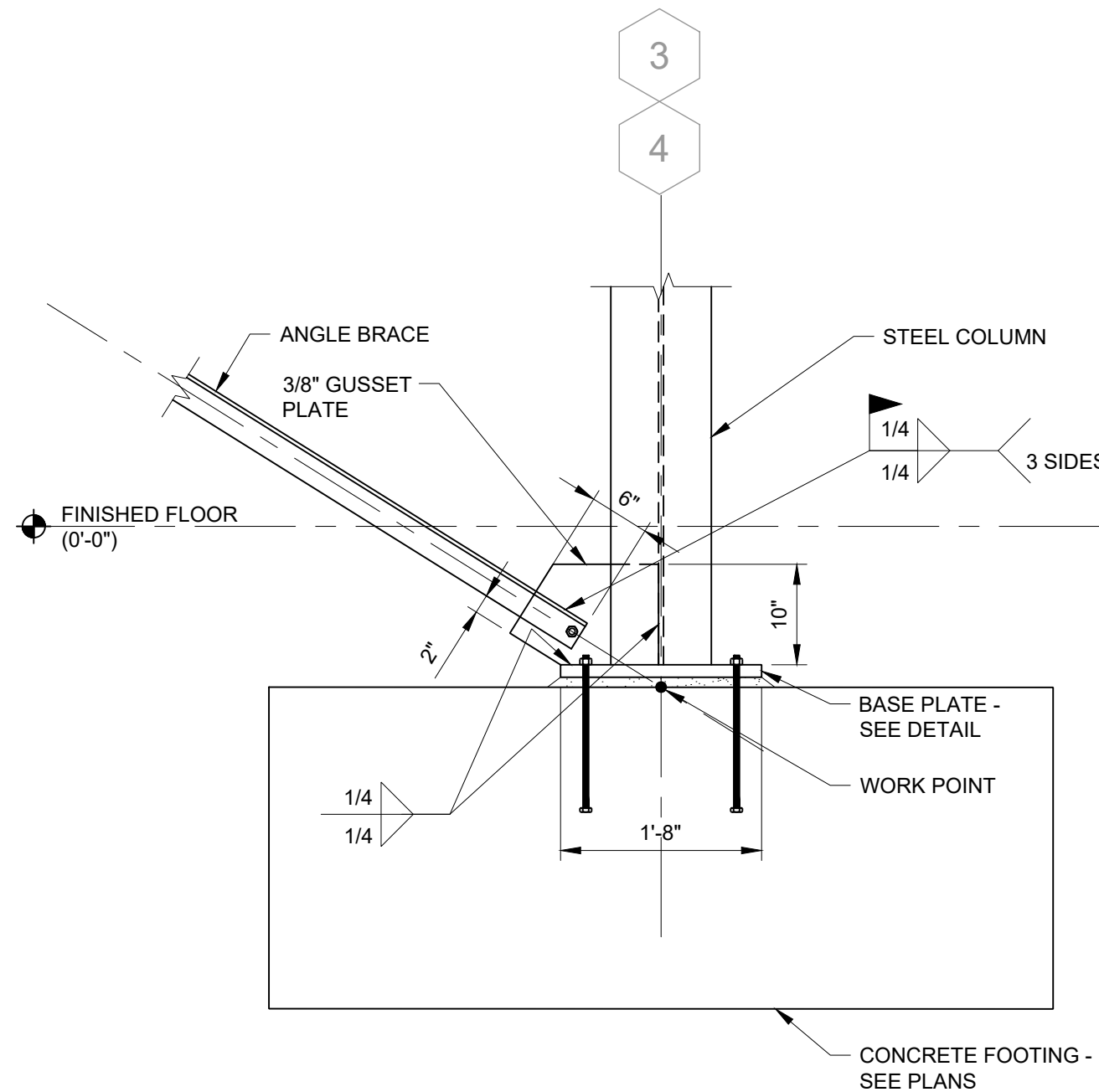
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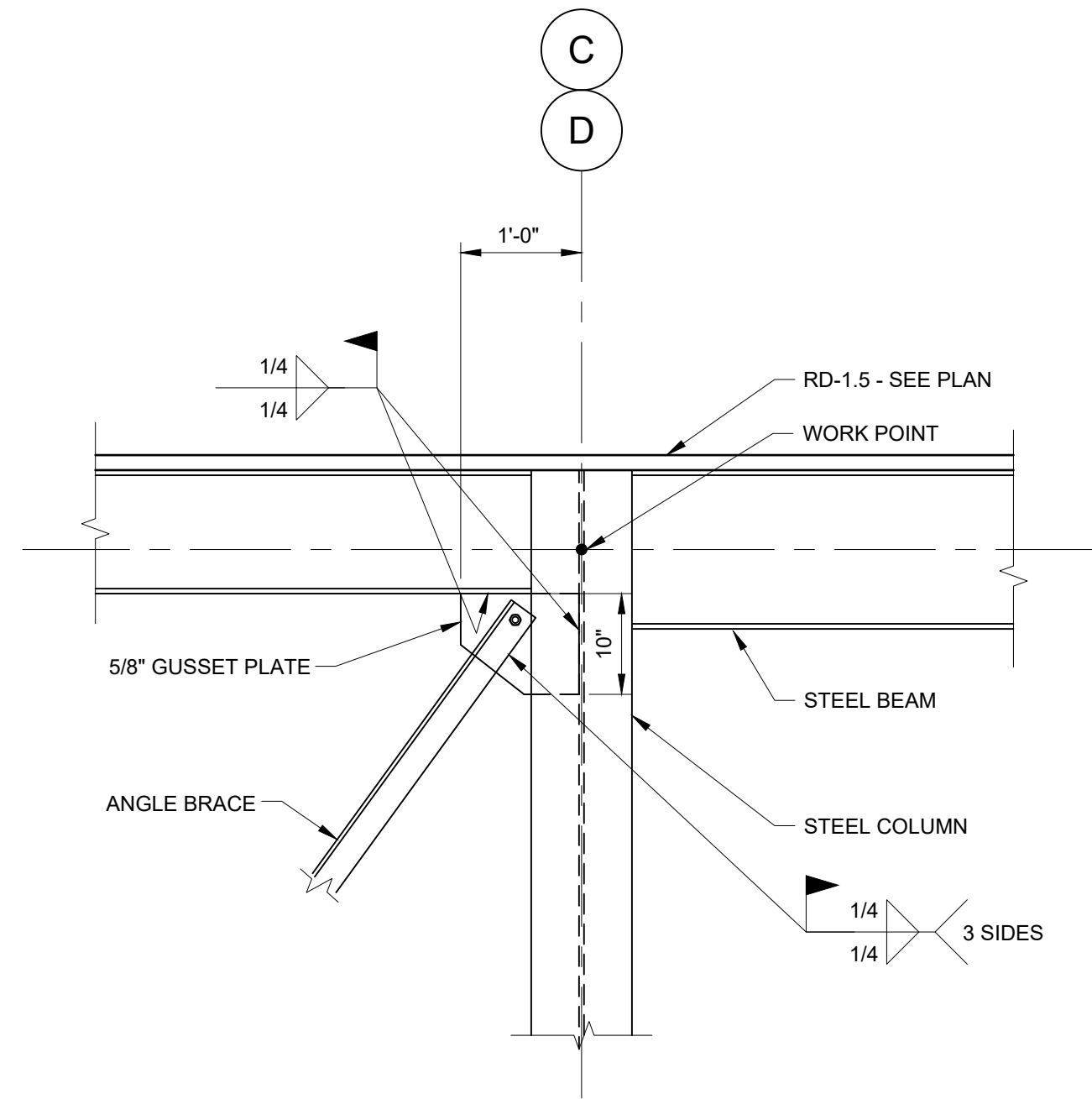
DETAIL A
3/4"=1'-0"



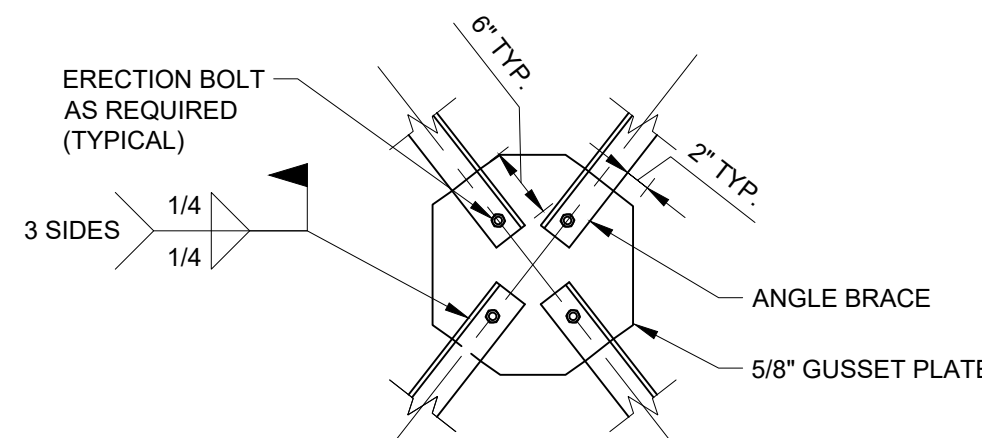
DETAIL B
3/4"=1'-0"



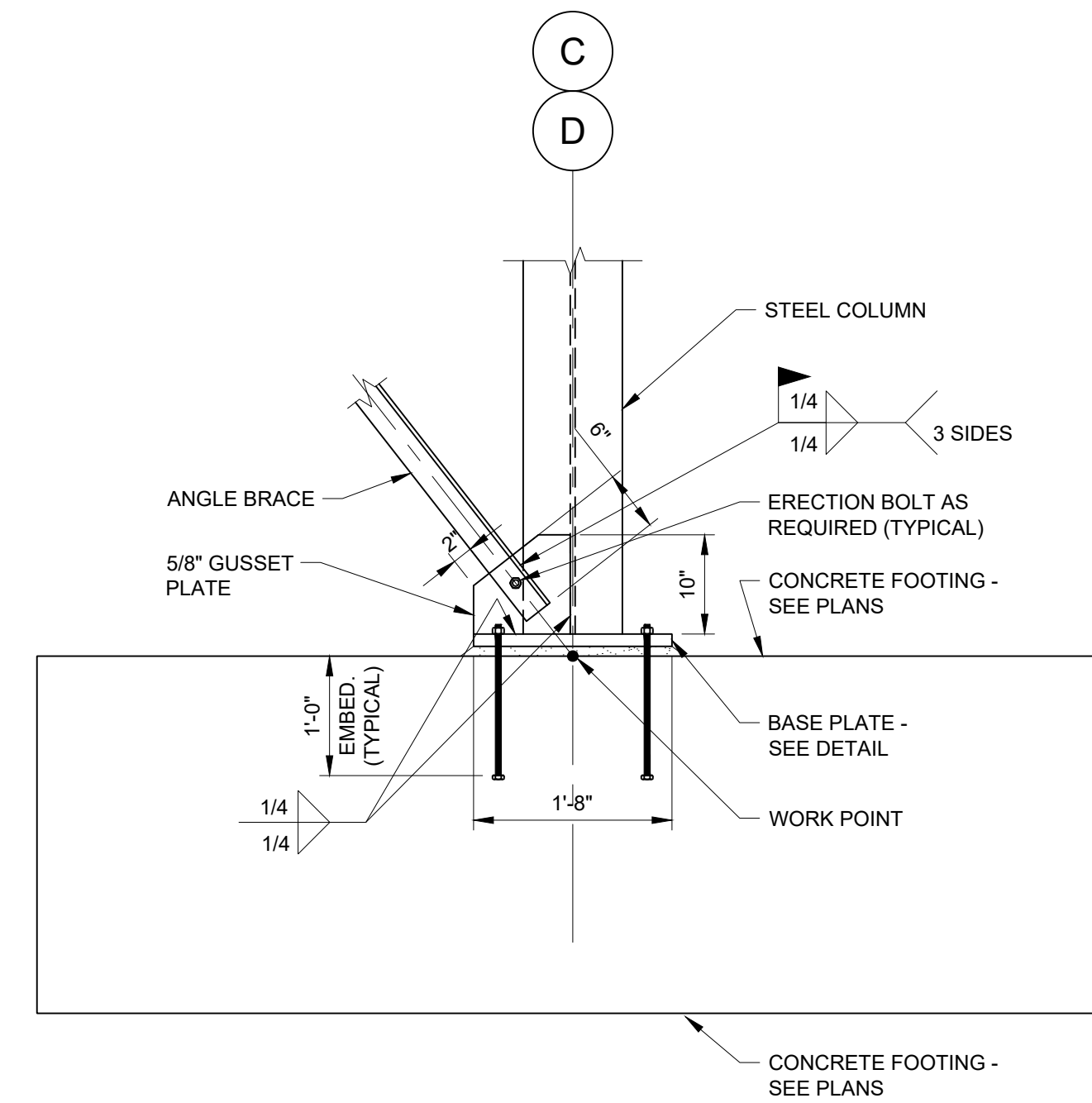
DETAIL C
3/4"=1'-0"



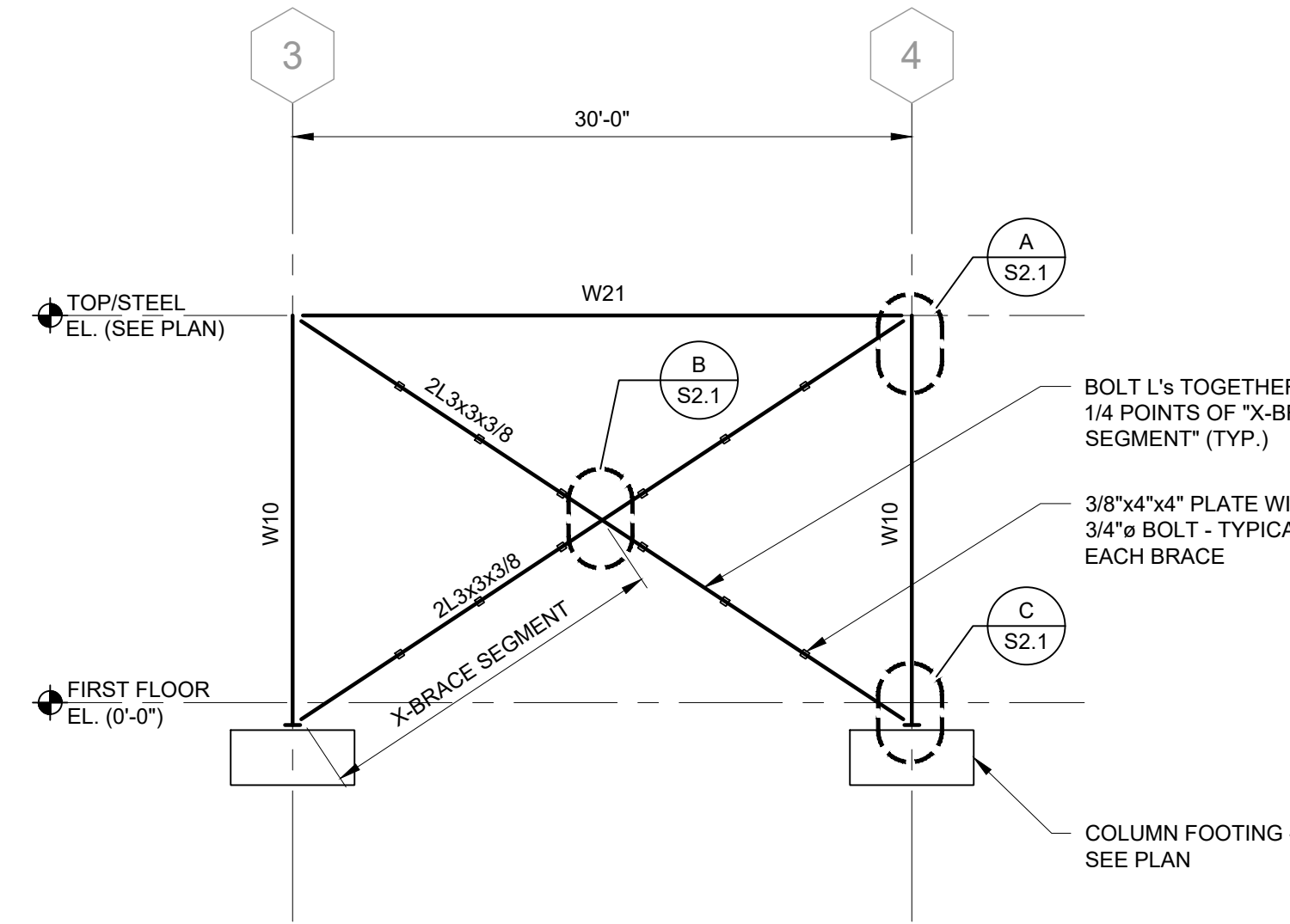
DETAIL D
3/4"=1'-0"



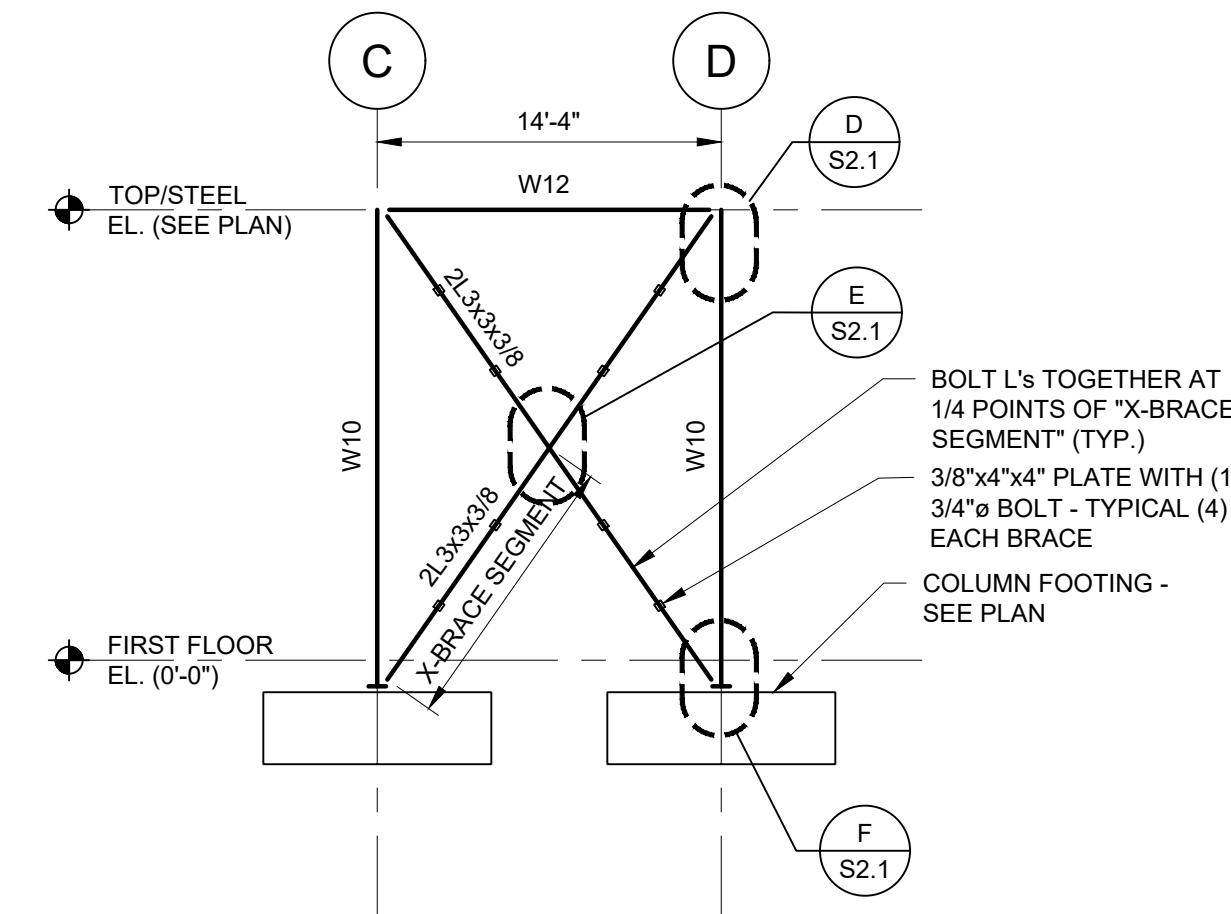
DETAIL E
3/4"=1'-0"



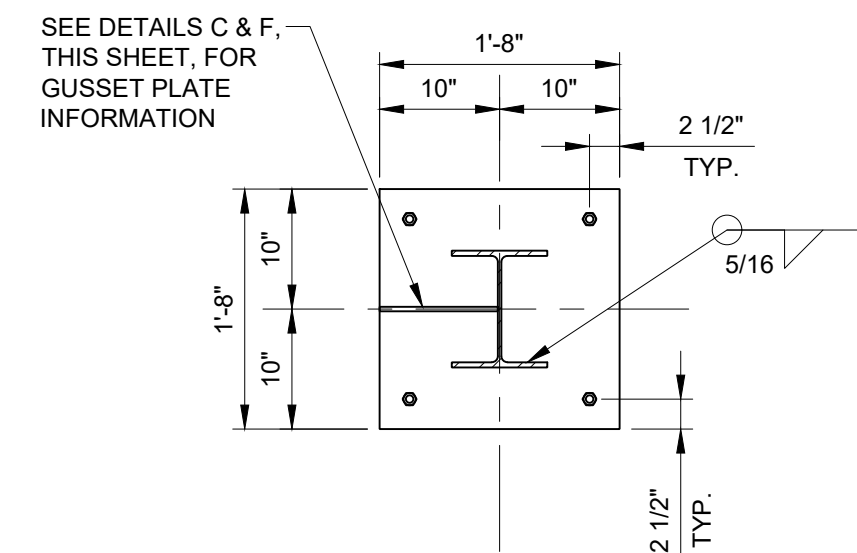
DETAIL F
3/4"=1'-0"



X-BRACE 'A' ELEVATION 1
1/8"=1'-0"



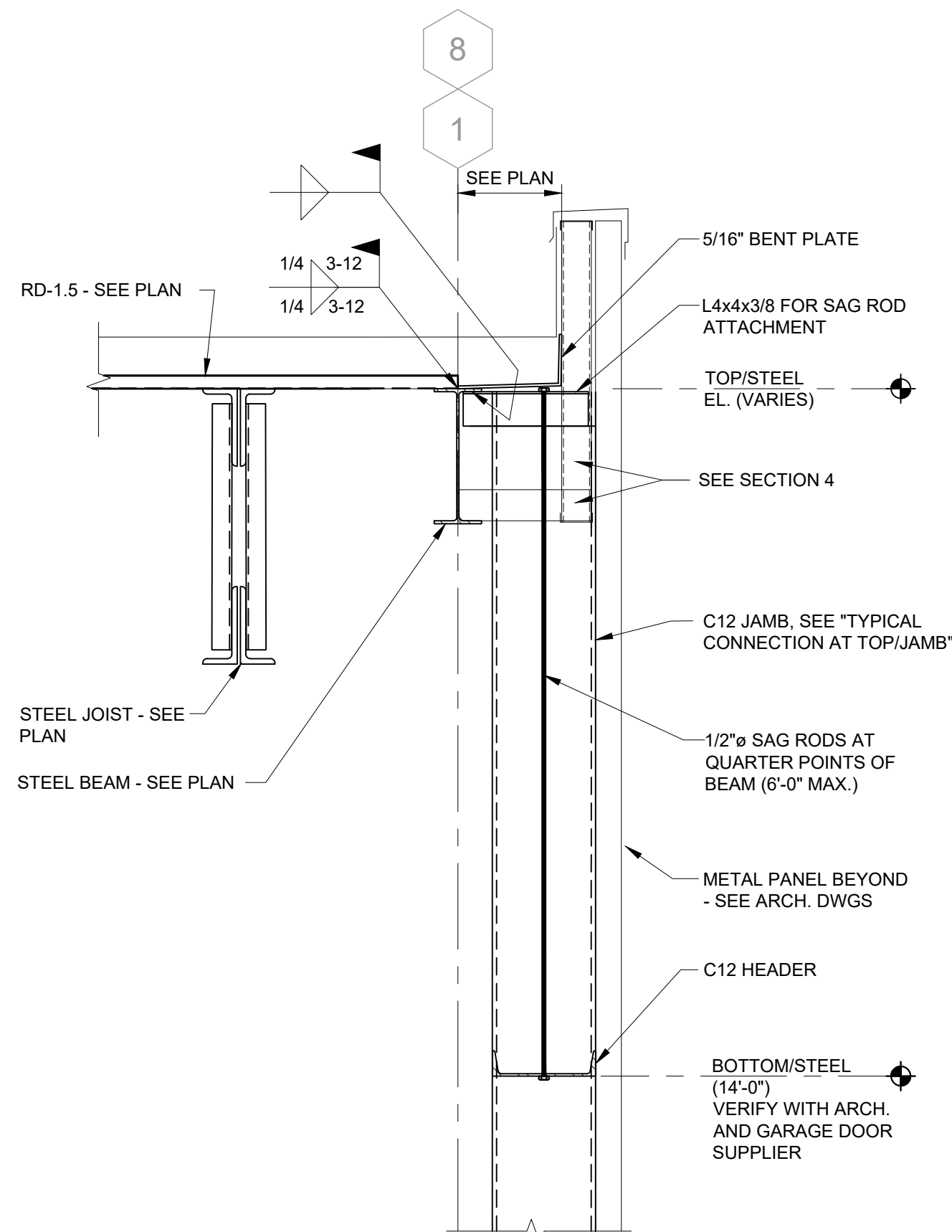
X-BRACE 'B' ELEVATION 2
1/8"=1'-0"



X-BRACE BASE PLATE DETAIL
3/4"=1'-0"

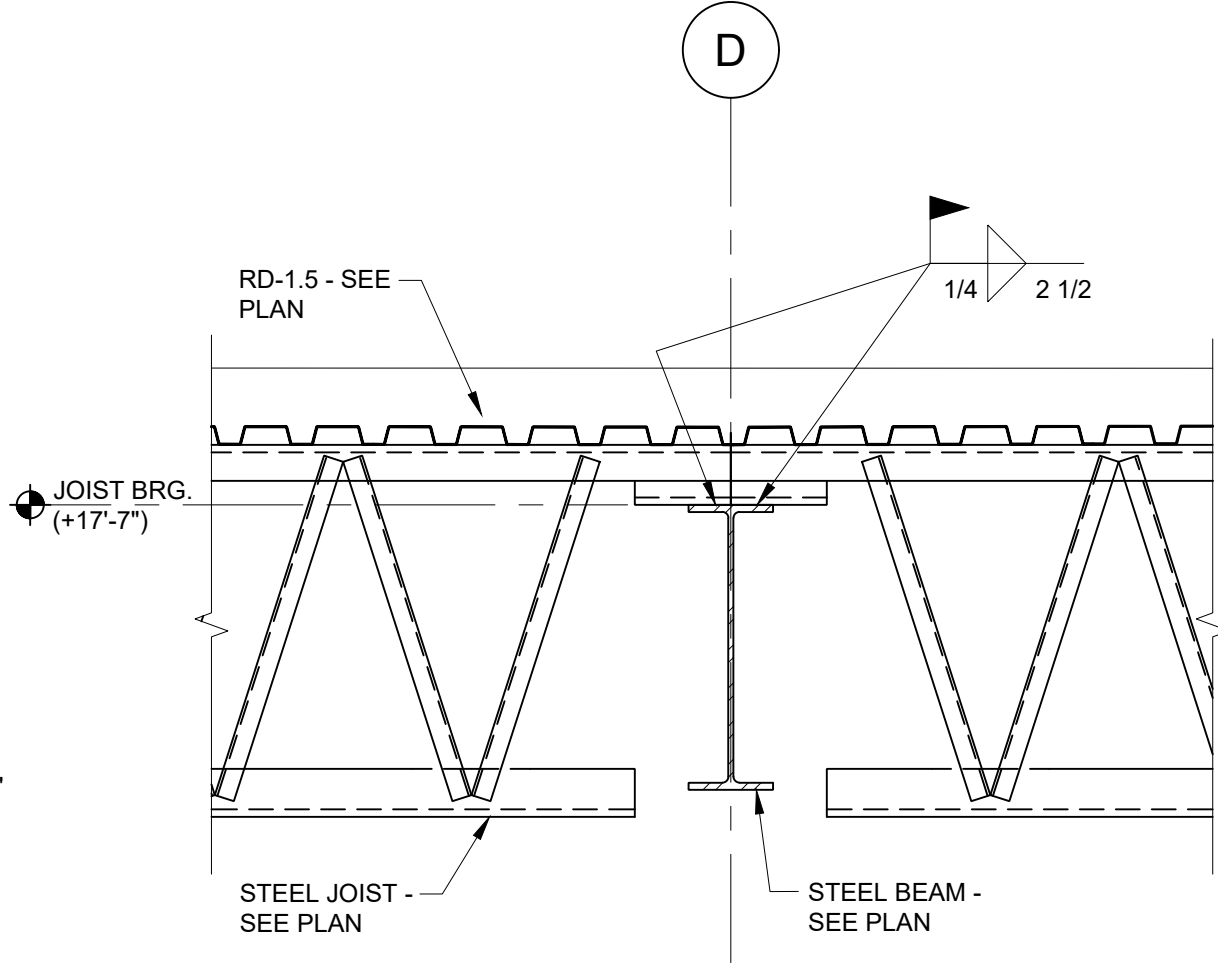
L5x3x3/8 LLV AT EACH JAMB W/ (2) 3/4" BOLTS IN LONG-SLOTTED HOLES

TYPICAL CONNECTION AT TOP/JAMB



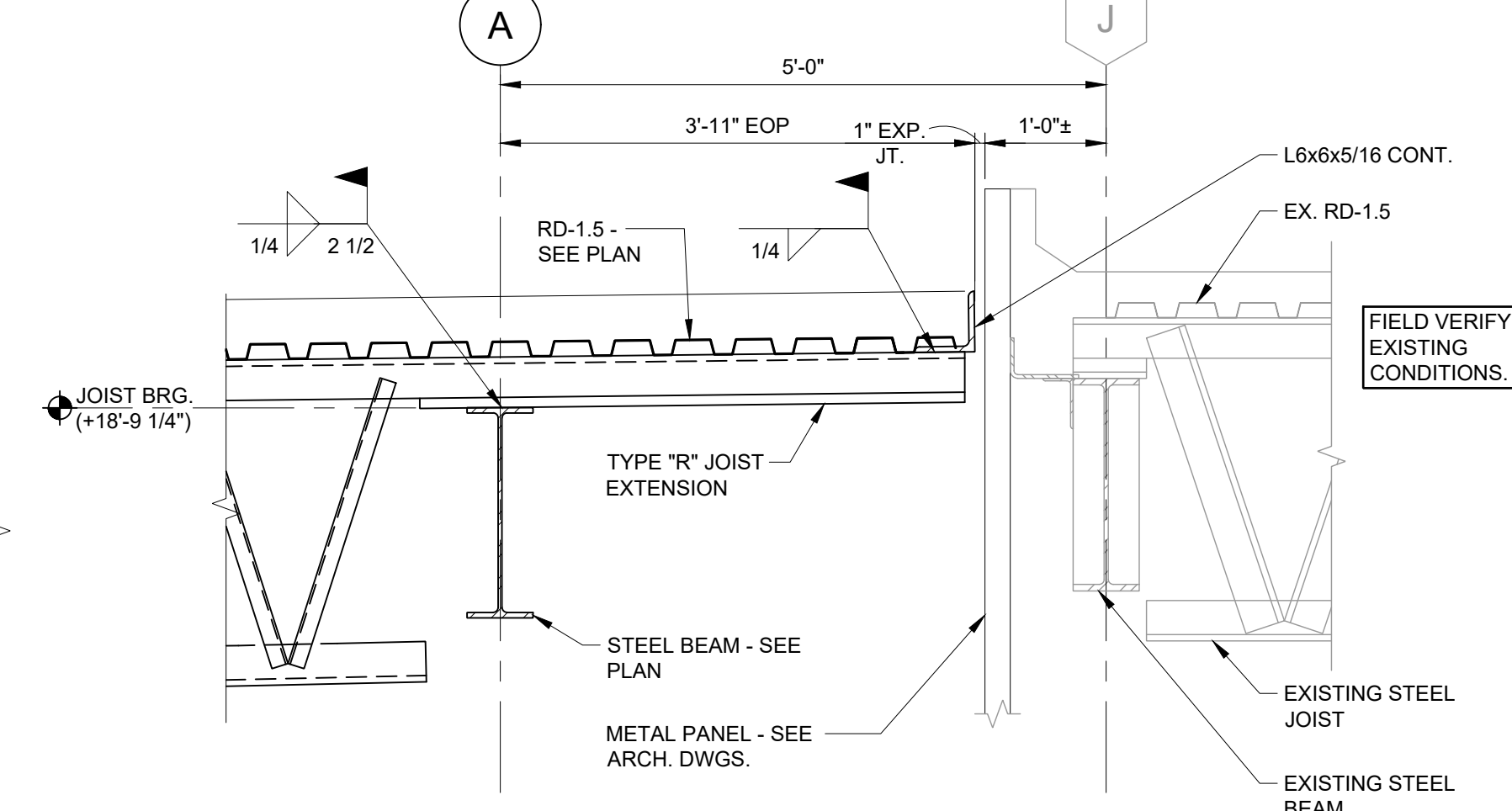
SECTION 5

3/4"=1'-0"
(AT GARAGE DOORS)



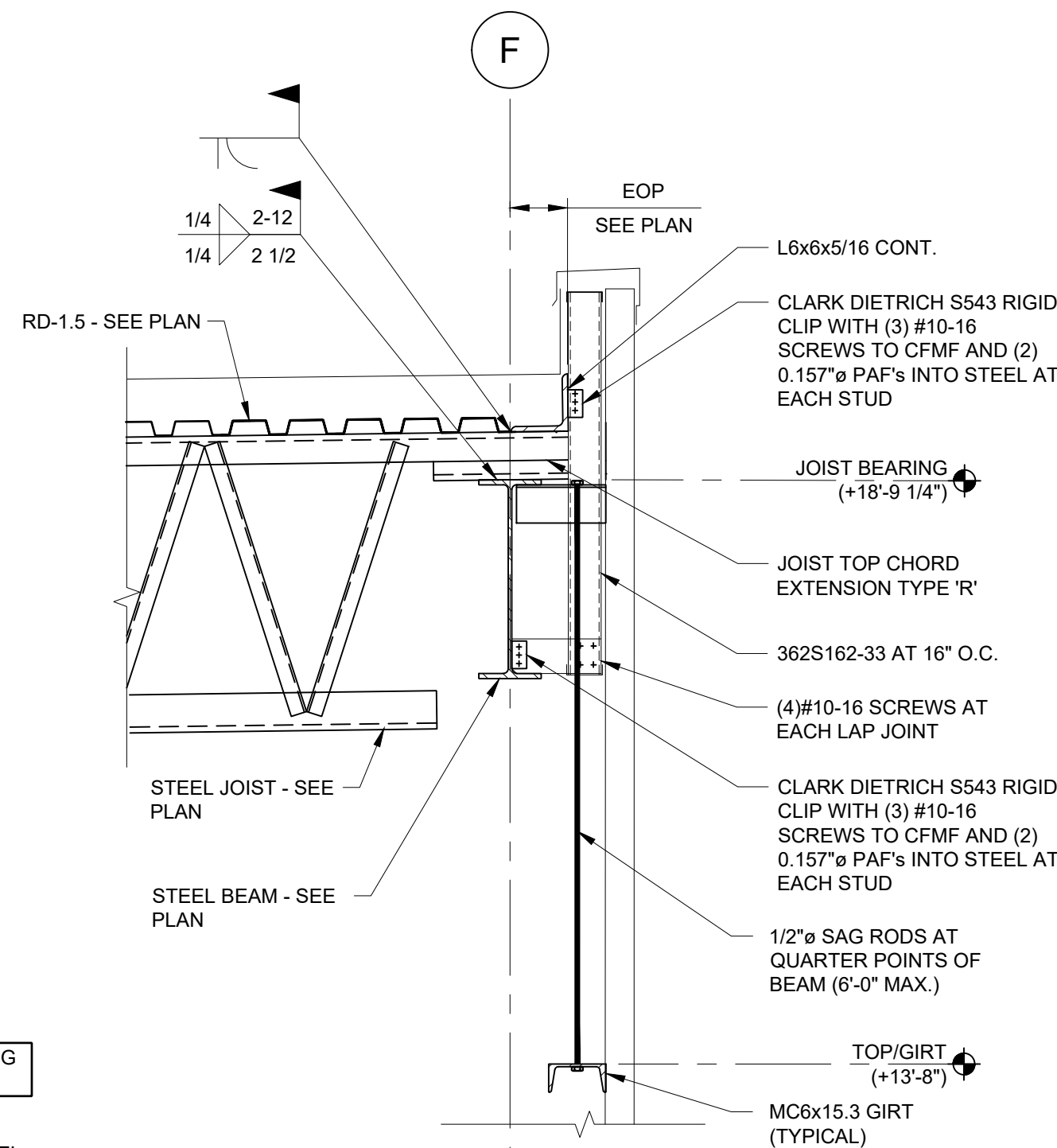
SECTION 6

3/4"=1'-0"



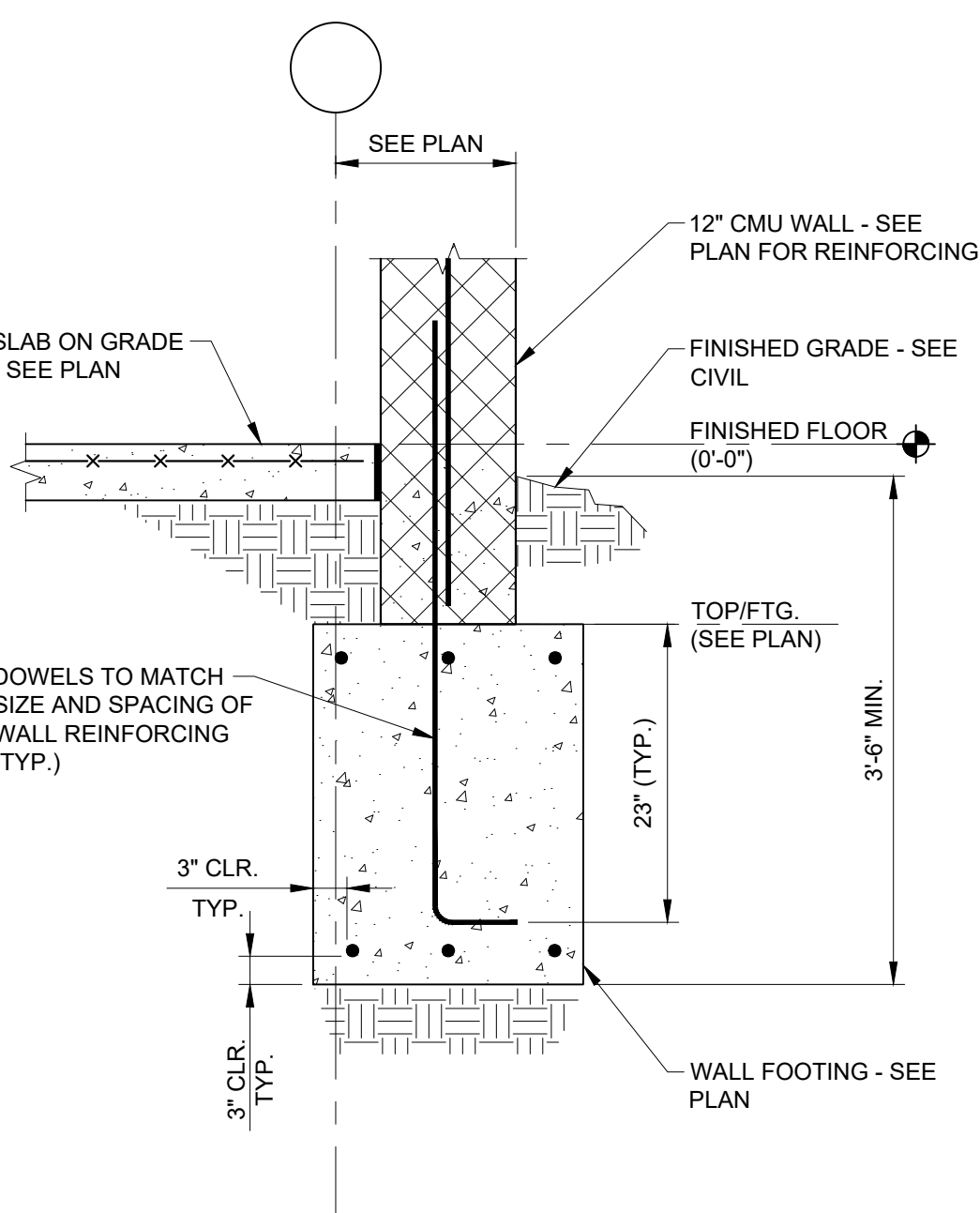
SECTION 7

3/4"=1'-0"



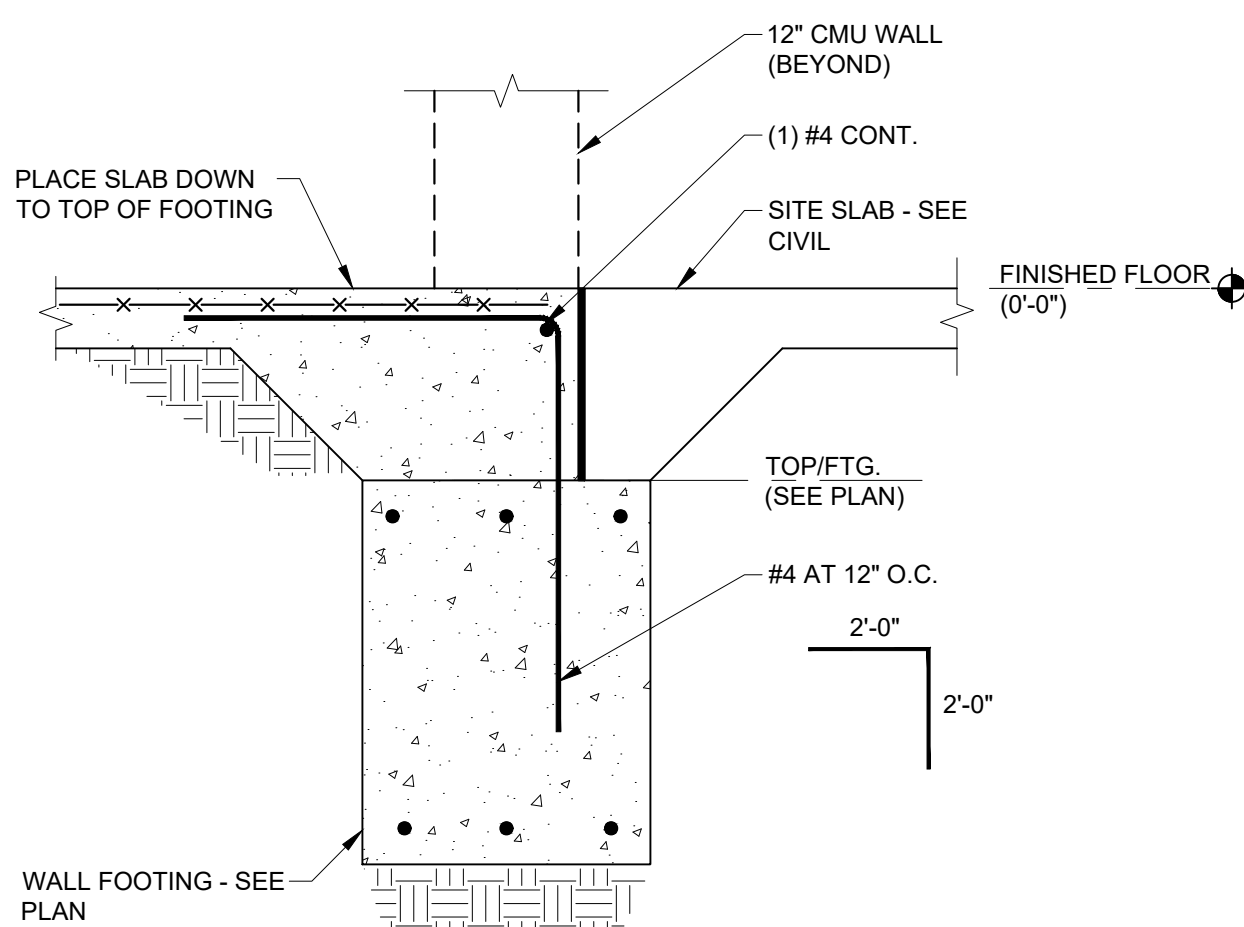
SECTION 4

3/4"=1'-0"



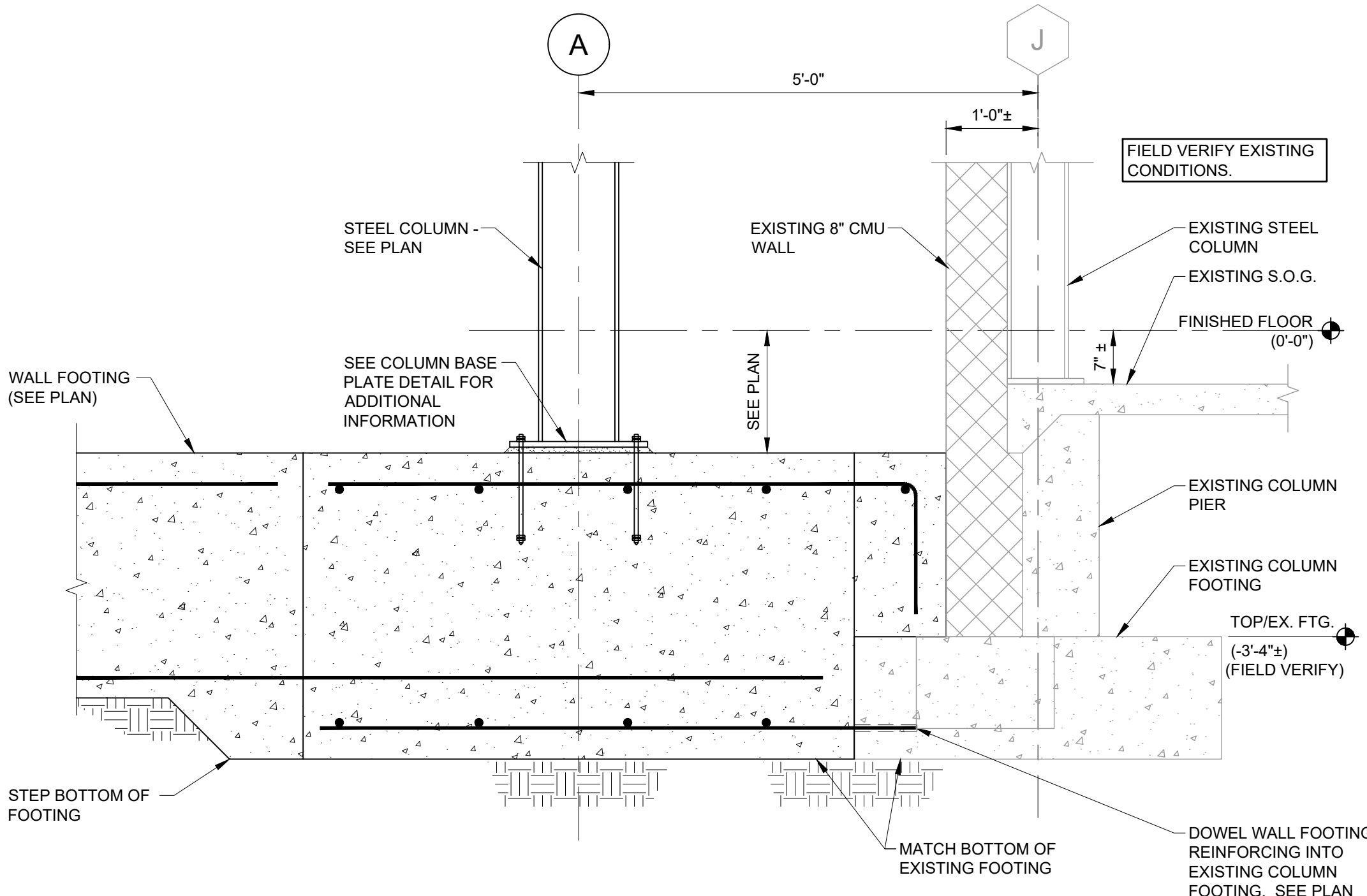
SECTION 1

3/4"=1'-0"



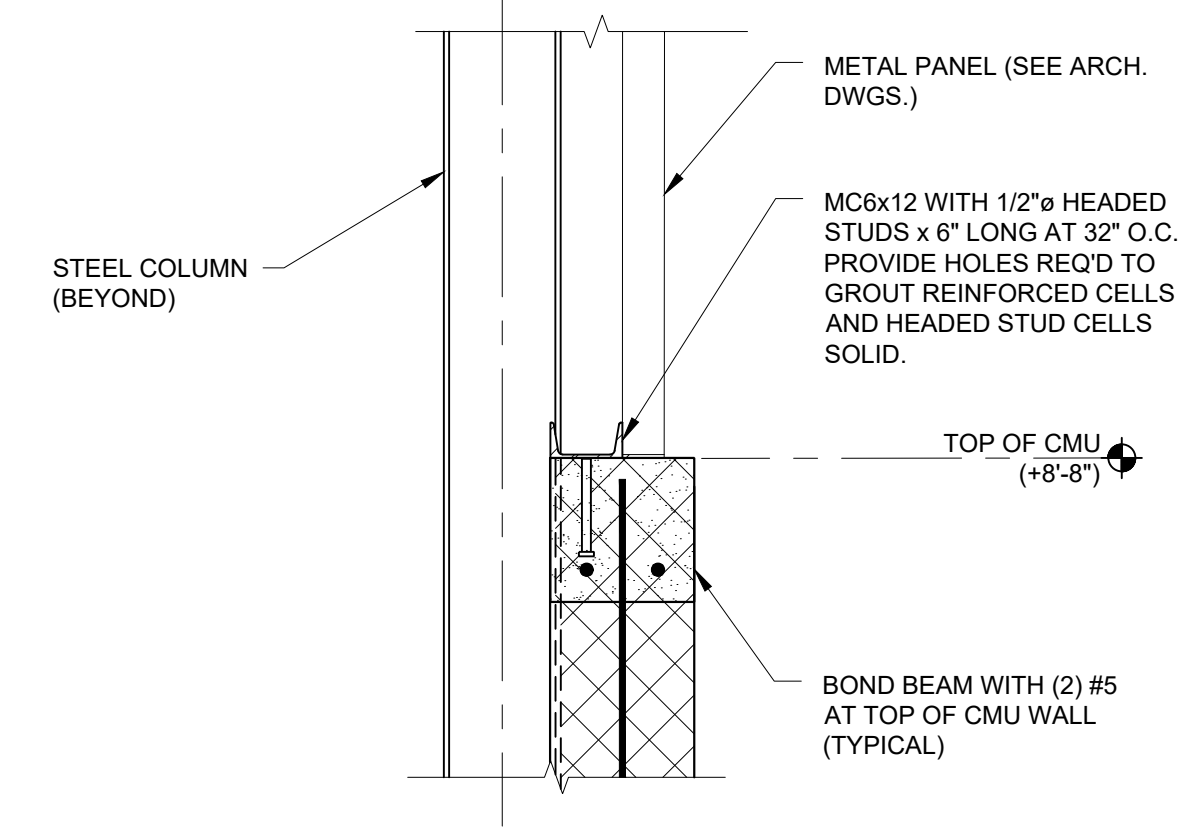
SECTION 2

3/4"=1'-0"

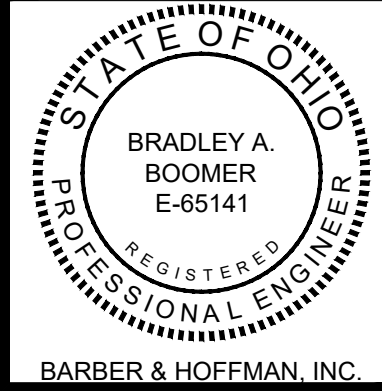


SECTION 3

3/4"=1'-0"



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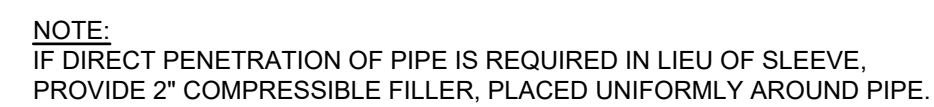
DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
SECTIONS

COMM 21161-B
DATE 02-01-2024

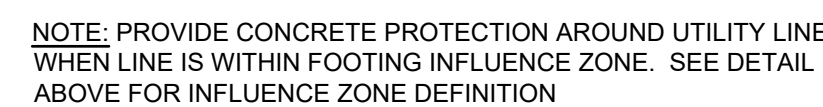
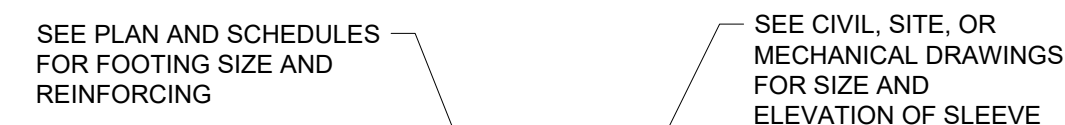
DWG
S-2.2

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NOTE:
WHERE BAR SIZES DIFFER, LAP FOR LARGER SIZE

NOTE:
SEE TYPICAL SLAB ON GROUND JOINT DETAILS,
SLAB REINFORCING DETAILS, AND SPECIFICATIONS
FOR ADDITIONAL REQUIREMENTS



NOTES:

1. SLAB TO BE 5" MINIMUM (INCLUDING FORM) REINFORCED WITH #4@8" O.C. BOTTOM AND #4@12" O.C. TEMPERATURE. FORM TO BE CORRUGATED GALVANIZED STEEL FORM DECK (GAUGE AS REQUIRED TO SUPPORT WET WEIGHT OF CONCRETE PLUS CONSTRUCTION LOADS. MAXIMUM DEFLECTION OF DECK TO BE 1/240 OF THE SPAN.).
2. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS, SLOPE AND DEPRESSION OF SLAB

NOTES:
1. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS AND SLOPE.

AT DISCONTINUOUS JOINTS



CONSTRUCTION JOINT



NOTES:

1. WALLS MAY BE PLACED IN ONE CONTINUOUS OPERATION TO A MAXIMUM LENGTH OF 60'-0". CONTRACTION JOINTS MUST BE INSTALLED AT THE LEAST SPACING OF:
A. FIELD OF WALL: 1.5 x WALL HEIGHT (IN FT.) AS SHOWN ON DRAWINGS, OR 30'-0"
B. FROM CORNERS: 1/3 WALL HEIGHT (IN FT.) OR 15'-0"
2. CONSTRUCTION JOINTS SHALL BE INSTALLED IN ADVANCE OF THE DAY'S PLACEMENT AND SHALL BE LOCATED AT REGULAR CONTRACTION JOINT SPACING (SEE NOTE 1). ALLOW 48 HOURS BETWEEN ADJACENT POURS.
3. CONTRACTION JOINTS IN EXPOSED AREAS SHALL BE INCORPORATED INTO THE CONCRETE FINISH WORK.
4. CONSTRUCTION AND CONTRACTION JOINT LAYOUT SHALL BE SHOWN ON THE REINFORCING SHOP DRAWINGS. THIS DETAIL DOES NOT APPLY TO CANTILEVERED WALL CONSTRUCTION OR SHEAR WALL CONSTRUCTION.

NOTES:

- 1. SOUND REPAIR AREAS BY CHAIN DRAGGING OR TAPPING WITH A HAMMER.
- 2. ALL AREAS WHICH SOUND HOLLOW OR ARE SPALLED SHALL BE MARKED AND "SQUARED-OFF" PATTERN THAT CAUSES THE LEAST AMOUNT OF CUTOUT AREA, BUT INCLUDES ALL OF THE DETERIORATED CONCRETE.
- 3. THE OWNER'S REPRESENTATIVE WILL CONFIRM OR MODIFY THE AREAS FOR "SQUARED-OFF" PATTERN.
- 4. "SQUARED-OFF" LINES SHALL BE GENERALLY 4" OUTSIDE OF THE HOLLOW SOUNDING CONCRETE.
- 5. ALL CHIPS AND EXPOSED EXPOSED REINFORCING STEEL AND MODIFY AREAS TO INCLUDE ALL RUSTED REINFORCING STEEL AND ANY HOLLOW CONCRETE.

NOTE:
WHERE BAR SIZES DIFFER, LAP FOR LARGER SIZE

PLAN

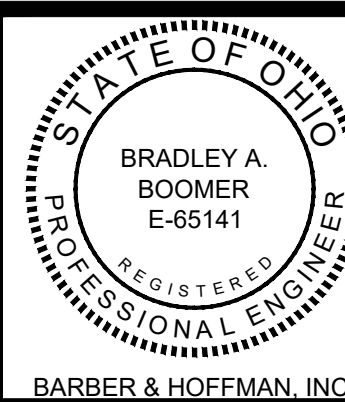
TYPICAL INTERIOR COLUMN



TYPICAL EXTERIOR COLUMN

EXISTING S.O.G. CUT
AND REPLACE DETAIL

REVISIONS:



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600 MARKET AVENUE NORTH

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WATER DEPARTMENT SERVICE CENTER
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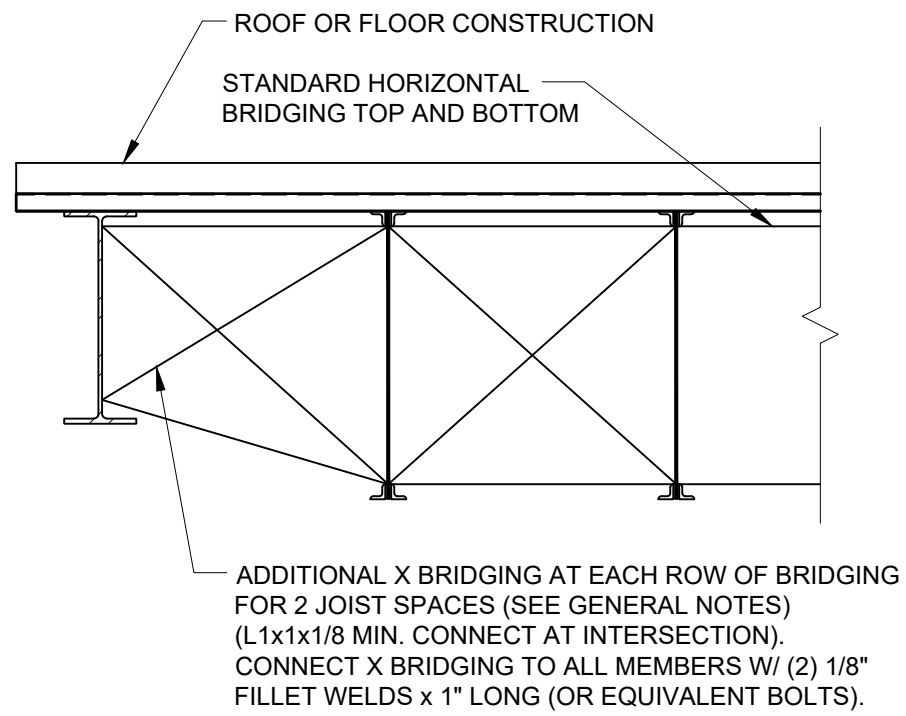
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THIS DWG :
TYPICAL DETAILS

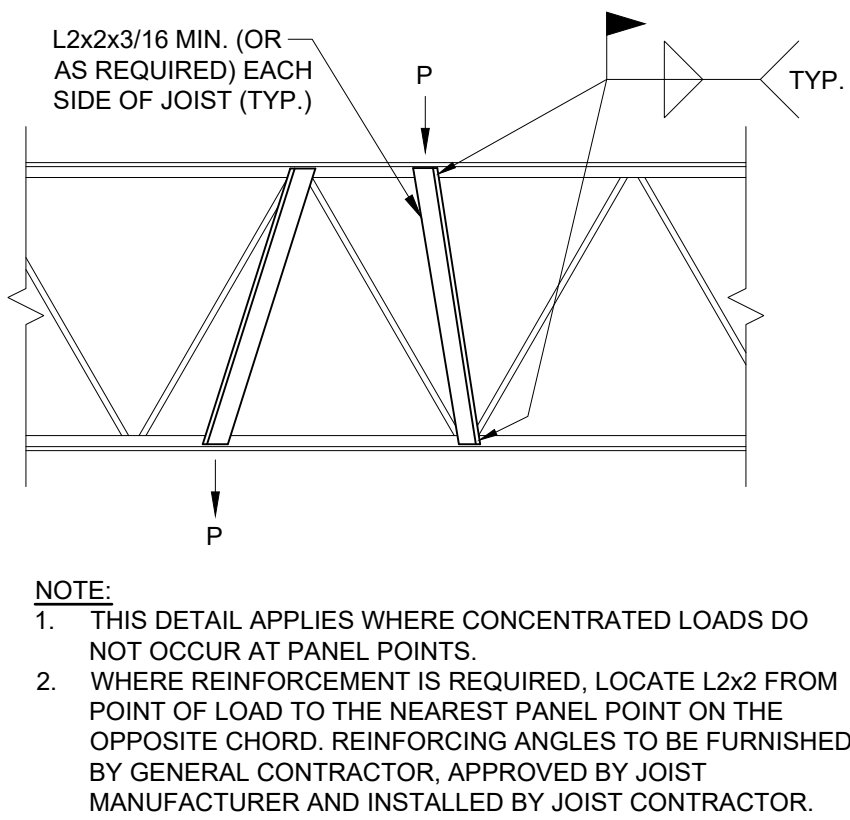
COMM 21161-B
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DWG
S-3.1

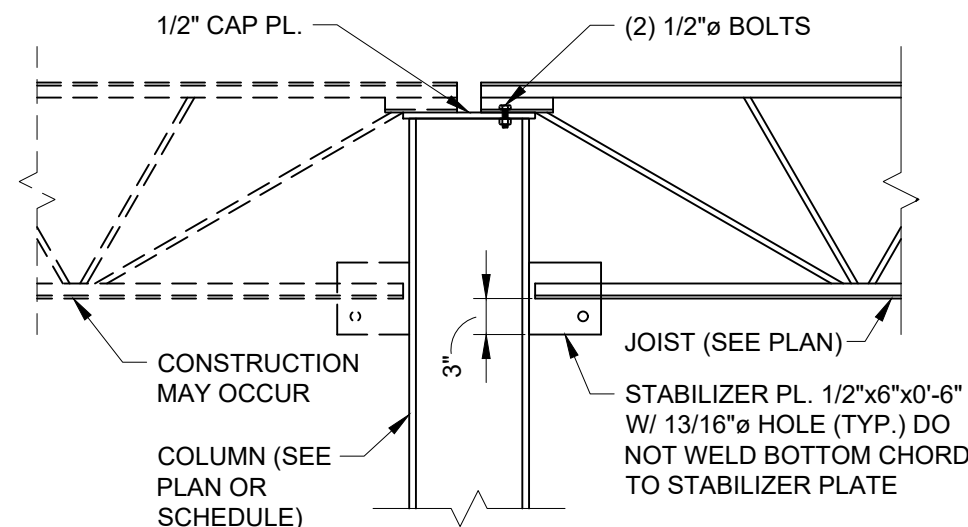
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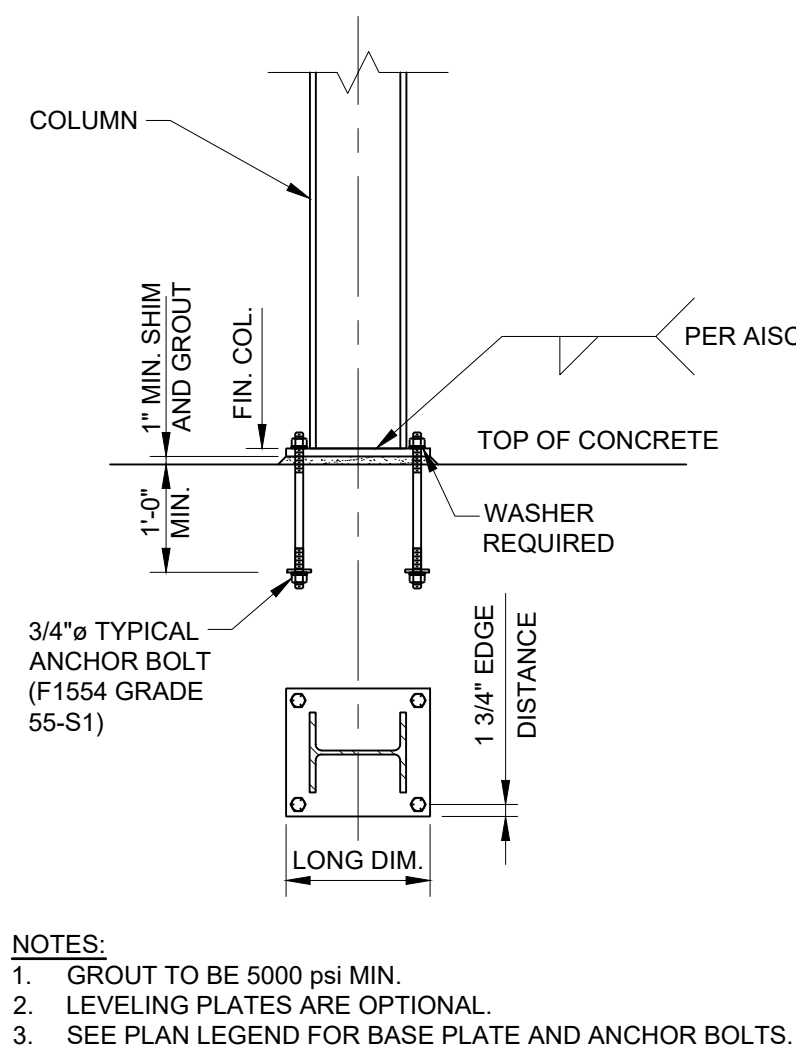
JOIST BRIDGING AT EDGE BEAM



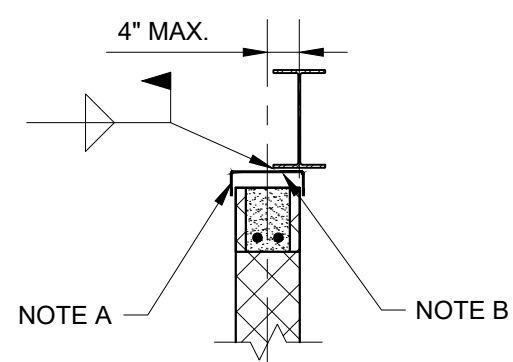
JOIST REINFORCEMENT DETAIL
AT CONCENTRATED LOADS



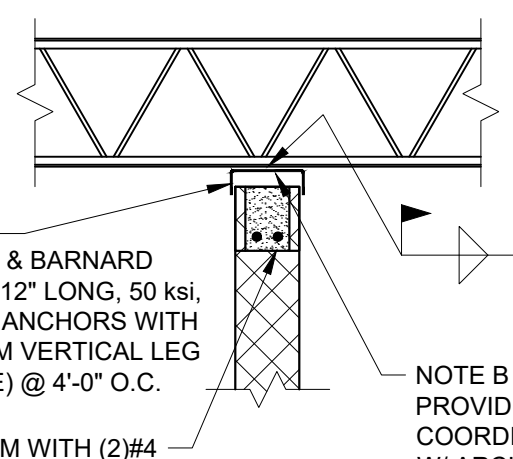
TIE JOIST DETAIL
(AT TOP OF COLUMN)



COLUMN BASE PLATE DETAIL



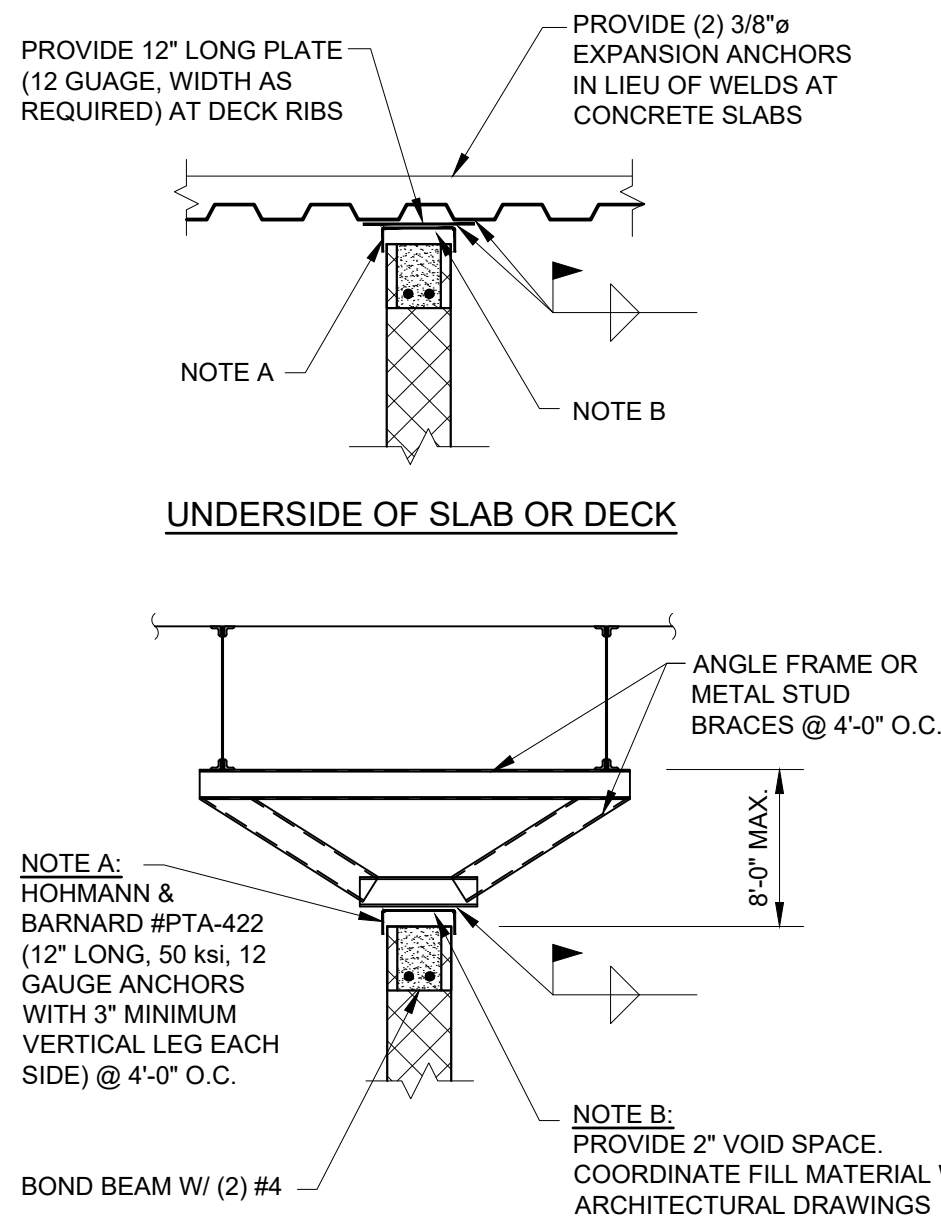
PARALLEL TO STRUCTURE



PERPENDICULAR TO STRUCTURE

- NOTES:
- COORDINATE TOP/WALL LOCATIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
 - PROVIDE SIMILAR CONNECTION DETAILS FOR BEAMS, JOISTS, OR LIGHT GAUGE MEMBERS.
 - SIZE AND ORIENTATION OF FRAMING MEMBERS AND/OR DECK MAY VARY.

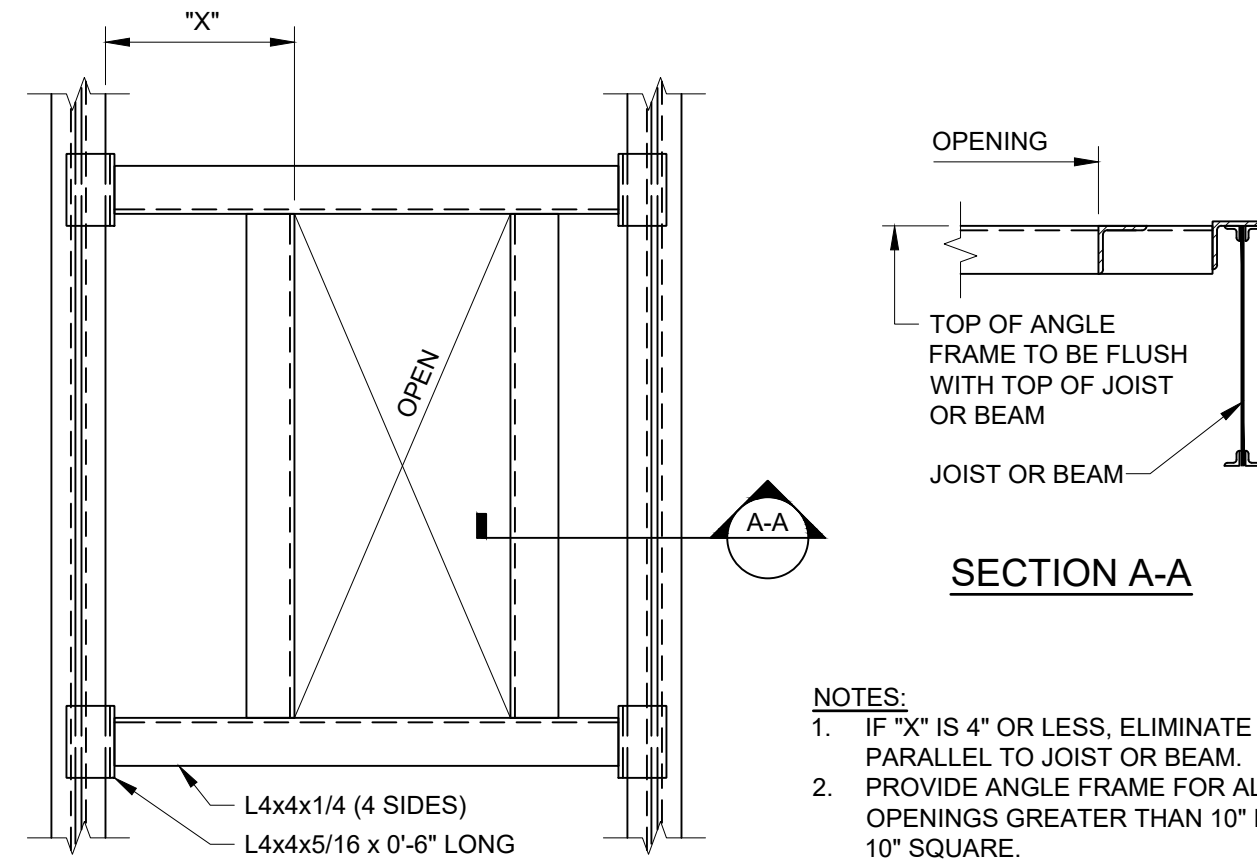
TOP OF MASONRY WALL BRACING DETAILS



BENEATH STRUCTURE

- NOTES:
- COORDINATE TOP/WALL LOCATIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
 - PROVIDE SIMILAR CONNECTION DETAILS FOR BEAMS, JOISTS, OR LIGHT GAUGE MEMBERS.
 - SIZE AND ORIENTATION OF FRAMING MEMBERS AND/OR DECK MAY VARY.

TOP OF MASONRY WALL BRACING DETAILS

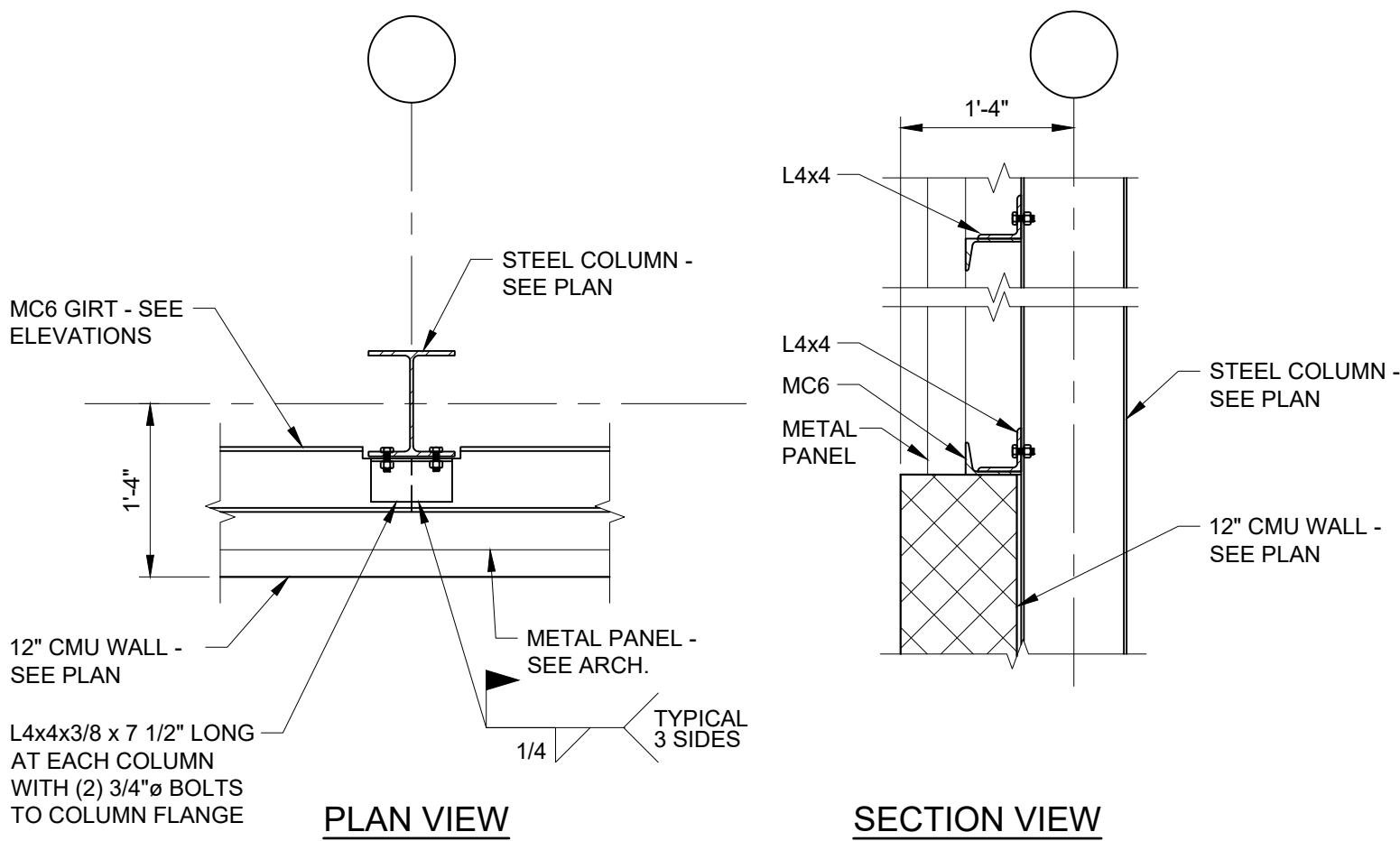


PLAN

SECTION A-A

ROOF DECK OPENING DETAIL

- NOTES:
- IF "X" IS 4" OR LESS, ELIMINATE ANGLE PARALLEL TO JOIST OR BEAM.
 - PROVIDE ANGLE FRAME FOR ALL OPENINGS GREATER THAN 10" DIA. OR 10' SQUARE.
 - CONTRACTOR TO VERIFY SIZE AND LOCATION OF ALL OPENINGS. SEE ARCHITECTURAL, MECHANICAL, ETC. DRAWINGS FOR OPENINGS NOT SHOWN ON STRUCTURAL DRAWINGS.

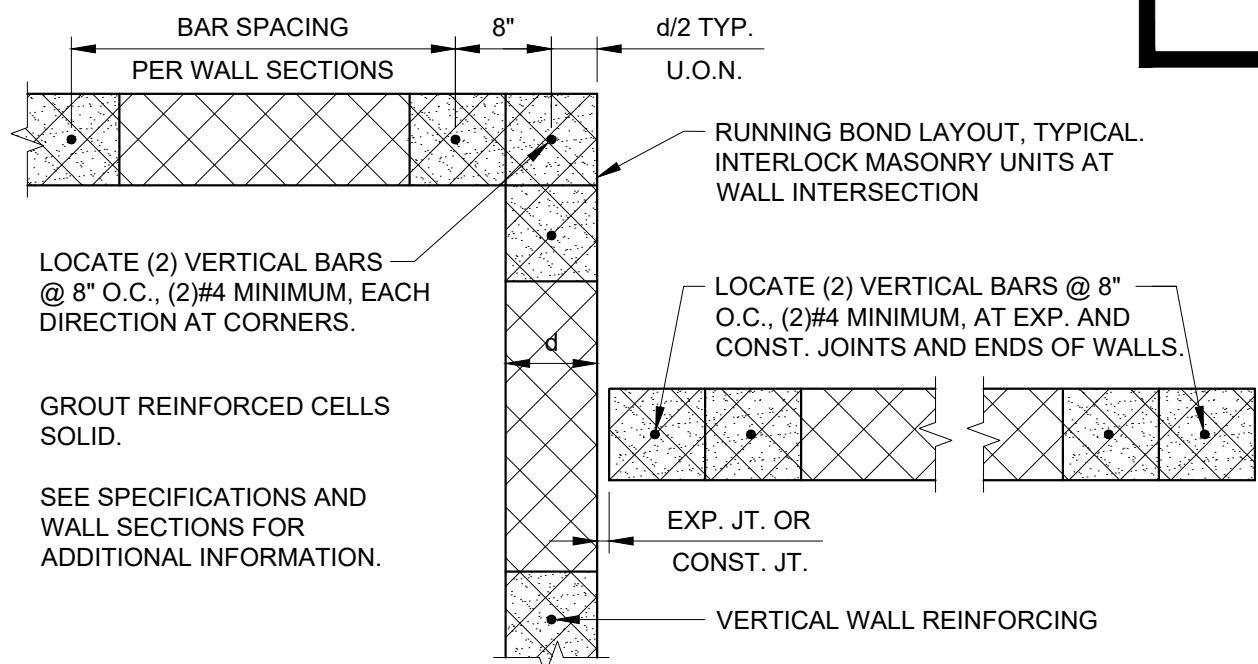


PLAN VIEW

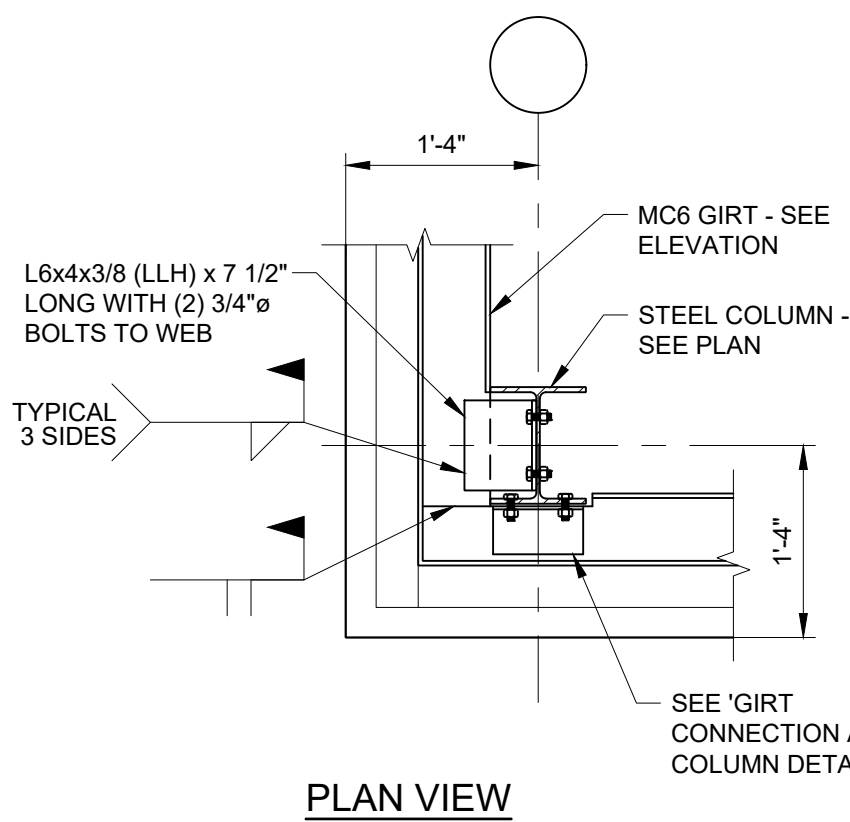
SECTION VIEW

GIRT CONNECTION AT COLUMN DETAIL

3/4"=1'-0"



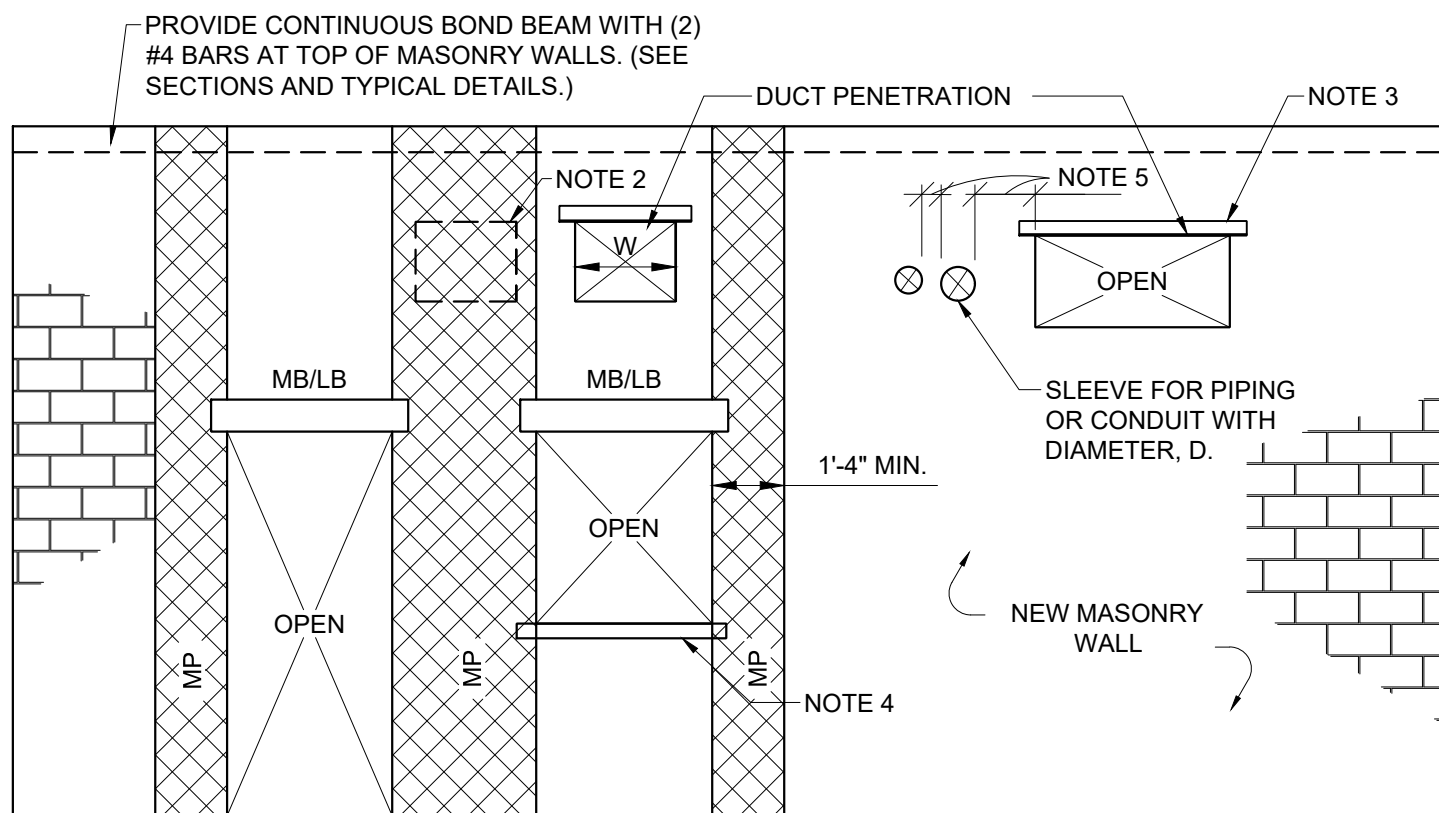
REINFORCING DETAILS FOR
CORNERS AND ENDS OF MASONRY WALLS



PLAN VIEW

GIRT CONNECTION AT CORNER DETAIL

3/4"=1'-0"

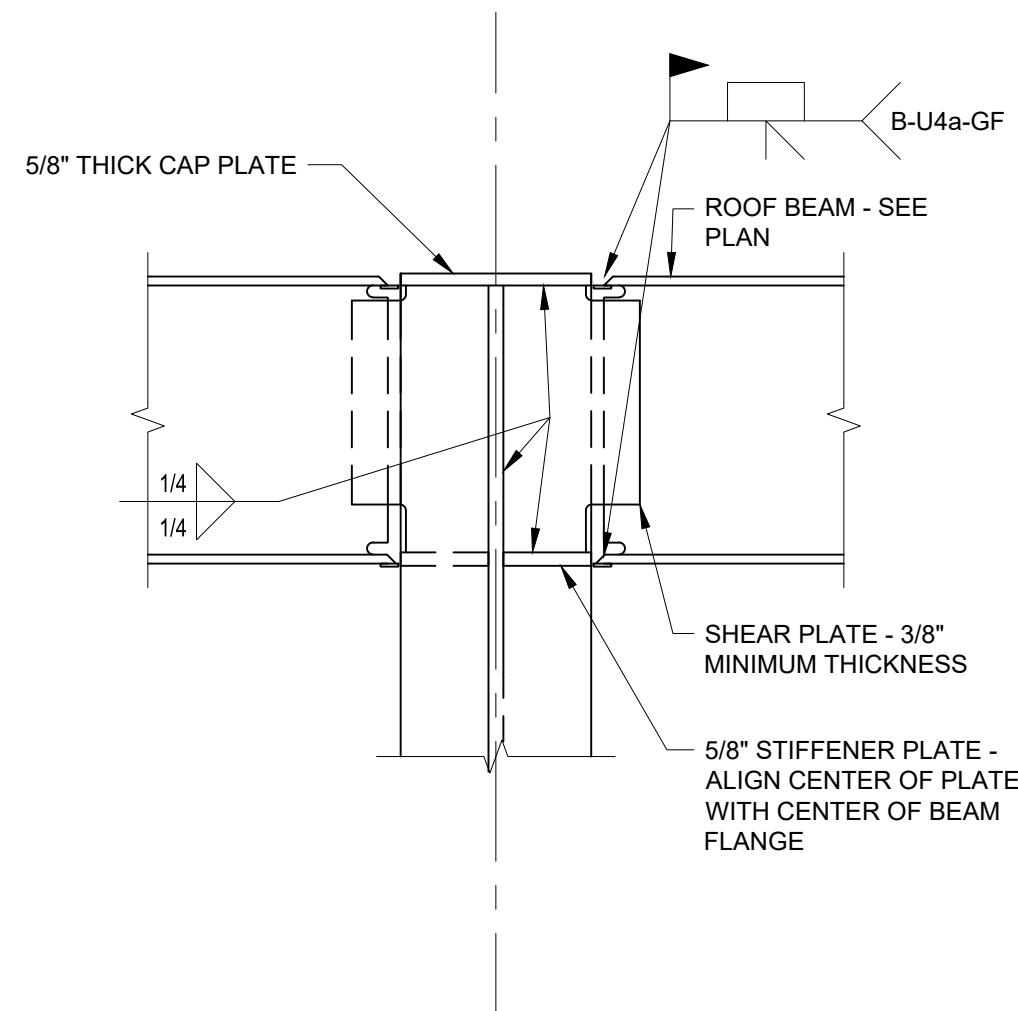


NOTES:

- WHEN CUTTING PENETRATIONS THROUGH EXISTING OR NEW MASONRY WALLS, LOCATE ALL WALL AND BEAM REINFORCING (HORIZ./VERT. REINFORCEMENT, LINTELS, BOND BEAMS, ETC.) PRIOR TO CUTTING. DO NOT CUT WALL OR BEAM REINFORCING.
- DO NOT LOCATE WALL PENETRATIONS WITHIN MASONRY PIERS. WHERE POSSIBLE, STACK WALL PENETRATION VERTICALLY. FOR EXAMPLE, LOCATE DUCT PENETRATIONS DIRECTLY ABOVE DOOR OR WINDOW OPENINGS.
- PROVIDE LOOSE LINTELS ABOVE ALL WALL PENETRATIONS PER SCHEDULE IN GENERAL NOTES.
- PROVIDE CONTINUOUS 8" BOND BEAMS WITH(2) #4 BELOW OPENINGS WITH WIDTHS, W, GREATER THAN OR EQUAL TO 8'-0". EXTEND BOND BEAM TO ADJACENT MASONRY PIER (2'-8" MIN. BEYOND EDGE OF OPENING).
- DO NOT LOCATE SLEEVE PENETRATIONS WITHIN 2'-8" OF DUCT PENETRATIONS. MAINTAIN A MINIMUM SLEEVE SPACING OF 3'D (8" MINIMUM).

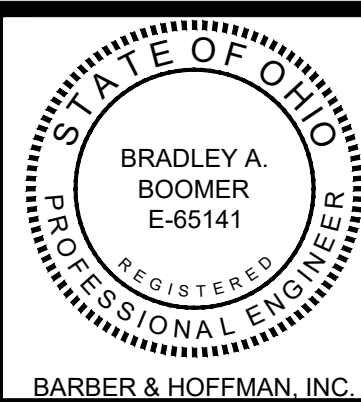
MP DENOTES MASONRY PIER/PILASTER. COORDINATE LOCATIONS WITH PLANS, SECTIONS, AND TYPICAL DETAILS.
MB/LB DENOTES MASONRY/LINTEL BEAM. SEE PLANS AND TYPICAL DETAILS FOR ADDITIONAL INFORMATION.

TYPICAL MASONRY WALL PENETRATION DETAIL



TYPICAL MOMENT CONNECTION DETAIL -
BEAM TO COLUMN WEB (WELDED)

REVISIONS:



CANTON OHIO 44702

600 MARKET AVENUE NORTH

MOTTED MEADOWS
ARCHITECT &

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
CANTON, OHIO
2664 HARRISBURG RD. NE



DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
TYPICAL DETAILS

COMM 21161-B
DATE 02-01-2024

DWG
S-3.2

2217 East 9th Street, Suite 350
Cleveland OH 44115-1257
216-875-0100 (F) 216-875-0111
barberhoffman.com
BARBER & HOFFMAN, INC.
Consulting Engineers



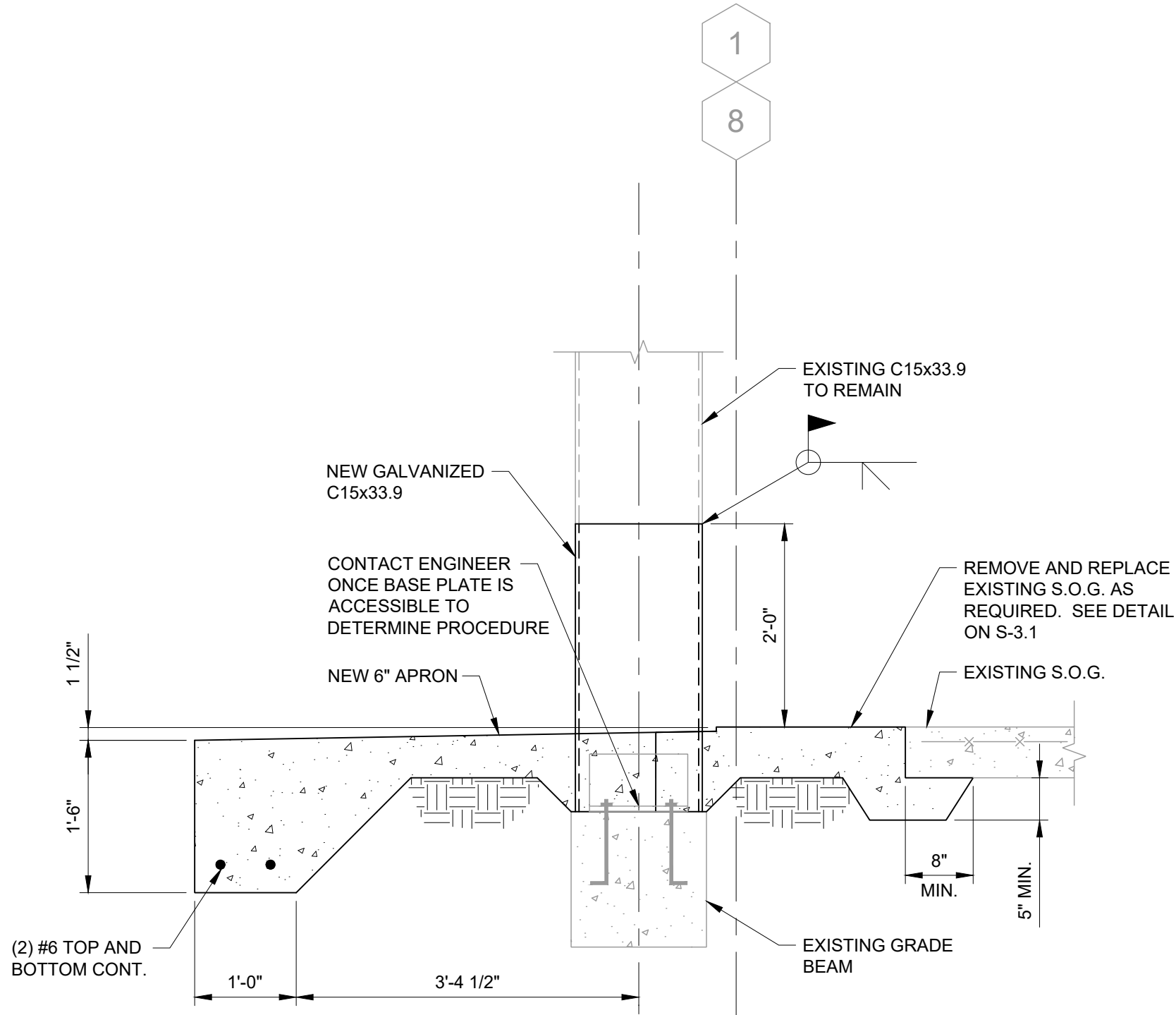
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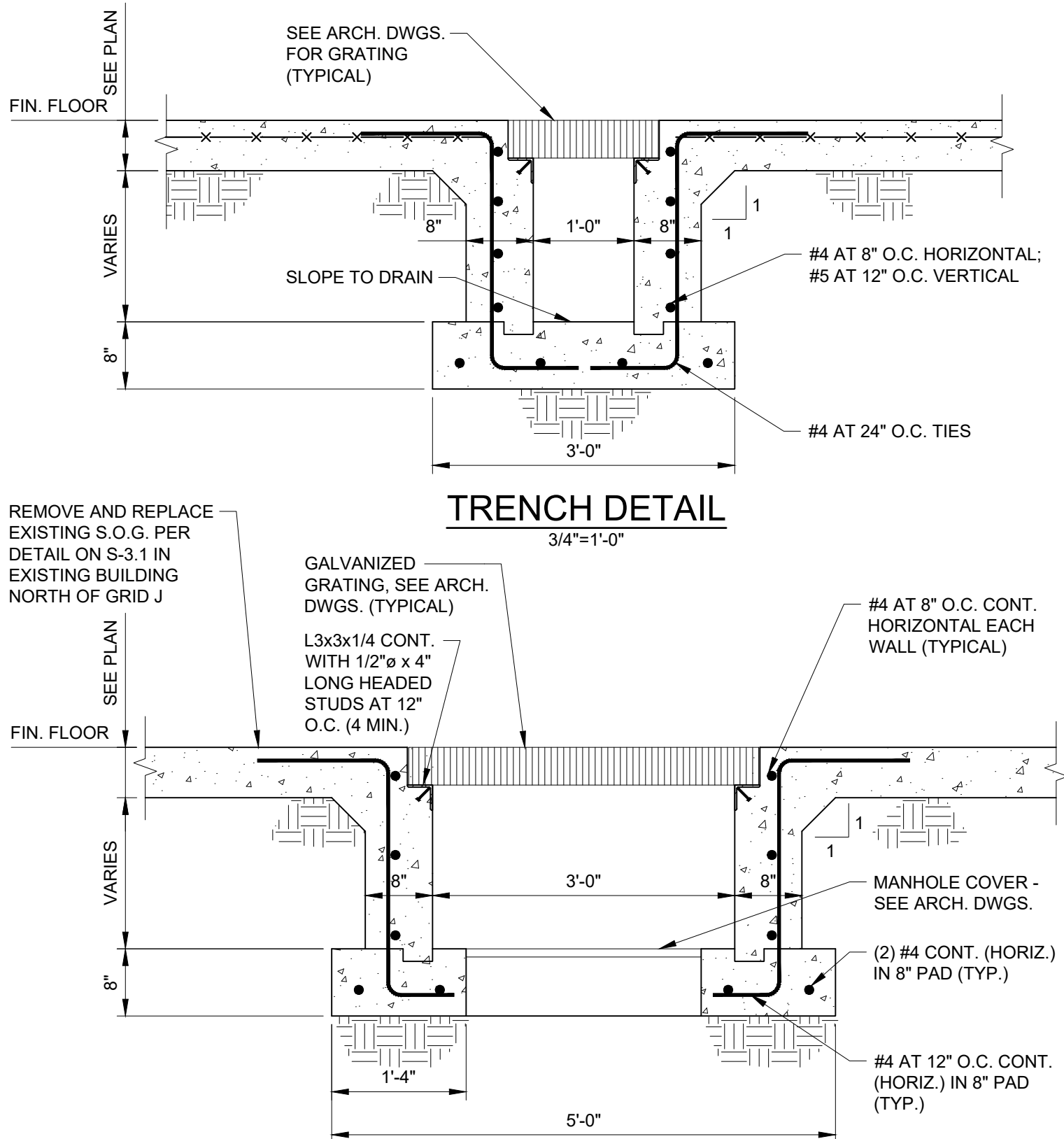
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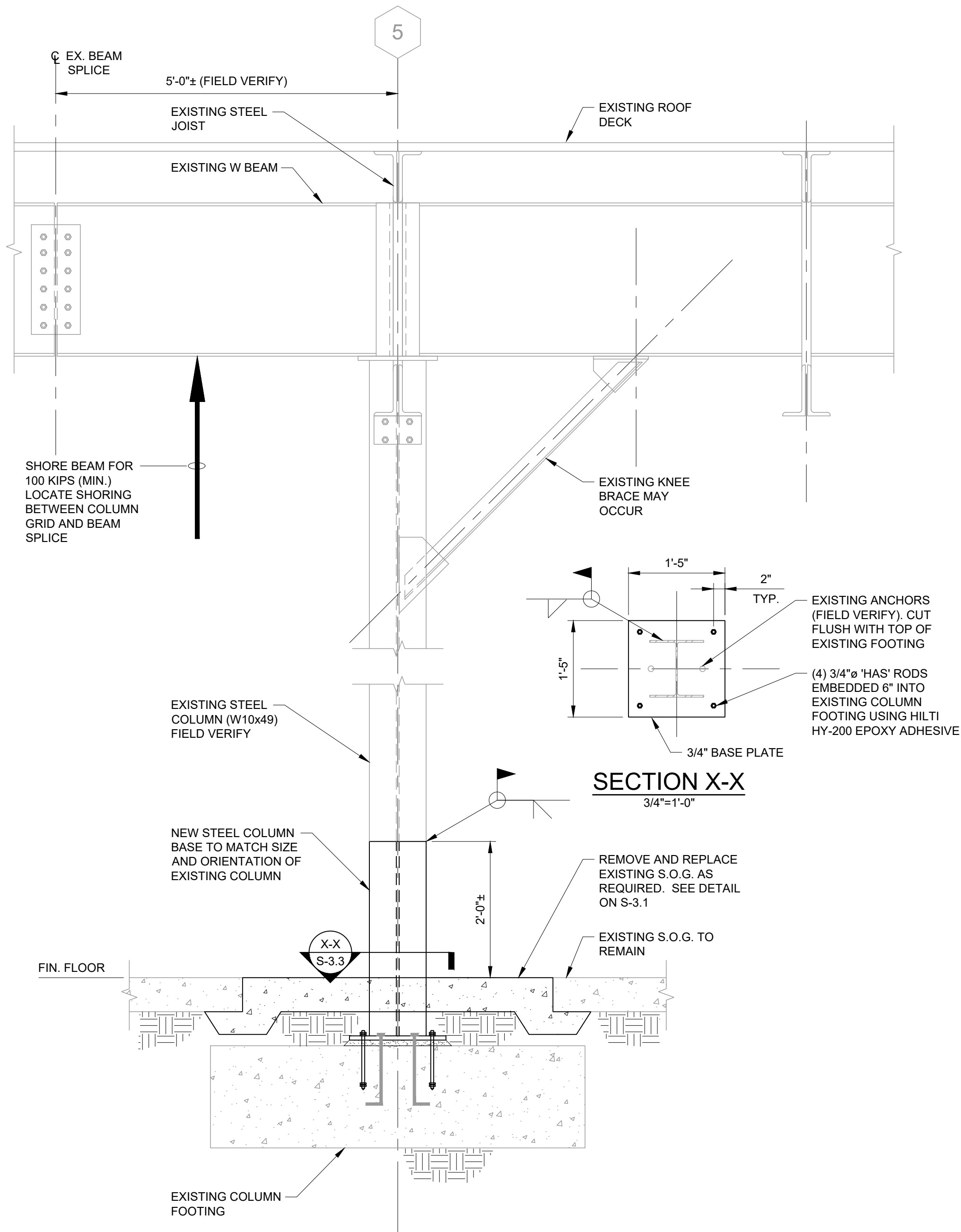
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OVERHEAD DOOR - JAMB BASE
REPAIR DETAIL
3/4"=1'-0"

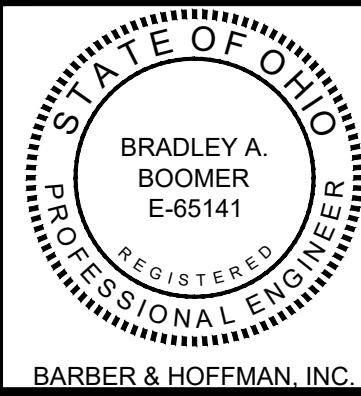


MANHOLE DETAIL
3/4"=1'-0"



COLUMN REPAIR DETAIL
3/4"=1'-0"

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WATER DEPARTMENT SERVICE CENTER
CANTON, OHIO
2664 HARRISBURG RD. NE



DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
REPAIR DETAILS

COMM 21161-B
DATE 02-01-2024

DWG
S-3.3

PLUMBING DEMOLITION NOTES

1. THE INTENT OF THE DEMOLITION NOTES AND DRAWINGS IS TO INDICATE THE SCOPE OF DEMOLITION WORK REQUIRED TO PERMIT THE INSTALLATION OF NEW WORK INDICATED ON THE CONTRACT DRAWINGS. THE DEMOLITION DRAWINGS ARE BASED ON THE ORIGINAL CONSTRUCTION DOCUMENTS AND MAY NOT REFLECT THE ACTUAL EXISTING CONDITIONS. THE CONTRACTOR SHALL COORDINATE DEMOLITION WORK REQUIRED WITH BOTH THE NEW WORK INDICATED AND THE ACTUAL FIELD CONDITIONS ENCOUNTERED.

2. ALL EQUIPMENT AND MATERIALS WHICH ARE INDICATED TO BE DEMOLISHED SHALL FIRST BE OFFERED TO THE OWNER FOR HIS RETENTION. IF THE OWNER DOES NOT WANT THE DEMOLISHED MATERIALS, THEY SHALL BE REMOVED FROM THE SITE AND LEGALLY DISPOSED OF BY THE CONTRACTOR.

3. THIS CONTRACTOR SHALL COORDINATE SHUTDOWN OF ANY MECHANICAL SYSTEMS REQUIRED AS PART OF THE DEMOLITION WORK WITH THE OWNER PRIOR TO INTERRUPTION OF SERVICES.

4. UNLESS NOTED OTHERWISE, PIPING INDICATED FOR DEMOLITION SHALL BE REMOVED BACK TO THE NEAREST MAIN. TERMINATION POINT SHALL BE CAPPED AIR/WATER TIGHT. PIPING WITHIN WALLS WHICH ARE TO REMAIN MAY BE CAPPED IN THE WALL AND ABANDONED WITHIN THE WALL. SERVICES MUST BE CAPPED FAR ENOUGH IN THE WALL TO ALLOW FOR FLUSH PATCHING AND FINISHING OF THE WALL.

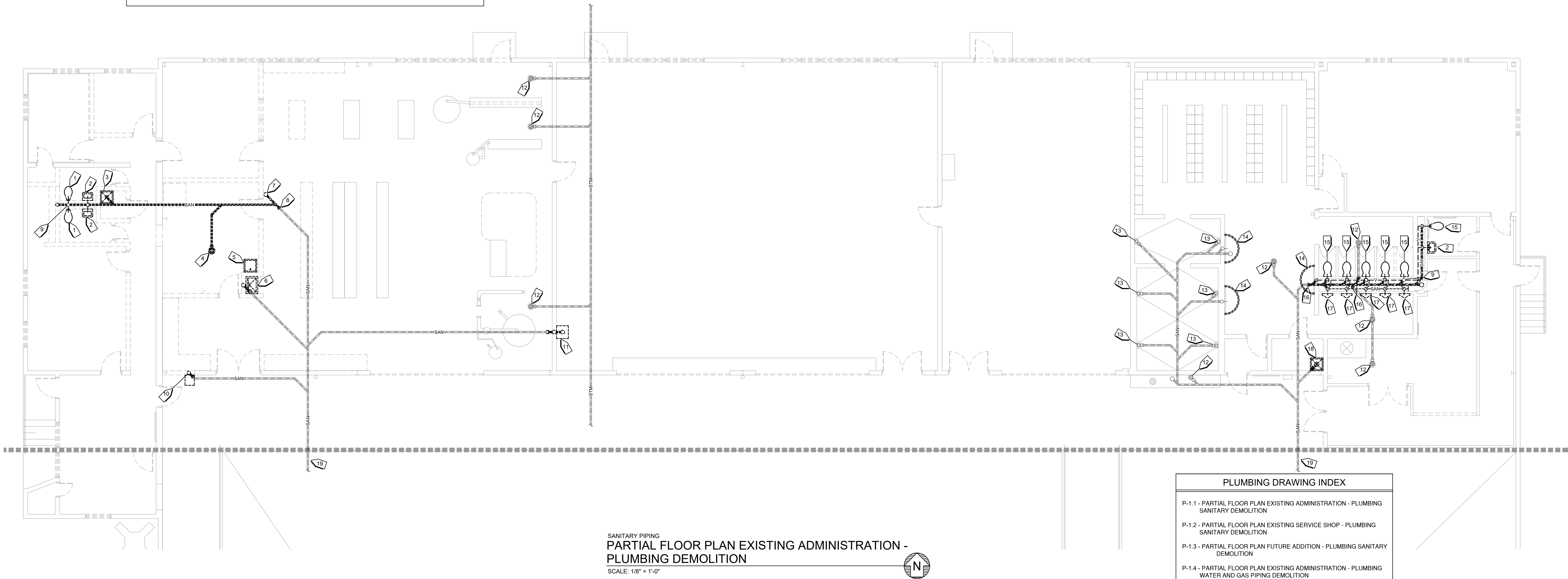
5. OPENINGS IN WALLS FROM REMOVAL OF ANY PIPING SHALL BE REPAIRED/PATCHED BY THE CONTRACTOR TO MAINTAIN THE FIRE RESISTANT RATING OF THE WALL UNLESS THE WALL IS ALSO BEING DEMOLISHED.

6. PRIOR TO DISCONNECTING OR REMOVING ANY PLUMBING EQUIPMENT CONTAINING A REFRIGERANT, THE CONTRACTOR SHALL RECOVER ALL REFRIGERANT WITHOUT VENTING AND LEGALLY DISPOSE OF SAME IN COMPLETE COMPLIANCE WITH ALL EPA REGULATIONS.

7. IF ANY MATERIAL IS ENCOUNTERED IN THE COURSE OF DEMOLITION WORK WHICH THE CONTRACTOR, SUBCONTRACTOR, OR TRADESMAN SUSPECTS TO BE ASBESTOS, THEN THE WORK IN THE AREA SHALL CEASE UNTIL THE OWNER OR OWNER'S REPRESENTATIVE IS CONTACTED FOR A DETERMINATION OF WHETHER THE MATERIAL IS SAFE, SHOULD BE TESTED, OR SHOULD BE REMOVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING ALL TRADESMAN ON THE JOB OF THE POTENTIAL PRESENCE AND HAZARD OF ASBESTOS MATERIALS.

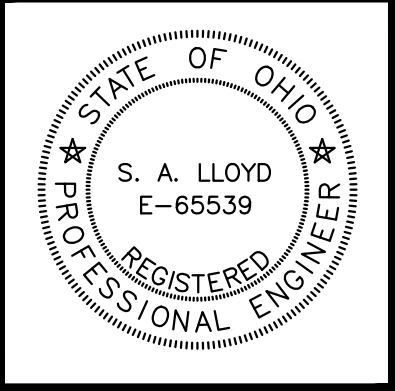
8. ALL PLUMBING FIXTURES, EQUIPMENT, PIPING, ETC. SHOWN DARK, DASHED TO BE REMOVED. ALL PLUMBING FIXTURES, EQUIPMENT, PIPING, ETC. SHOWN LIGHT TO REMAIN.

PLUMBING DEMOLITION CODED NOTES	
1 REMOVE EXISTING WC ALONG WITH ASSOCIATED SAN AND VENT PIPING	11 REMOVE EXISTING SINK ALONG WITH ASSOCIATED SAN AND VENT PIPING. REMOVE EXISTING SAN PIPING TO POINT INDICATED AND CAP. REMOVE EXISTING 3" VENT THRU THE ROOF AND PATCH ROOF
2 REMOVE EXISTING LAV ALONG WITH ASSOCIATED SAN AND VENT PIPING	12 EXISTING FLOOR DRAIN TO REMAIN
3 REMOVE EXISTING MOP BASIN ALONG WITH ASSOCIATED SAN AND VENT PIPING	13 EXISTING SHOWER DRAIN TO REMAIN
4 REMOVE EXISTING FLOOR DRAIN AND SAN PIPING BELOW FLOOR	14 REMOVE EXISTING WASH FOUNTAIN. EXISTING SAN AND VENT PIPING TO REMAIN AND BE REWORKED FOR NEW SINK
5 REMOVE EXISTING LAUNDRY TUB ALONG WITH ASSOCIATED SAN AND VENT PIPING	15 REMOVE EXISTING WC. REMOVE EXISTING SAN AND VENT PIPING
6 REMOVE EXISTING SINK ALONG WITH ASSOCIATED SAN AND VENT PIPING	16 REMOVE EXISTING SAN TO POINT INDICATED FOR RECONNECTION
7 REMOVE EXISTING FLOOR CLEANOUT	17 REMOVE EXISTING URINAL. REMOVE EXISTING SAN AND VENT PIPING
8 REMOVE EXISTING SAN PIPING TO POINT INDICATED FOR RECONNECTION	18 REMOVE EXISTING MOP BASIN. EXISTING SAN AND VENT PIPING TO REMAIN AND BE REWORKED FOR NEW MOP BASIN
9 EXISTING 4" VENT THRU ROOF TO REMAIN FOR RECONNECTION	19 SEE SHEET P-1.2 FOR CONTINUATION OF PIPING
10 REMOVE EXISTING EWC ALONG WITH ASSOCIATED SAN AND VENT PIPING. REMOVE EXISTING SAN PIPING TO POINT INDICATED FOR RECONNECTION. REMOVE EXISTING 3" VENT THRU THE ROOF AND PATCH ROOF	



PLUMBING DRAWING INDEX	
P-1.1 - PARTIAL FLOOR PLAN EXISTING ADMINISTRATION - PLUMBING SANITARY DEMOLITION	
P-1.2 - PARTIAL FLOOR PLAN EXISTING SERVICE SHOP - PLUMBING SANITARY DEMOLITION	
P-1.3 - PARTIAL FLOOR PLAN FUTURE ADDITION - PLUMBING SANITARY DEMOLITION	
P-1.4 - PARTIAL FLOOR PLAN EXISTING ADMINISTRATION - PLUMBING WATER AND GAS PIPING DEMOLITION	
P-1.5 - PARTIAL FLOOR PLAN EXISTING SERVICE SHOP - PLUMBING WATER AND GAS PIPING DEMOLITION	
P-2.1 - PARTIAL FLOOR PLAN EXISTING ADMINISTRATION - PLUMBING SANITARY	
P-2.2 - PARTIAL FLOOR PLAN EXISTING SERVICE SHOP - PLUMBING SANITARY	
P-2.3 - PARTIAL FLOOR PLAN NEW ADDITION - PLUMBING SANITARY	
P-2.4 - PARTIAL FLOOR PLAN EXISTING ADMINISTRATION - PLUMBING WATER AND GAS PIPING	
P-2.5 - PARTIAL FLOOR PLAN EXISTING SERVICE SHOP - PLUMBING WATER AND GAS PIPING	
P-2.6 - PARTIAL FLOOR PLAN NEW ADDITION - GAS PIPING PLUMBING	
P-3.1 - SANITARY ISOMETRIC	
P-3.2 - PLUMBING DETAILS	
P-3.3 - PLUMBING SCHEDULES, NOTES, AND STMBOL LEGENDS	

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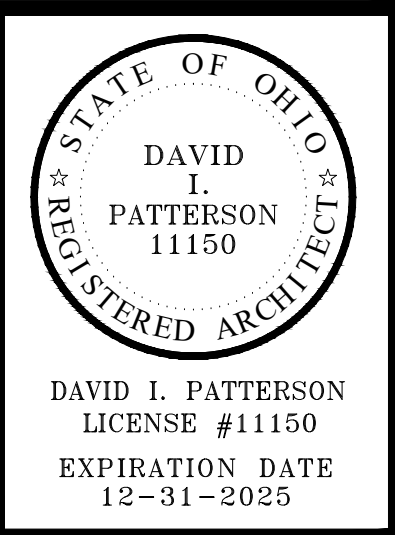
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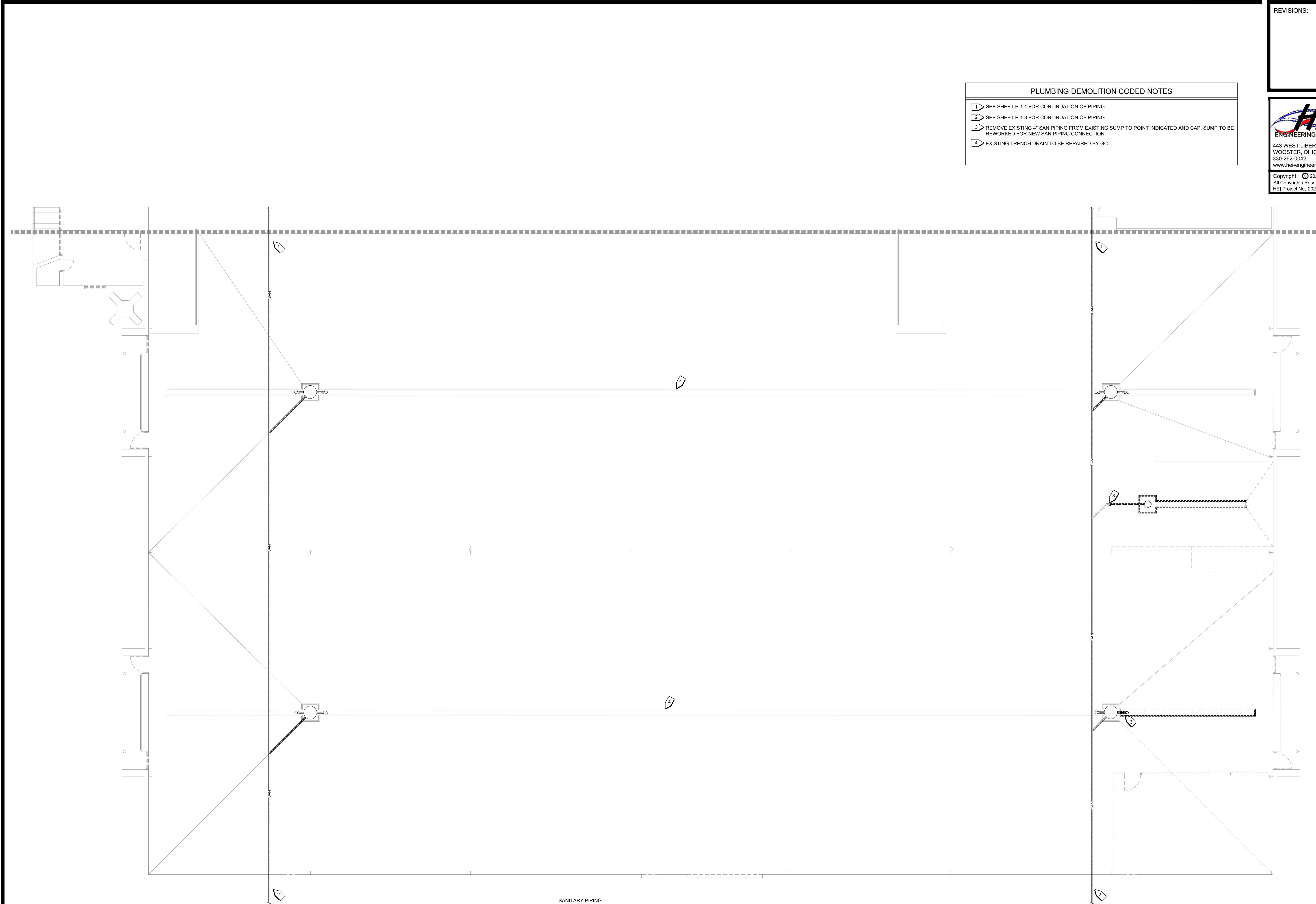
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CANTON, OHIO



THIS DWG :
PARTIAL FLOOR PLAN
EXISTING
ADMINISTRATION -
PLUMBING SANITARY
DEMOLITION

COMM 21161-B
DATE 02-01-2024

DWG
P-1.1



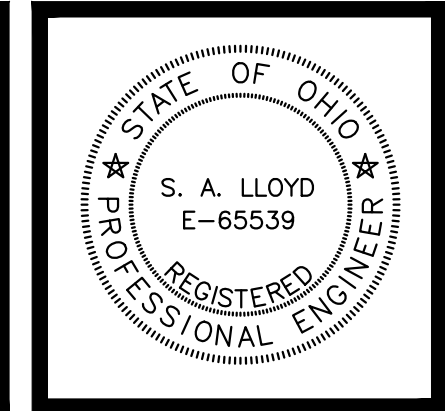
SANITARY PIPING
PARTIAL FLOOR PLAN EXISTING SERVICE SHOP -
PLUMBING DEMOLITION
SCALE: 1/8" = 1'-0"



- PLUMBING DEMOLITION CODED NOTES
- 1 SEE SHEET P-1.1 FOR CONTINUATION OF PIPING
 - 2 SEE SHEET P-1.3 FOR CONTINUATION OF PIPING
 - 3 REMOVE EXISTING 4" SAN PIPING FROM EXISTING SUMP TO POINT INDICATED AND CAP. SUMP TO BE REWORKED FOR NEW SAN PIPING CONNECTION.
 - 4 EXISTING TRENCH DRAIN TO BE REPAIRED BY GC

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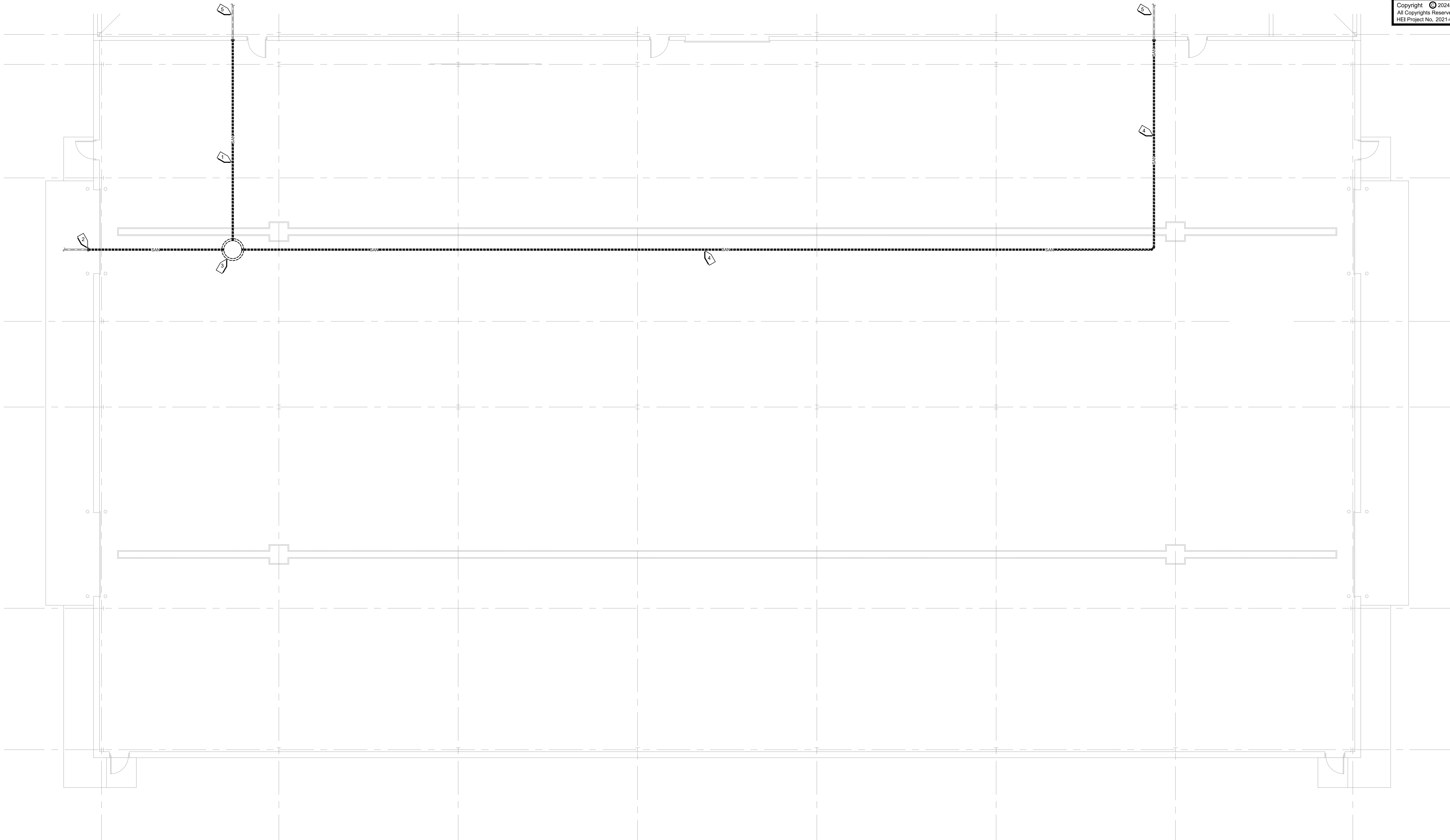
GARAGE ADDITION
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2664 HARRISBURG RD, NE
CANTON, OHIO

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11150
REGISTERED ARCHITECT
DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
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THIS DWG :
PARTIAL FLOOR PLAN
EXISTING SERVICE SHOP
- PLUMBING SANITARY
DEMOLITION

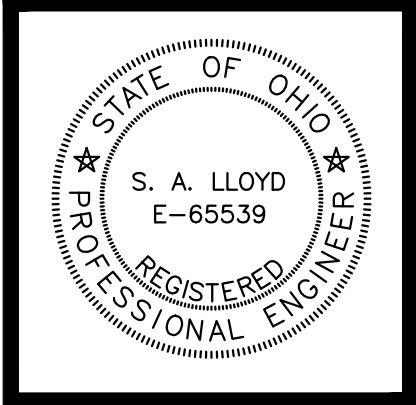
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DWG
P-1.2



PLUMBING DEMOLITION CODED NOTES	
1	REMOVE EXISTING 4" SAN PIPING FROM MANHOLE BACK TO POINT INDICATED FOR RECONNECTION
2	REMOVE EXISTING 8" SAN PIPING FROM MANHOLE TO POINT INDICATED FOR RECONNECTION
3	REMOVE EXISTING MANHOLE
4	REMOVE EXISTING 6" SAN PIPING FROM MANHOLE BACK TO POINT INDICATED FOR RECONNECTION
5	SEE SHEET P-1.2 FOR CONTINUATION OF PIPING

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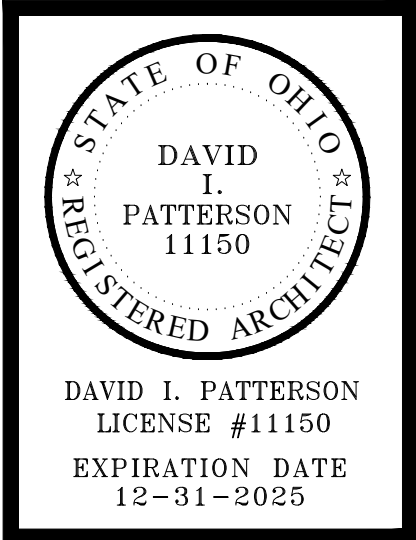


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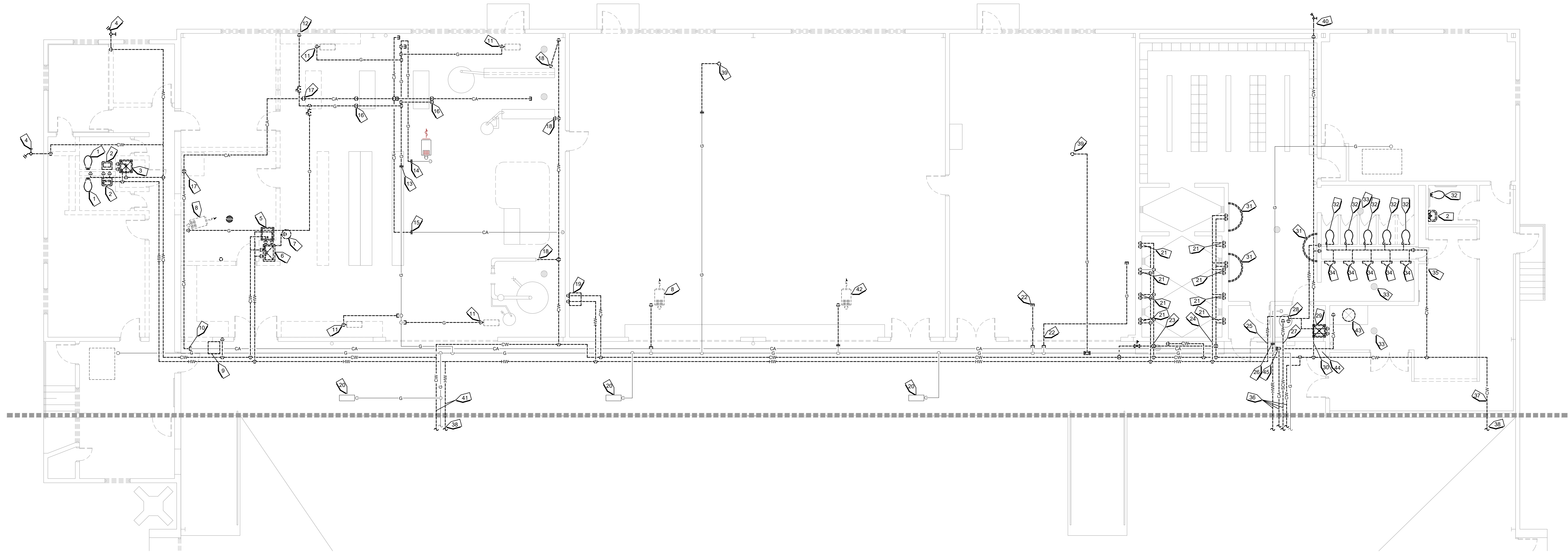


THIS DWG :
PARTIAL FLOOR PLAN
FUTURE ADDITION -
PLUMBING SANITARY
DEMOLITION

COMM	21161-B
DATE	02-01-2024

DWG
P-1.3





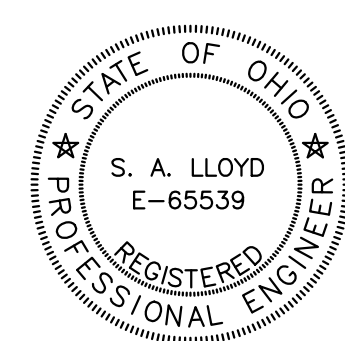
WATER AND GAS PIPING
PARTIAL FLOOR PLAN EXISTING ADMINISTRATION -
PLUMBING DEMOLITION
SCALE: 1/8" = 1'-0"



PLUMBING DEMOLITION CODED NOTES

- | | |
|--|---|
| 1 REMOVE EXISTING WC ALONG WITH ASSOCIATED CW PIPING | 24 REMOVE EXISTING 1-1/4" CW AND HW PIPING |
| 2 REMOVE EXISTING LAV ALONG WITH ASSOCIATED CW AND HW PIPING | 25 REMOVE EXISTING 1-1/2" HW PIPING BACK TO WATER HEATER |
| 3 REMOVE EXISTING MOP BASIN ALONG WITH ASSOCIATED CW AND HW PIPING | 26 REMOVE EXISTING 1" RHW PIPING TO POINT INDICATED FOR RECONNECTION |
| 4 REMOVE EXISTING HOSE BIB ALONG WITH ASSOCIATED CW PIPING. PATCH EXISTING OPENING AND MATCH EXISTING CONDITIONS | 27 REMOVE EXISTING 1-1/2" CW PIPING BACK TO WATER HEATER |
| 5 REMOVE EXISTING LAUNDRY TUB ALONG WITH ASSOCIATED CW AND HW PIPING | 28 EXISTING WATER HEATER TO REMAIN |
| 6 REMOVE EXISTING SINK ALONG WITH ASSOCIATED CW AND HW PIPING | 29 REMOVE EXISTING MOP BASIN ALONG WITH EXISTING CW AND HW PIPING |
| 7 REMOVE EXISTING EMERGENCY SHOWER ALONG ASSOCIATED CW PIPING | 30 REMOVE EXISTING 1" CW PIPING |
| 8 REMOVE EXISTING GAS PIPING FROM UNIT HEATER TO POINT INDICATED AND CAP. UNIT HEATER TO BE REMOVED BY M.C. | 31 REMOVE EXISTING WASH FOUNTAIN. REMOVE EXISTING CW AND HW PIPING |
| 9 REMOVE EXISTING EWC ALONG WITH ASSOCIATED CW PIPING | 32 REMOVE EXISTING WC. REMOVE EXISTING CW PIPING |
| 10 REMOVE EXISTING 2" CA PIPING TO POINT INDICATED AND CAP | 33 EXISTING FLOOR DRAIN TO REMAIN |
| 11 REMOVE EXISTING GAS PIPING TO INFRARED HEATER. INFRARED HEATER TO BE REMOVED BY M.C. | 34 REMOVE EXISTING URINAL. REMOVE EXISTING CW PIPING |
| 12 REMOVE EXISTING GAS PIPING TO STOVE. STOVE REMOVED BY OWNER | 35 REMOVE EXISTING 3" CW |
| 13 REMOVE EXISTING 1-1/4" GAS PIPING TO POINT INDICATED FOR RECONNECTION | 36 REMOVE EXISTING 1" RHW, 1-1/2" SCW, 1/2" CA, AND 1-1/2" CW PIPING |
| 14 REMOVE EXISTING 3/4" GAS PIPING TO POINT INDICATED FOR RECONNECTION | 37 REMOVE EXISTING 1-1/2" CW PIPING |
| 15 REMOVE EXISTING CA TO POINT INDICATED FOR RECONNECTION | 38 SEE SHEET P-1.5 FOR CONTINUATION OF PIPING |
| 16 REMOVE EXISTING GAS AND CA DROPS TO TABLE | 39 REMOVE EXISTING GAS PIPING TO POINT INDICATED FOR RECONNECTION. GAS PIPING TO BE REWORKED FOR NEW RTU INSTALLATION. INSTALL NEW SHUT-OFF VALVE AND UNION |
| 17 REMOVE EXISTING CA DROP TO TABLE | 40 REMOVE EXISTING HOSE BIB AND EXISTING CW PIPING |
| 18 REMOVE EXISTING CW PIPING TO TEST EQUIPMENT | 41 REMOVE EXISTING 6" CW AND 1" HW PIPING |
| 19 REMOVE EXISTING SINK ALONG WITH CW AND HW PIPING | 42 REMOVE EXISTING GAS PIPING FROM UNIT HEATER TO POINT INDICATED FOR RECONNECTION. UNIT HEATER TO BE REMOVED BY M.C. |
| 20 EXISTING GAS PIPING AND INFRARED HEATER TO REMAIN | 43 REMOVE EXISTING AIR COMPRESSOR FOR RELOCATION |
| 21 REMOVE EXISTING SHOWER HEAD AND VALVE. REMOVE EXISTING CW AND HW PIPING | 44 REMOVE EXISTING 3/4" CA TO POINT INDICATED |
| 22 REMOVE EXISTING CAPPED GAS PIPING BACK TO POINT INDICATED AND CAP | 45 REMOVE EXISTING 3/4" CA TO POINT INDICATED FOR RECONNECTION |
| 23 REMOVE EXISTING 1" CW AND HW PIPING | |

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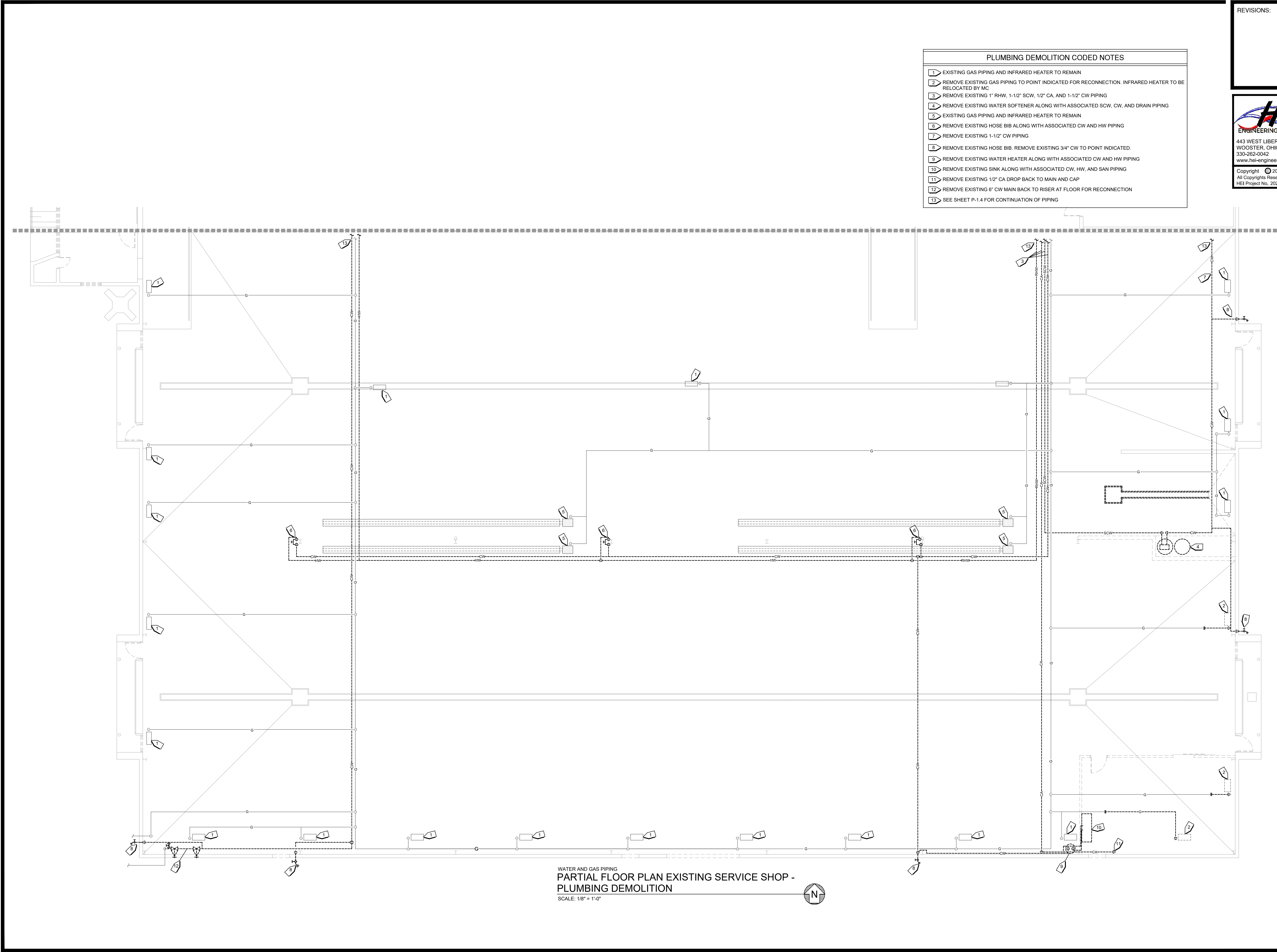


DAVID I. PATTERSON
LICENSE #111150
EXPIRATION DATE
12-31-2025

THIS DWG :
PARTIAL FLOOR PLAN
EXISTING
ADMINISTRATION -
PLUMBING WATER AND
GAS PIPING DEMOLITION

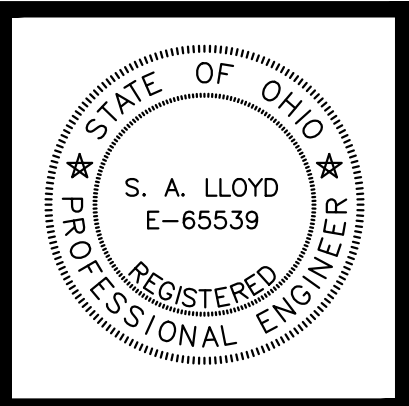
COMM 21161-B
DATE 02-01-2024

DWG
P-1.4



- PLUMBING DEMOLITION CODED NOTES
- 1 EXISTING GAS PIPING AND INFRARED HEATER TO REMAIN
 - 2 REMOVE EXISTING GAS PIPING TO POINT INDICATED FOR RECONNECTION. INFRARED HEATER TO BE RELOCATED BY MC
 - 3 REMOVE EXISTING 1" RHW, 1-1/2" SCW, 1/2" CA, AND 1-1/2" CW PIPING
 - 4 REMOVE EXISTING WATER SOFTENER ALONG WITH ASSOCIATED SCW, CW, AND DRAIN PIPING
 - 5 EXISTING GAS PIPING AND INFRARED HEATER TO REMAIN
 - 6 REMOVE EXISTING HOSE BIB ALONG WITH ASSOCIATED CW AND HW PIPING
 - 7 REMOVE EXISTING 1-1/2" CW PIPING
 - 8 REMOVE EXISTING HOSE BIB. REMOVE EXISTING 3/4" CW TO POINT INDICATED.
 - 9 REMOVE EXISTING WATER HEATER ALONG WITH ASSOCIATED CW AND HW PIPING
 - 10 REMOVE EXISTING SINK ALONG WITH ASSOCIATED CW, HW, AND SAN PIPING
 - 11 REMOVE EXISTING 1/2" CA DROP BACK TO MAIN AND CAP
 - 12 REMOVE EXISTING 6" CW MAIN BACK TO RISER AT FLOOR FOR RECONNECTION
 - 13 SEE SHEET P-1.4 FOR CONTINUATION OF PIPING

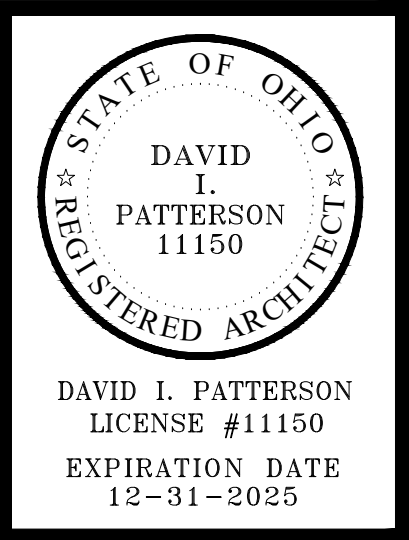
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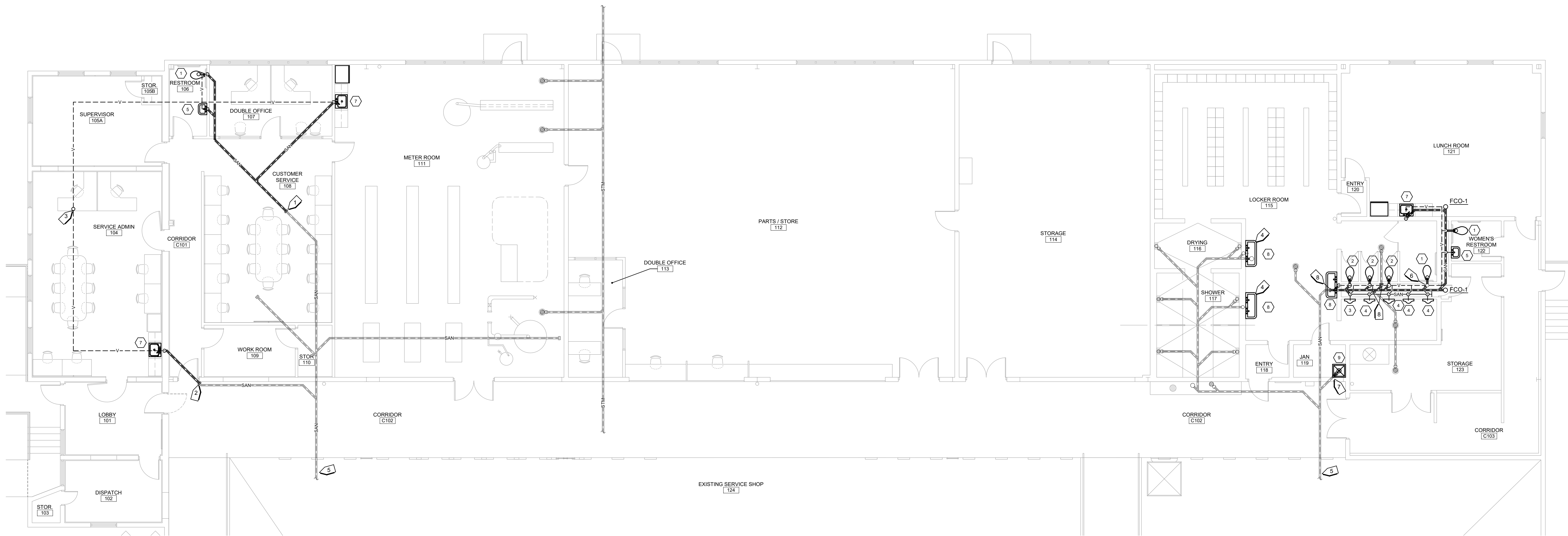
THIS DWG :
PARTIAL FLOOR PLAN
EXISTING SERVICE SHOP
- PLUMBING WATER AND
GAS PIPING DEMOLITION

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DATE 02-01-2024

DWG
P-1.5

WATER AND GAS PIPING
PARTIAL FLOOR PLAN EXISTING SERVICE SHOP -
PLUMBING DEMOLITION
SCALE: 1/8" = 1'-0"



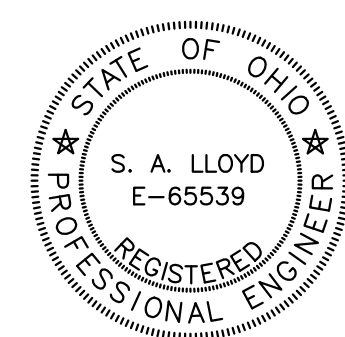


SANITARY PIPING
PARTIAL FLOOR PLAN EXISTING ADMINISTRATION - PLUMBING
SCALE: 1/8" = 1'-0"



PLUMBING NEW WORK CODED NOTES	
1	TIE 4" SAN PIPING INTO EXISTING 4" SAN PIPING
2	TIE 2" SAN PIPING INTO EXISTING 3" SAN PIPING
3	TIE 2" VENT AND 1-1/2" VENT PIPING INTO EXISTING 4" VENT THRU ROOF
4	TIE NEW LAVATORY SYSTEM INTO EXISTING SANITARY AND VENT PIPING
5	SEE SHEET P-2.2 FOR CONTINUATION OF PIPING
6	TIE NEW 2" VENT PIPING INTO EXISTING VENT THRU ROOF
7	TIE NEW MOP BASIN INTO EXISTING SAN AND VENT PIPING
8	TIE NEW 4" SAN PIPING INTO EXISTING AT LOCATION SHOWN

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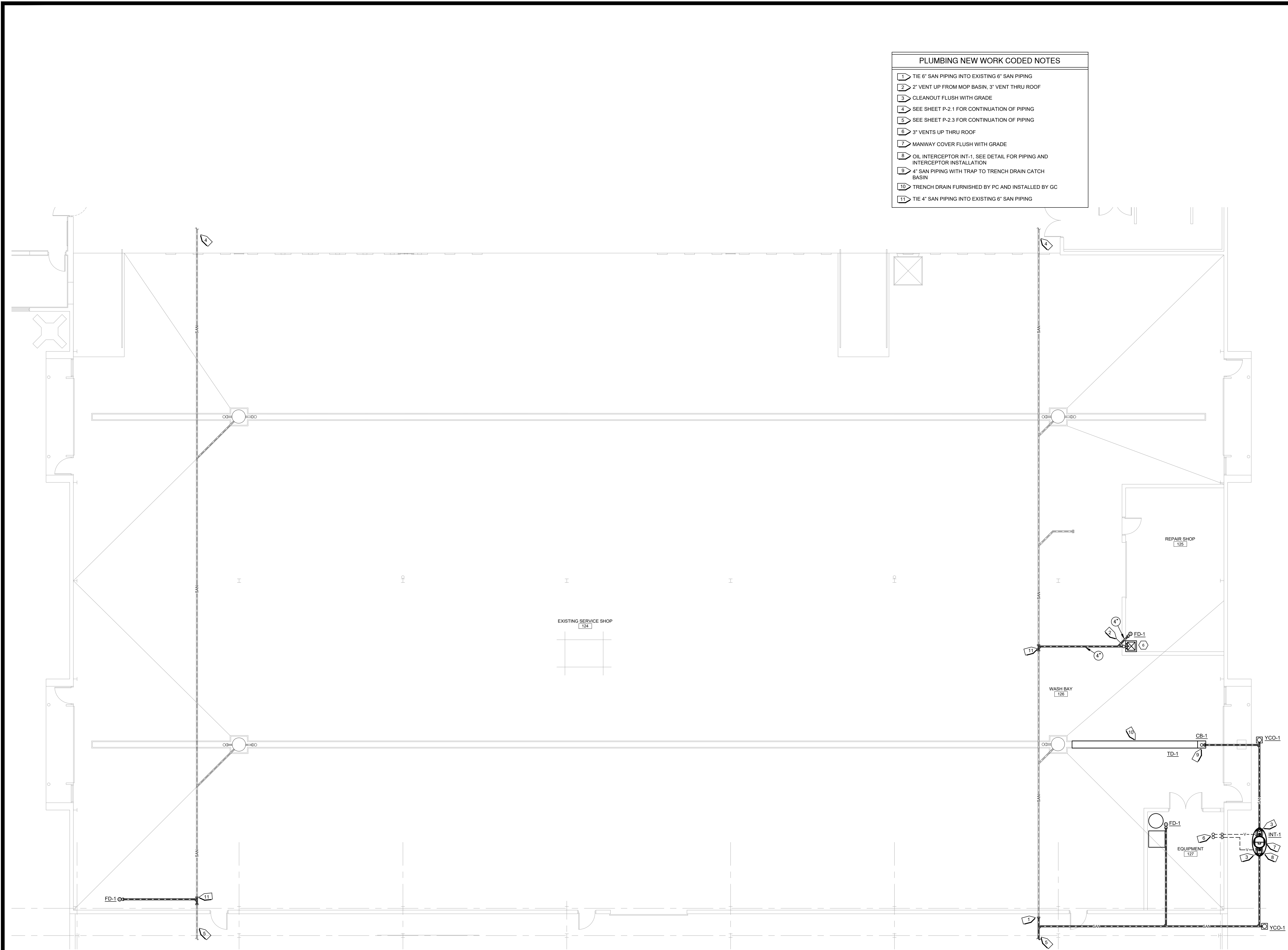
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WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD, NE
CANTON, OHIO

DAVID I. PATTERSON
11150
REGISTERED ARCHITECT
DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
PARTIAL FLOOR PLAN
EXISTING
ADMINISTRATION -
PLUMBING SANITARY

COMM 21161-B
DATE 02-01-2024

DWG
P-2.1



PLUMBING NEW WORK CODED NOTES	
1	TIE 6" SAN PIPING INTO EXISTING 6" SAN PIPING
2	2" VENT UP FROM MOP BASIN, 3" VENT THRU ROOF
3	CLEANOUT FLUSH WITH GRADE
4	SEE SHEET P-2.1 FOR CONTINUATION OF PIPING
5	SEE SHEET P-2.3 FOR CONTINUATION OF PIPING
6	3" VENTS UP THRU ROOF
7	MANWAY COVER FLUSH WITH GRADE
8	OIL INTERCEPTOR INT-1, SEE DETAIL FOR PIPING AND INTERCEPTOR INSTALLATION
9	4" SAN PIPING WITH TRAP TO TRENCH DRAIN CATCH BASIN
10	TRENCH DRAIN FURNISHED BY PC AND INSTALLED BY GC
11	TIE 4" SAN PIPING INTO EXISTING 6" SAN PIPING

SANITARY PIPING
PARTIAL FLOOR PLAN EXISTING SERVICE SHOP - PLUMBING
SCALE: 1/8" = 1'-0"

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E-65539

REGISTERED
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MOTT & MEADOWS
ARCHITECTS

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GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD, NE
CANTON, OHIO

STATE OF OHIO

DAVID I. PATTERSON
11150

REGISTERED ARCHITECT

DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

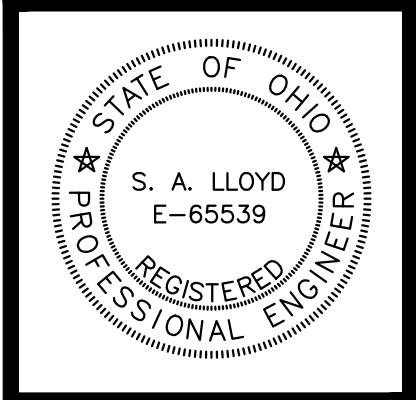
THIS DWG :
PARTIAL FLOOR PLAN
EXISTING SERVICE SHOP
- PLUMBING SANITARY

COMM 21161-B
DATE 02-01-2024

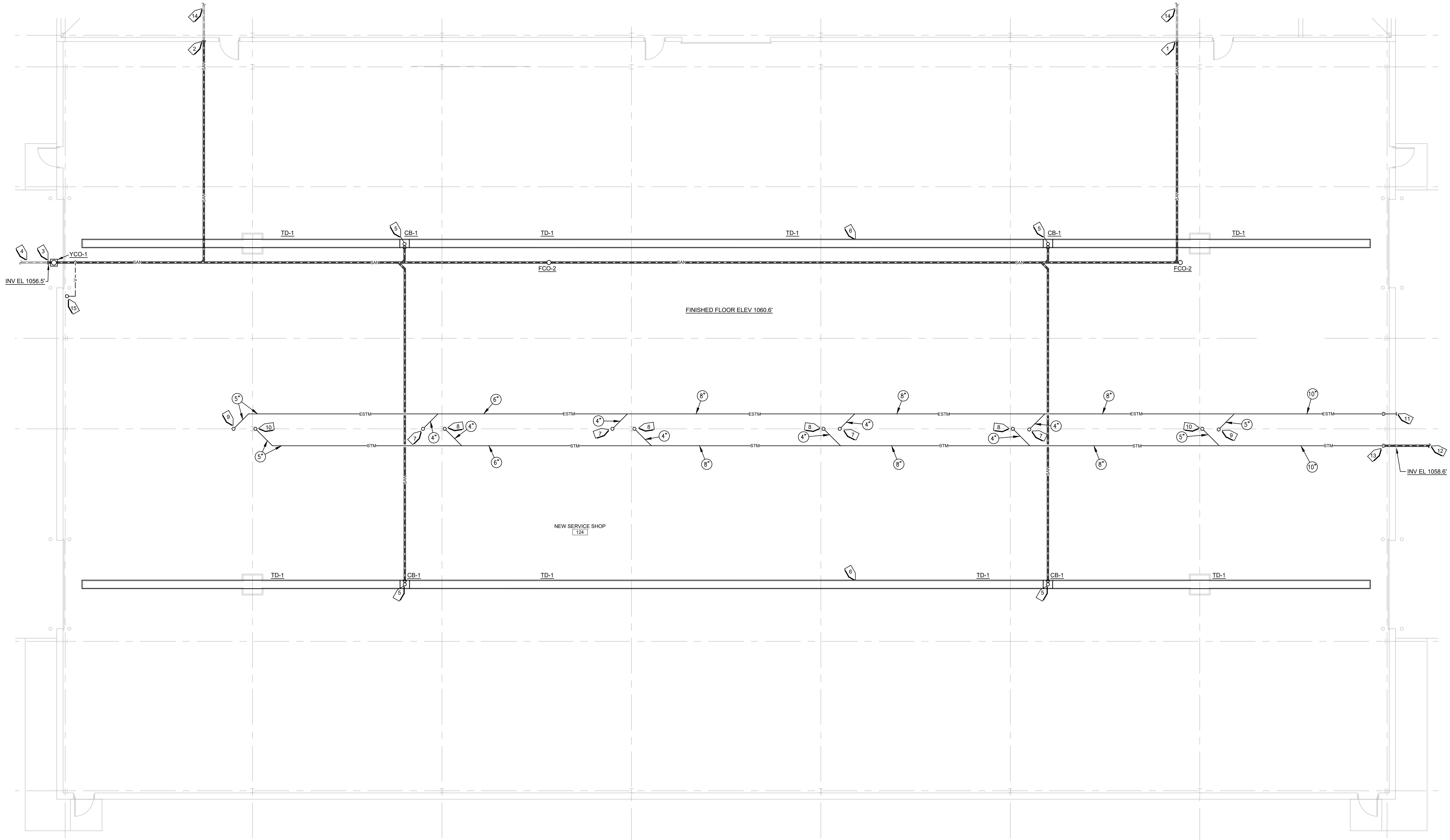
DWG
P-2.2

PLUMBING NEW WORK CODED NOTES	
1 TIE 6" SAN PIPING INTO EXISTING 6" SAN PIPING	9 5" ESTM UP TO OVERFLOW ROOF DRAIN SRD-1
2 TIE 4" SAN PIPING INTO EXISTING 4" SAN PIPING	10 5" STM UP TO ROOF DRAIN RD-1
3 TIE 6" SAN PIPING INTO EXISTING 8" SAN PIPING	11 10" ESTM DOWNSPOUT DN IN WALL AND TERMINATE 24" AFG WITH J.R. SMITH MODEL 1770 DOWNSPOUT NOZZLE
4 SEE SITE PLAN FOR CONTINUATION OF SAN PIPING	12 SEE SITE PLAN FOR CONTINUATION OF STORM PIPING
5 4" SAN PIPING WITH TRAP TO TRENCH DRAIN CATCH BASIN	13 10" STORM DN TO BELOW FLOOR
6 TRENCH DRAIN FURNISHED BY PC AND INSTALLED BY GC	14 SEE SHEET P-2.2 FOR CONTINUATION OF PIPING
7 4" ESTM UP TO OVERFLOW ROOF DRAIN SRD-1	15 3" VENT UP THRU ROOF
8 4" STM UP TO ROOF DRAIN RD-1	

REVISIONS:



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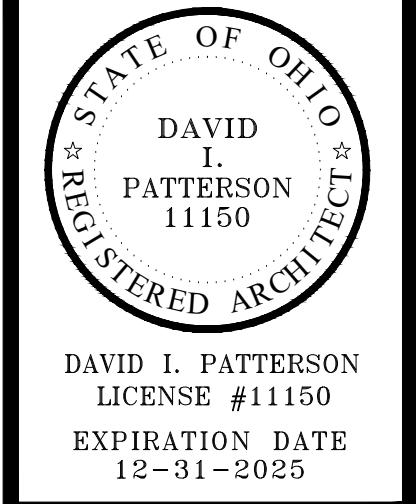
SANITARY PIPING
PARTIAL FLOOR PLAN NEW ADDITION - PLUMBING
SCALE: 1/8" = 1'-0"



MOTTER & MEADOWS
ARCHITECTS

600 MARKET AVENUE NORTH CANTON OHIO 44702

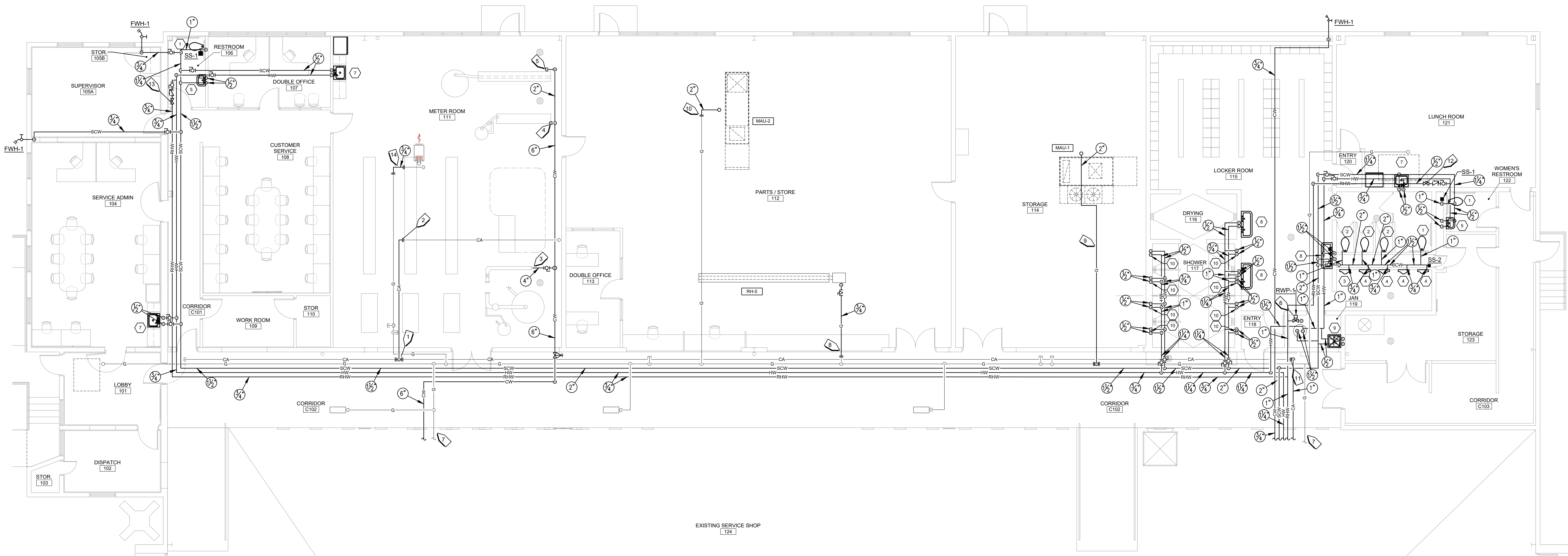
GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD, NE
CANTON, OHIO



THIS DWG :
PARTIAL FLOOR PLAN
NEW ADDITION -
PLUMBING SANITARY

COMM 21161-B
DATE 02-01-2024

DWG
P-2.3

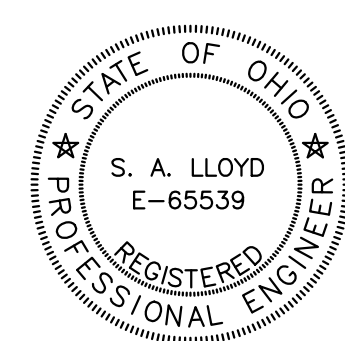


WATER AND GAS PIPING
PARTIAL FLOOR PLAN EXISTING ADMINISTRATION - PLUMBING
SCALE: 1/8" = 1'-0"

PLUMBING DEMOLITION CODED NOTES

- 1 TIE 1" CA INTO EXISTING 2" CA MAIN
- 2 TIE 1" CA INTO EXISTING CA
- 3 TIE 4" CW INTO EXISTING TESTING EQUIPMENT WITH SHUT-OFF VALVE
- 4 TIE 2" CW INTO EXISTING TESTING EQUIPMENT WITH SHUT-OFF VALVE
- 5 TIE 1-1/2" CW INTO EXISTING TESTING EQUIPMENT WITH SHUT-OFF VALVE
- 6 1" RHW TO RWP-1 PUMP AND TIE INTO EXISTING WATER HEATER. SEE DETAIL FOR INSTALLATION DIAGRAM
- 7 SEE SHEET P2.5 FOR CONTINUATION OF PIPING
- 8 TIE 3/4" GAS PIPING INTO EXISTING 3/4" GAS AND EXTEND TO NEW RH-5 WITH SHUT-OFF VALVE, DIRT LEG AND UNION
- 9 TIE 2" GAS PIPING INTO EXISTING 2" GAS AND EXTEND UP THRU ROOF TO NEW MAU-1 WITH SHUT-OFF VALVE, DIRT LEG AND UNION
- 10 TIE 2" GAS PIPING INTO EXISTING 2" GAS AND EXTEND UP THRU ROOF TO NEW MAU-2 WITH SHUT-OFF VALVE, DIRT LEG AND UNION
- 11 TIE 1" CA INTO EXISTING 3/4" CA
- 12 BALANCE TO 1.0 GPM
- 13 BALANCE TO 2.0 GPM
- 14 TIE 3/4" GAS INTO EXISTING

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ARCHITECTS
GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD, NE
CANTON, OHIO
600 MARKET AVENUE NORTH
CANTON OHIO 44702

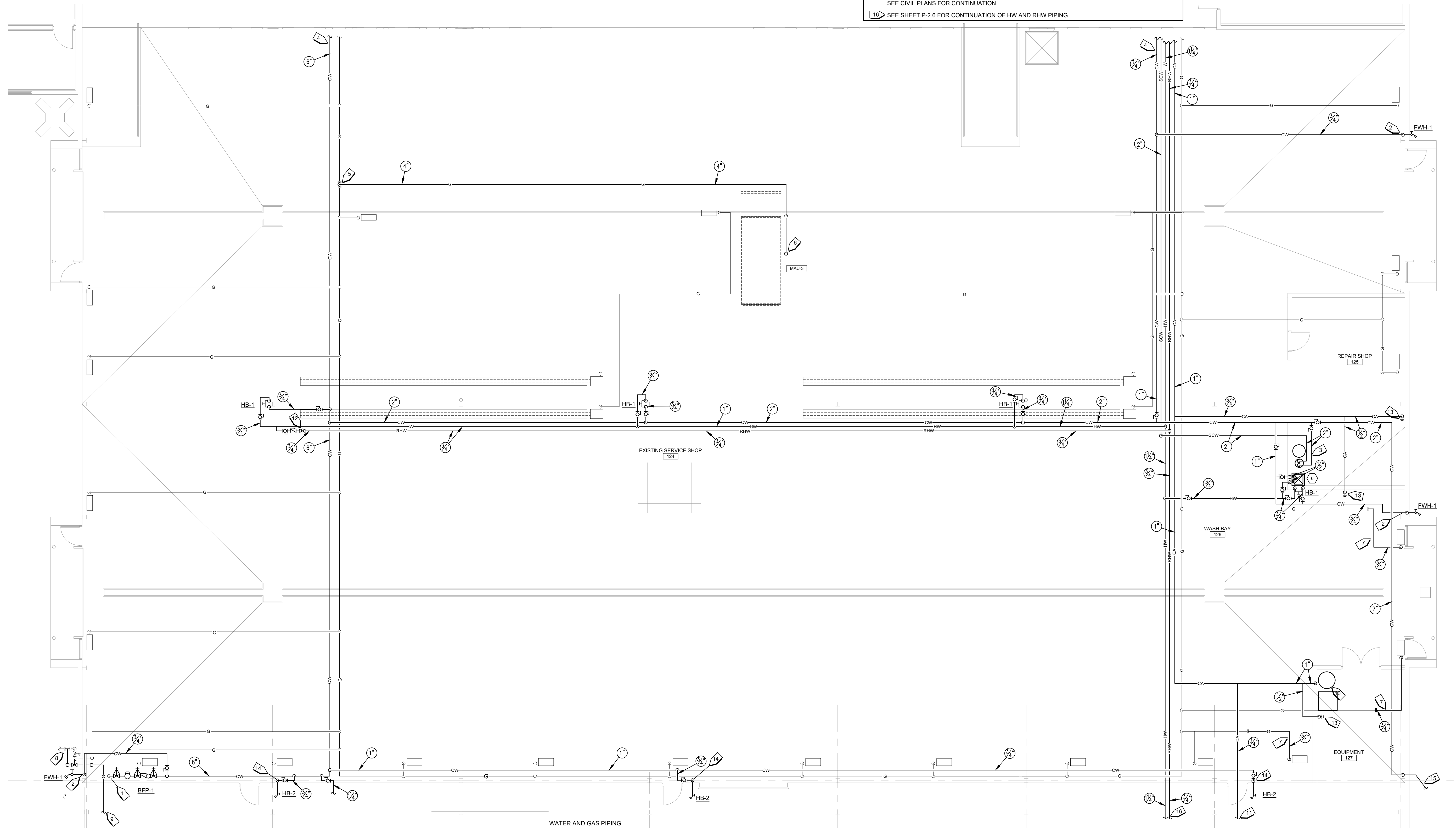


DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
PARTIAL FLOOR PLAN
EXISTING
ADMINISTRATION -
PLUMBING WATER AND
GAS PIPING

COMM 21161-B
DATE 02-01-2024

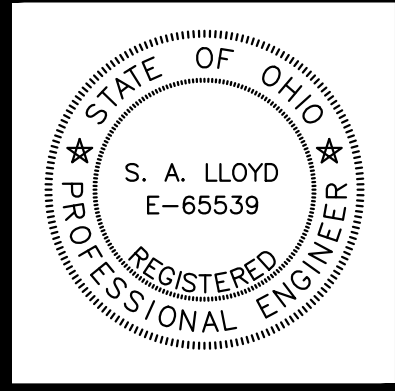
DWG
P-2.4



- PLUMBING NEW WORK CODED NOTES
- 1 TIE NEW 6" CW INTO EXISTING AT FLOOR WITH NEW SHUT-OFF VALVE
 - 2 3/4" CW DN TO FROST PROOF HOSE BIB
 - 3 2" CW AND 2" SCW DN TO WATER SOFTENER. DRAIN FROM WATER SOFTENER AND BRINE TANK OVERFLOW ROUTED TO FLOOR DRAIN. SEE DETAIL FOR SCHEDULE INFORMATION AND PIPING ARRANGEMENT
 - 4 SEE SHEET P2.4 FOR CONTINUATION OF PIPING
 - 5 TIE NEW 4" GAS INTO EXISTING 5" GAS
 - 6 4" GAS UP THRU ROOF TO MAU-3 WITH SHUT-OFF VALVE, DIRT LEG, AND UNION
 - 7 TIE NEW 3/4" GAS INTO EXISTING AND EXTEND TO RELOCATED INFRARED HEATER. INSTALL NEW SHUT-OFF VALVE, DIRT LEG AND UNION
 - 8 PC TO TIE NEW 2" GAS INTO EXISTING 2" 20# GAS LINE UPSTREAM OF EXISTING REGULATOR. GAS TO TRANSITION TO 4" DOWNSTREAM OF NEW REGULATOR AND EXTEND TO NEW ADDITION. EXISTING CONNECTED LOAD WAS APPROXIMATELY 4442 MBH. NEW CONNECTED LOAD IS APPROXIMATELY 6892 MBH. PC TO COORDINATE WITH GAS COMPANY ON EXISTING METER AND REPLACE AS NEEDED. ALL COSTS INCURED WITH TIE-IN, REGULATOR AND METER REPLACEMENT WITH BE BY THE PC
 - 9 SEE SHEET P2.6 FOR CONTINUATION OF GAS PIPING
 - 10 1" CA DN TO RELOCATED AIR COMPRESSOR. PC TO RELOCATE AIR COMPRESSOR
 - 11 SEE SHEET P-2.6 FOR CONTINUATION OF CA PIPING
 - 12 BALANCE TO 2.0 GPM
 - 13 1/2" CA DN TO QUICK CONNECT FITTING AT 36" AFF
 - 14 3/4" CW DN TO HOSE BIB
 - 15 TRANSITION 2" CW TO PLASTIC NEAR FLOOR AND DN THRU FLOOR TO EXISTING YARD HYDRANT. SEE CIVIL PLANS FOR CONTINUATION.
 - 16 SEE SHEET P-2.6 FOR CONTINUATION OF HW AND RHW PIPING

WATER AND GAS PIPING
PARTIAL FLOOR PLAN EXISTING SERVICE SHOP - PLUMBING
SCALE: 1/8" = 1'-0"

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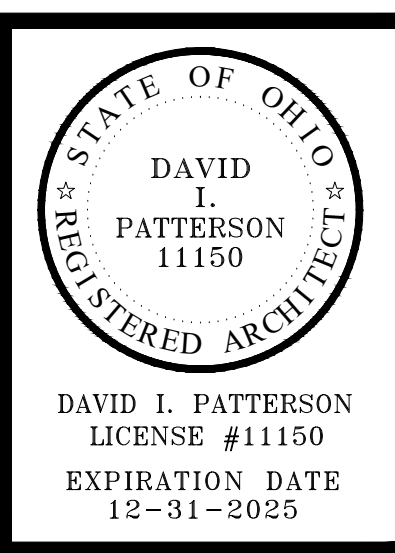


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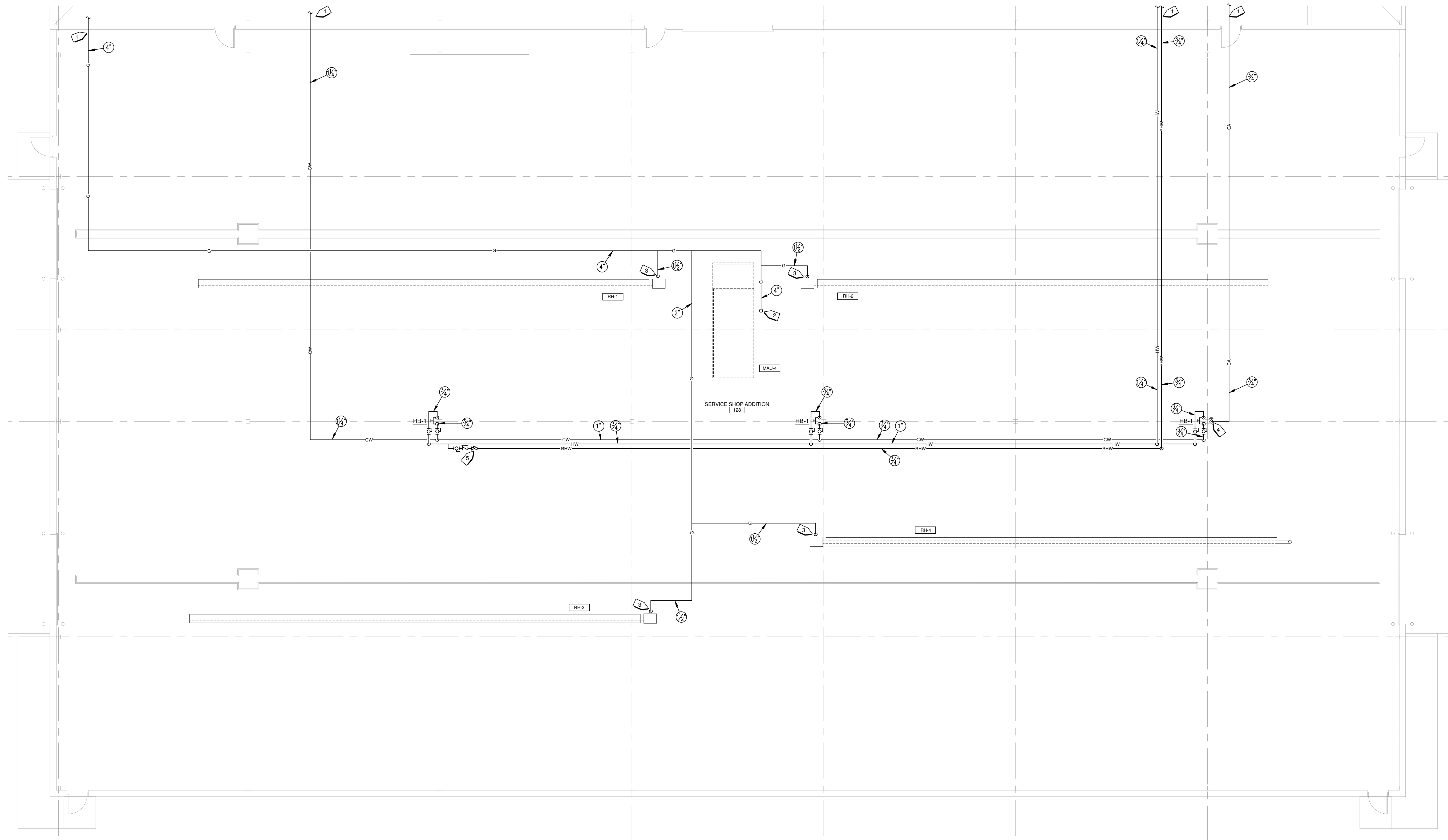
GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD, NE
CANTON, OHIO



THIS DWG :
PARTIAL FLOOR PLAN
EXISTING SERVICE SHOP
- PLUMBING WATER AND
GAS PIPING

COMM 21161-B
DATE 02-01-2024

DWG
P-2.5



PLUMBING NEW WORK CODED NOTES	
1	SEE SHEET P2.5 FOR CONTINUATION OF PIPING
2	4" GAS UP THRU ROOF TO MAU-4 WITH SHUT-OFF VALVE, DIRT LEG, AND UNION
3	1-1/2" GAS TO INFRARED HEATER WITH SHUT-OFF VALVE, DIRT LEG, AND UNION
4	3/4" CA DN TO QUICK CONNECT FITTING AT 3'-0" AFF
5	BALANCE TO 2.0 GPM

REVISIONS:

STATE OF OHIO

S. A. LLOYD

E-65539

REGISTERED

PROFESSIONAL ENGINEER

ENGINEERING GROUP, INC.

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GARAGE ADDITION

WATER DEPARTMENT SERVICE CENTER

2664 HARRISBURG RD, NE CANTON, OHIO

STATE OF OHIO

DAVID I. PATTERSON

11150

REGISTERED ARCHITECT

DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :

PARTIAL FLOOR PLAN
NEW ADDITION - GAS
PIPING PLUMBING

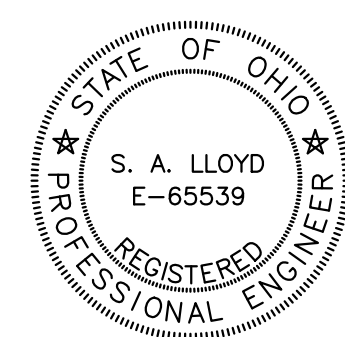
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P-2.6

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ARCHITECTS

GARAGE ADDITION
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CANTON, OHIO

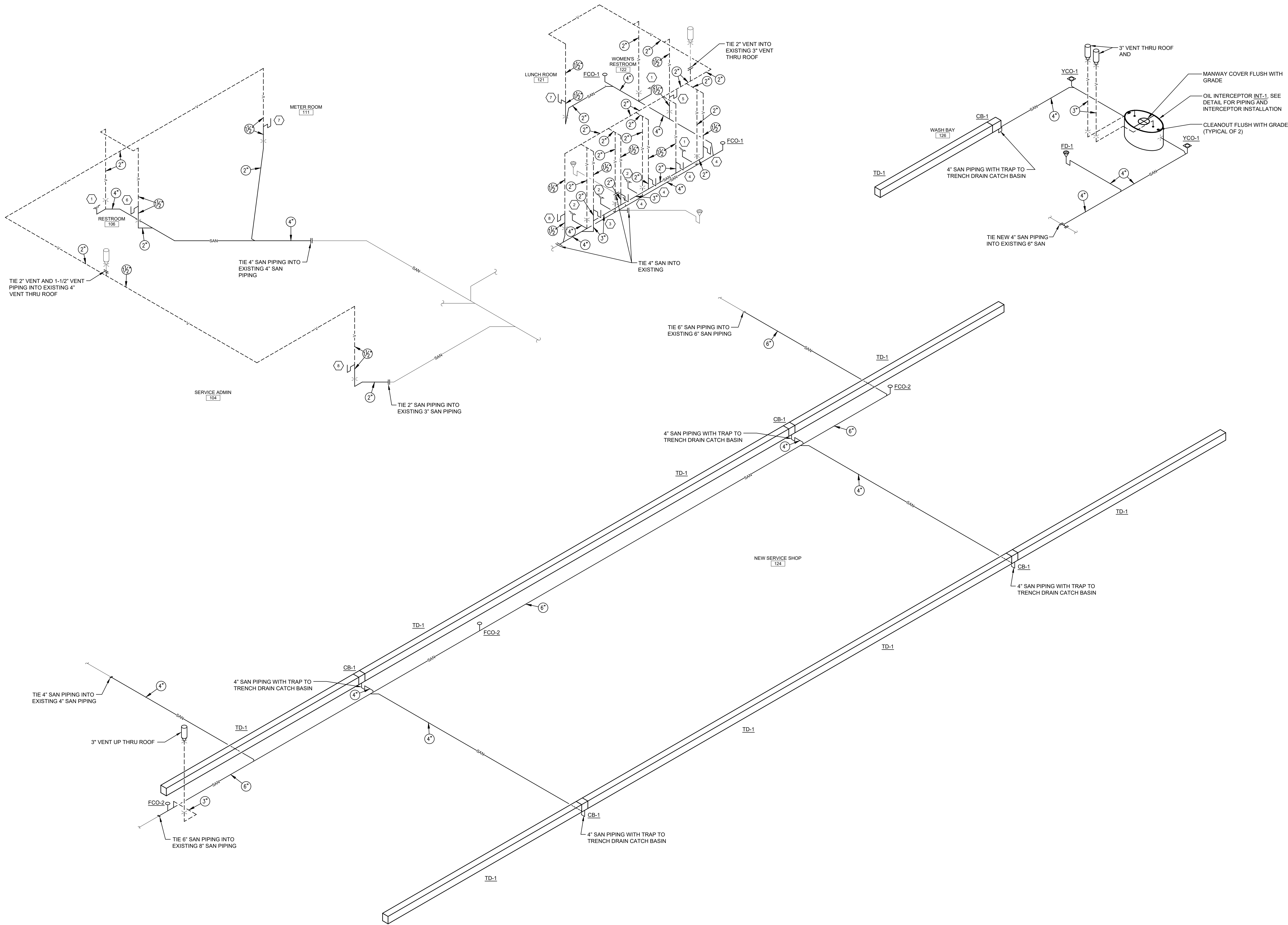


DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

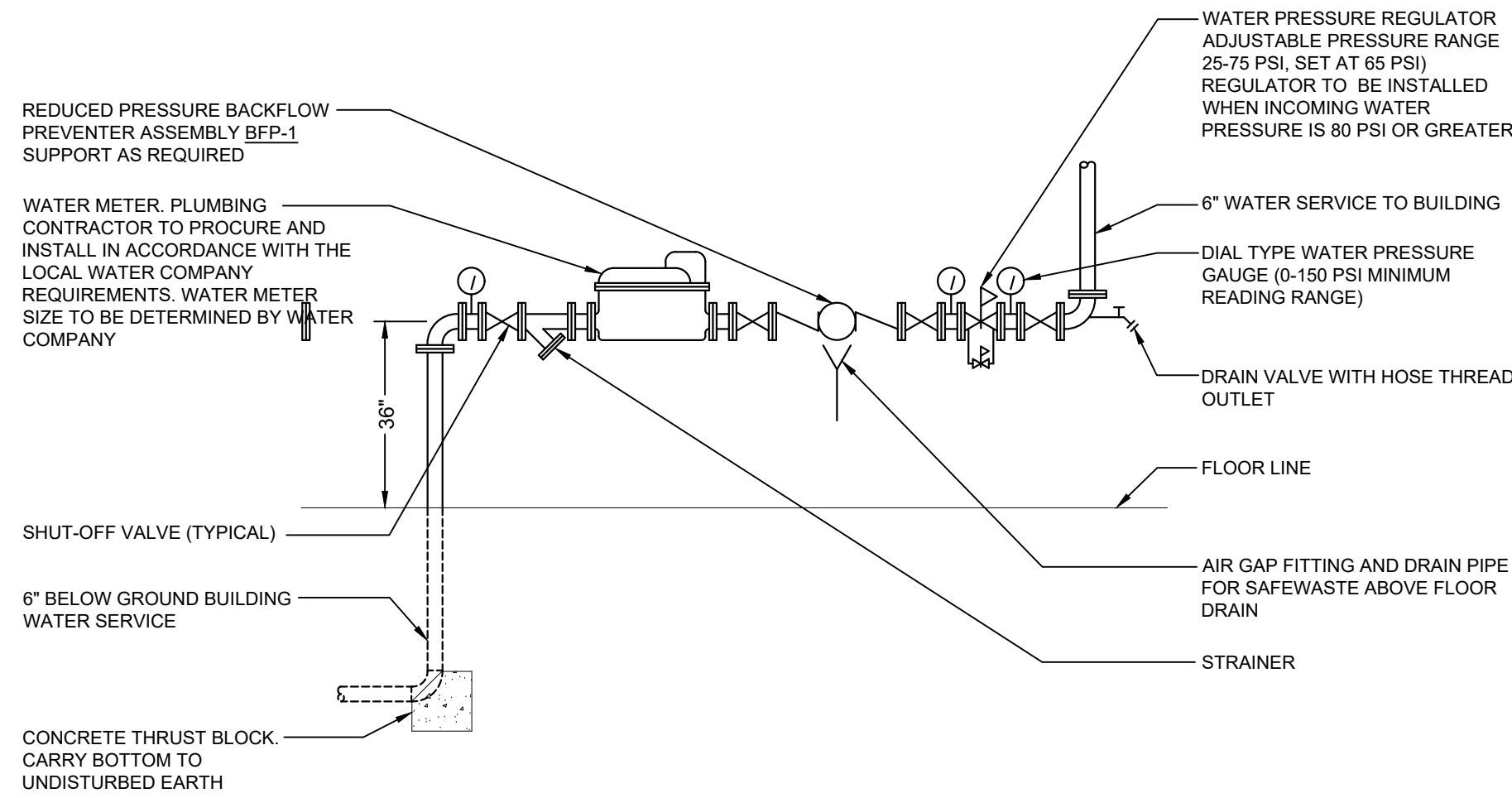
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SANITARY ISOMETRICS

COMM 21161-B
DATE 02-01-2024

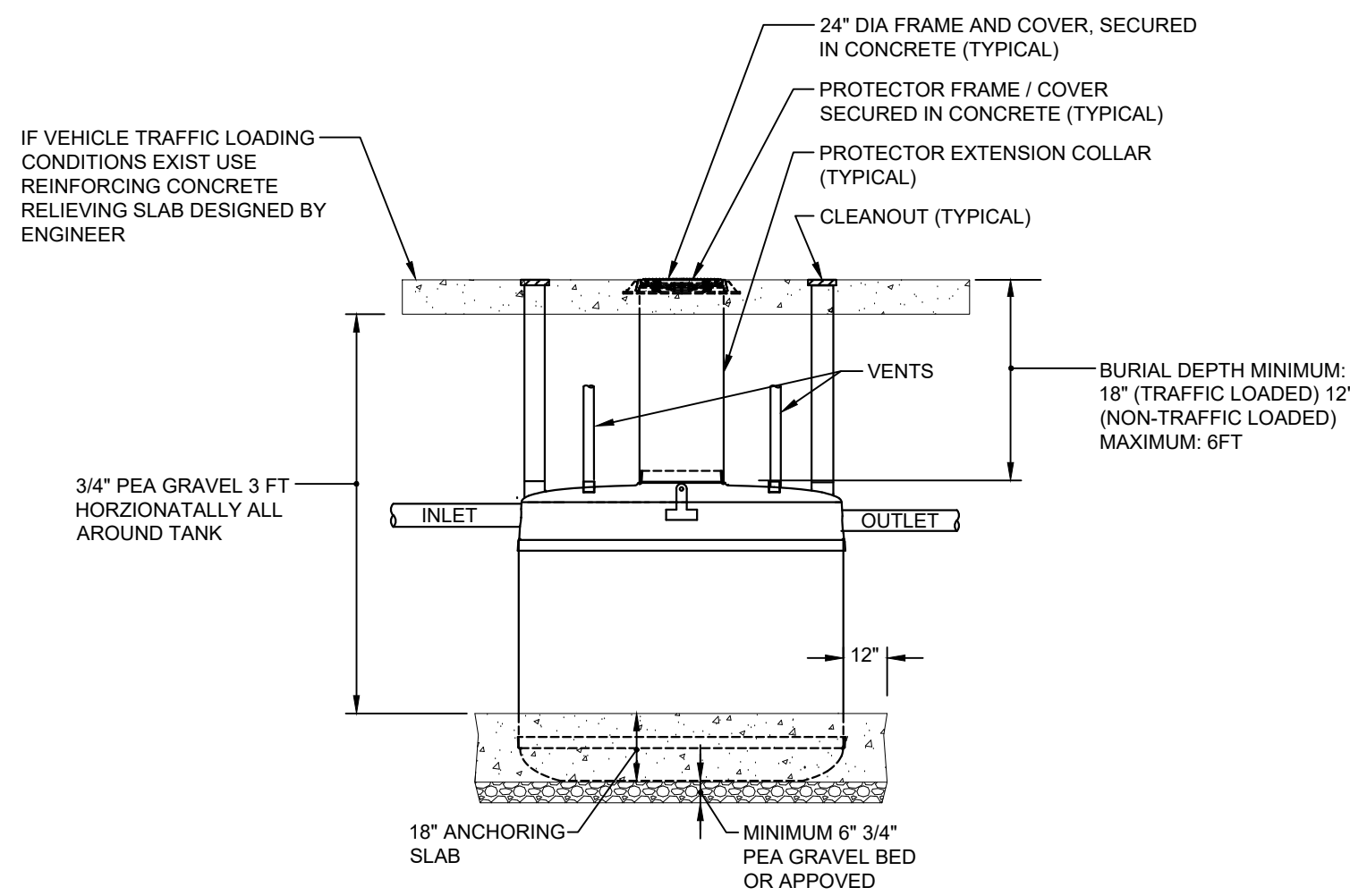
DWG
P-3.1



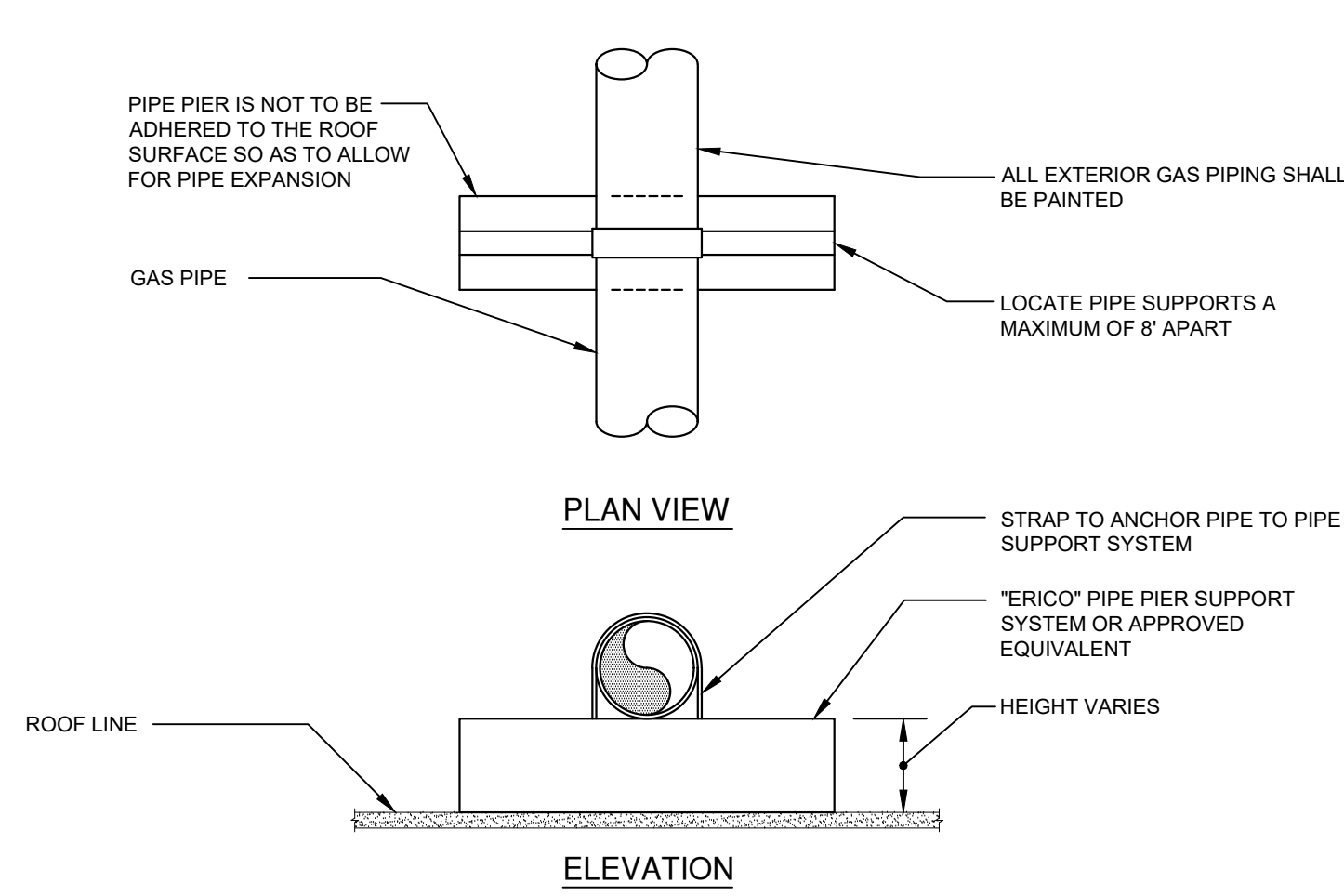
SANITARY ISOMETRICS
NOT TO SCALE



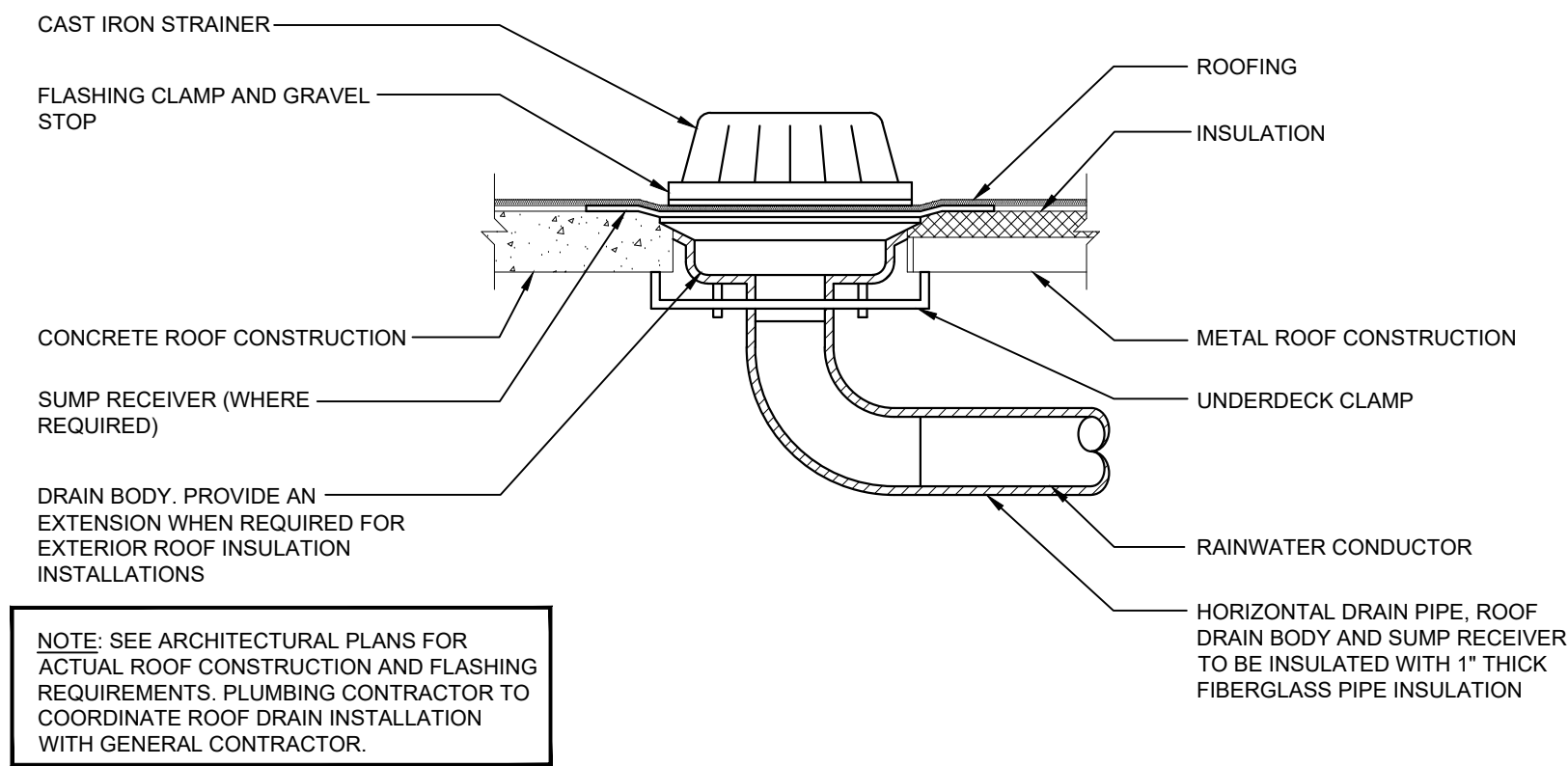
DOMESTIC WATER SERVICE ENTRANCE DETAIL
NOT TO SCALE



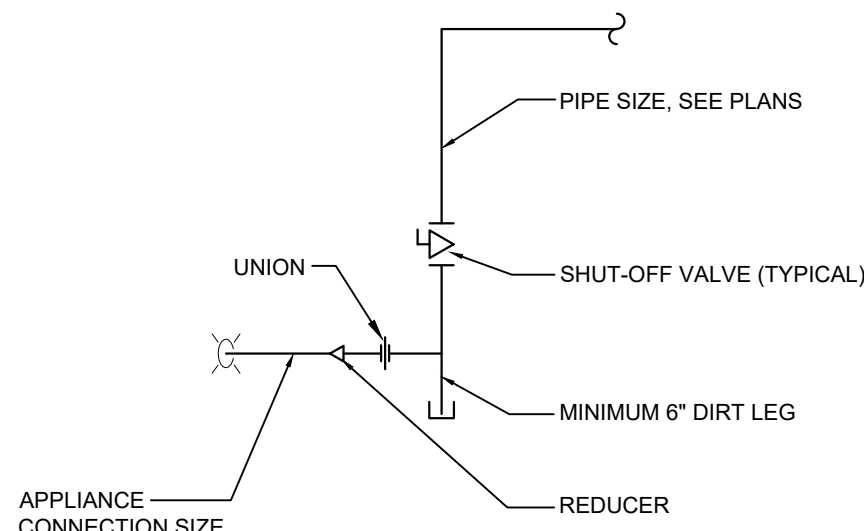
OIL INTERCEPTOR DETAIL
NOT TO SCALE



GAS PIPE ROOF SUPPORT DETAIL
NOT TO SCALE



ROOF DRAIN DETAIL
NOT TO SCALE



EQUIPMENT GAS CONNECTION DETAIL
NOT TO SCALE

- NOTES:
- UNIONS SHOULD BE LOCATED ON INLET AND OUTLET CONNECTIONS OF CONTROL VALVE TO FACILITATE SERVICING.
 - THE USE OF DISSIMILAR METALS IN A PIPING SYSTEM IS NOT RECOMMENDED. WHERE DISSIMILAR METALS MUST BE CONNECTED IN A WATER SYSTEM, THE USE OF NONCONDUCTIVE (DIELECTRIC) FITTINGS MAY REDUCE GALVANIC CORROSION.
 - A TEN FOOT POWER CORD (LONGER LENGTHS AVAILABLE) AND WALL MOUNT TRANSFORMER ARE PROVIDED.
 - THE CUSTOMER SHOULD PROVIDE A RECEPTACLE, PREFERABLE ONE NOT CONTROLLED BY A SWITCH THAT CAN BE TURNED OFF ACCIDENTALLY, OBSERVE THE LOCAL ELECTRICAL CODES.
 - ALLOW 6-12 INCHES BEHIND THE UNIT FOR PLUMBING AND DRAIN UNES AND 12 INCHES ABOVE OVERALL HEIGHT FOR SERVICE ACCESS AND FILLING THE SALT CONTAINER.
 - SYSTEM USES FRP TANKS WHICH MUST NOT BE SUBJECTED TO VACUUM CONDITIONS. SYSTEM CONTROL VALVE DESIGN HAS INTEGRATED VACUUM BREAKER TO PREVENT SUCH CONDITIONS WHICH SHOULD NOT BE REMOVED DURING OPERATION.
 - TO PERMIT THE OBSERVATION OF THE DRAIN FLOW DO NOT MAKE A DIRECT CONNECTION TO THE DRAIN. PROVIDE AN AIR GAP OF AT LEAST TWO TIMES THE DIAMETER OF THE DRAIN PIPE OR CONFORM TO LOCAL SANITATION CODES.
 - BRINE TANK DIMENSIONS SHOWN ARE FOR THE BRINE TANK MOST COMMONLY SELECTED FOR USE WITH THIS SIZE SYSTEM.
 - SHIPPING AND OPERATING WEIGHTS SHOWN ON THIS DRAWING INCLUDE THE BRINE SYSTEM.

SOFTENER SYSTEM SELECTED IS: CTM-150-DF WITH HARD WATER BYPASS

INPUT PARAMETERS:

WATER HARDNESS, GPG	: 24
SOLUBLE IRON, MG/L AS ION	: 0

THE CTM WILL PROVIDE (EACH UNIT):

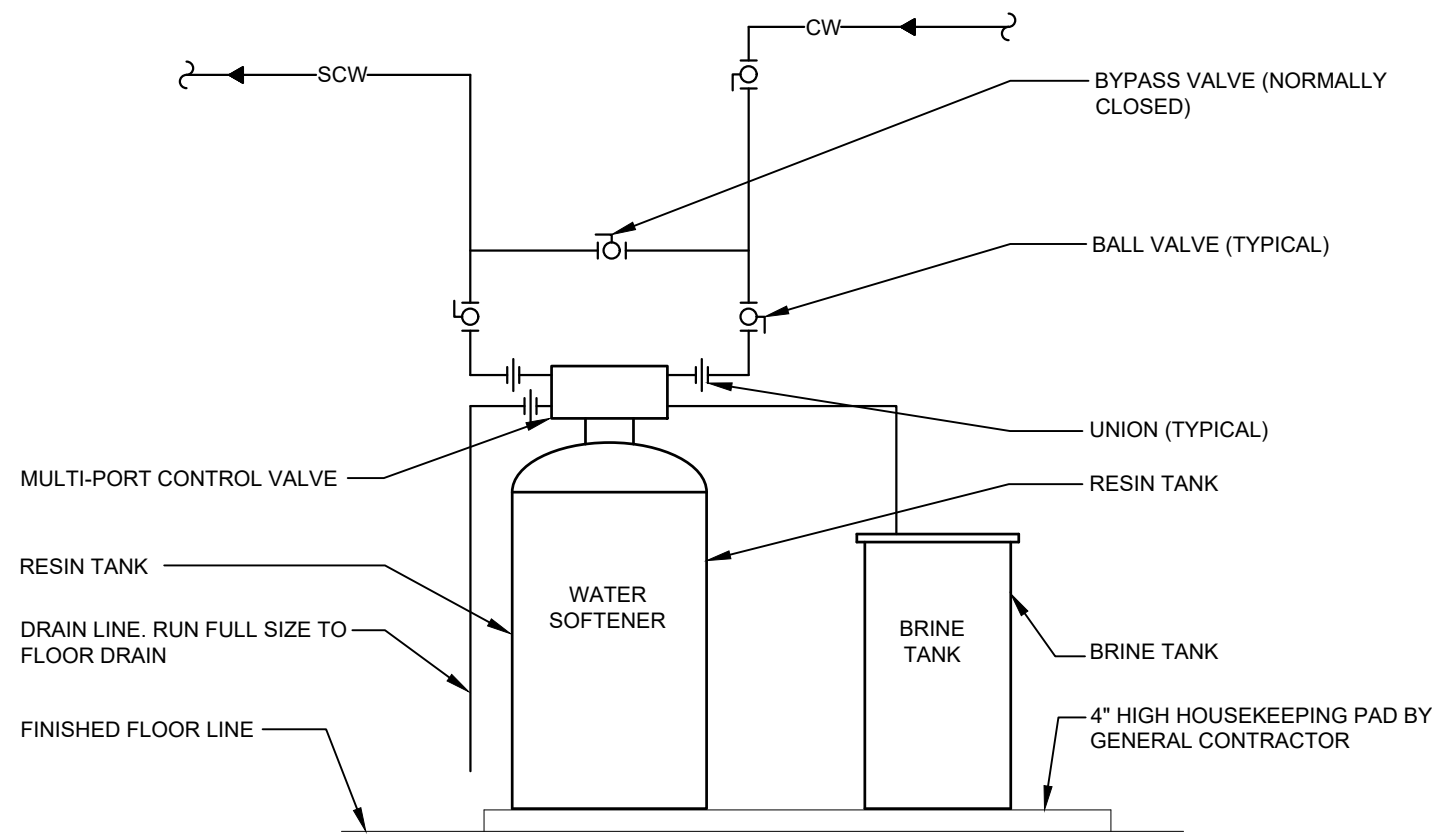
CONTINUOUS FLOW, GPM	: 59 @ 15 PSI LOSS
PEAK FLOW, GPM	: 76 @ 25 PSI LOSS
MIN. RECOMMENDED FLOW, GPM	: 3.5
DESIGN SOFTENING RATE, GPM/FT ²	: 42.37
RESIN QUANTITY, FT ³	: 5
UNIT CAPACITY, KGR	: 148 @ 75 LBS SALT
MAXIMUM CAPACITY, KGR	: 150 @ 75 LBS SALT
MINIMUM CAPACITY, KGR	: 100 @ 30 LBS SALT
TANK SIZE, IN.	: 18X65
TANK AREA, FT ²	: 1.77
FREEBOARD, IN.	: 23

REGENERATION DATA WITH RECOMMENDED BRINE SYSTEM (EACH UNIT):

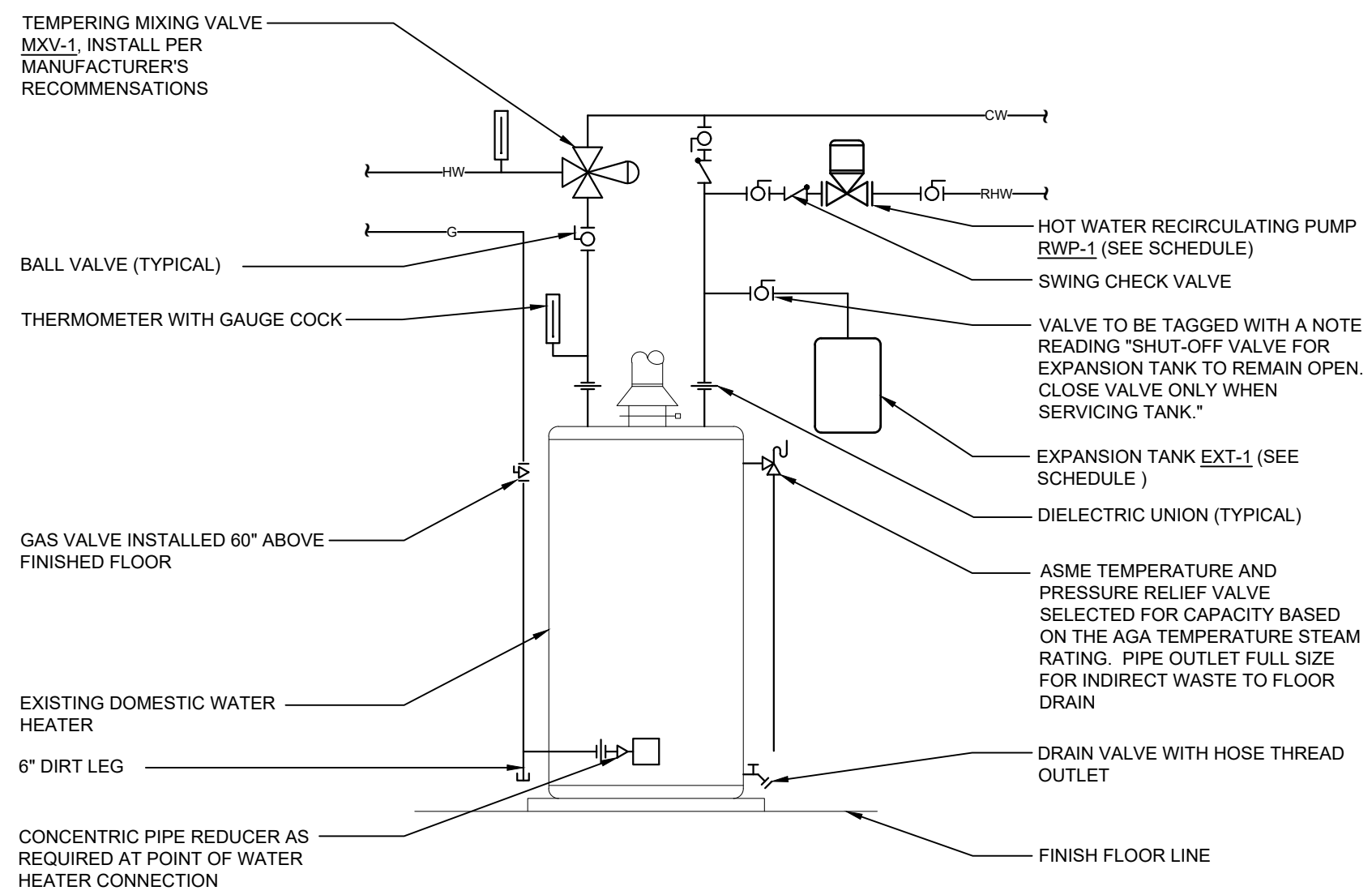
BRINE TANK SIZE, IN.	: 24X50
MAX. SALT LOAD, LBS	: 800
NUMBER OF REGENS/SALT FILL	: 10.67
SALT USAGE, LBS/REGEN	: 75
BACKWASH FLOW REQ'D, GPM	: 8
RECOND. WATER REQ'D, GALS	: 272
TOTAL REGEN TIME, MIN	: 76

SYSTEM REQUIREMENTS:

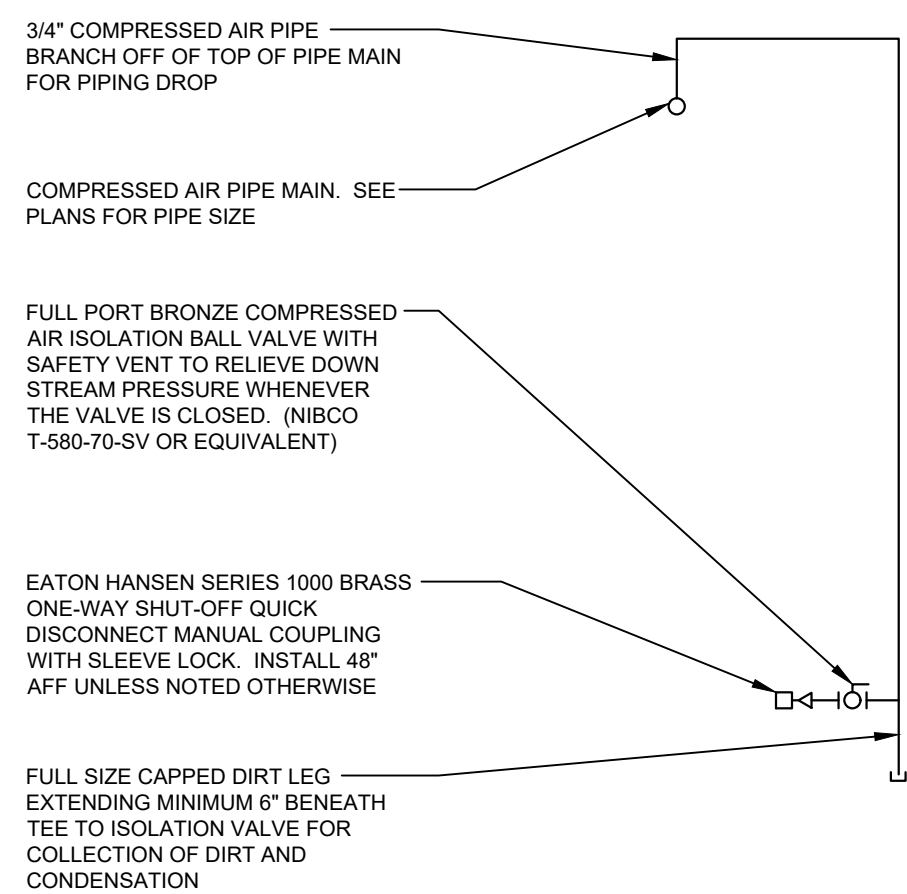
OPERATING PRESS., PSI	: 35-125
VOLTAGE	: 120 VOLTS AC, 50/60 HZ, 1 PH
OPERATING TEMP., °F	: 40-120
PIPE CONN., IN NPT...	: 2
INLET	: 2
OUTLET	: 2
DRAIN	: 1.5
WEIGHT, LBS...	: 458
SHIPPING	: 1453
OPERATING	: 1453
OVERALL DIMENSIONS, IN...	: 55X88.5X21.5
WIDTH X HEIGHT X DEPTH	: 55X88.5X21.5



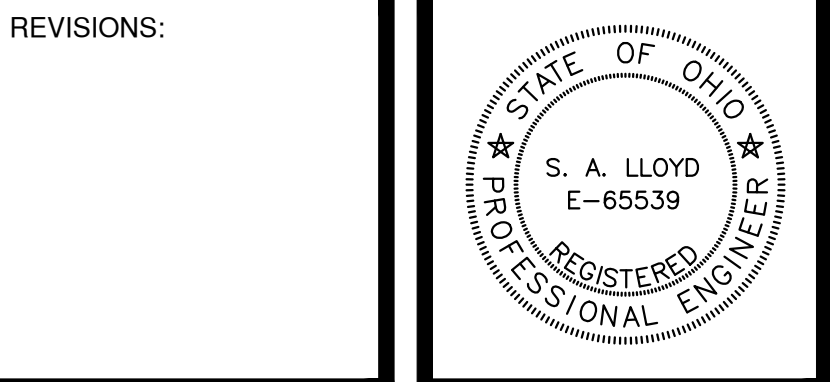
WATER SOFTENER SYSTEM PIPING DETAIL
NOT TO SCALE



GAS DOMESTIC WATER HEATER DETAIL
NOT TO SCALE



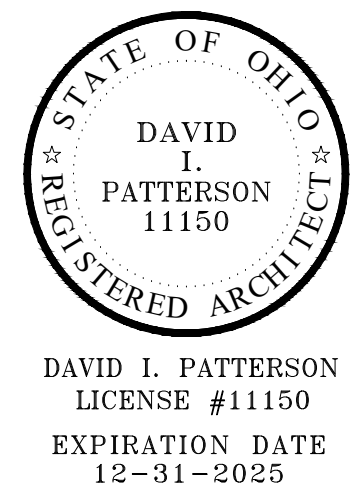
TYPICAL COMPRESSED AIR PIPING DROP
NOT TO SCALE



600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTED MEADOWS ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD., NE
CANTON, OHIO



THIS DWG :
PLUMBING DETAILS

COMM 21161-B
DATE 02-01-2024

DWG
P-3.2

GENERAL PLUMBING NOTES
1. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF THE PLUMBING SYSTEMS. ACTUAL FIELD CONDITIONS AND WORK OF OTHER TRADES MAY REQUIRE MINOR DEVIATIONS.
2. THIS CONTRACTOR TO BE AWARE OF LIMITED SPACE ABOVE CEILING FOR NEW WORK AND SHOULD COORDINATE HIS WORK WITH ALL OTHER TRADES.
3. ALL PLUMBING SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE OHIO PLUMBING AND MECHANICAL CODES.
4. ALL PIPING TO BE INSTALLED GENERALLY BENEATH DUCTWORK FOR ACCESS TO VALVING, ALLOW 6" MINIMUM CLEAR TO TOP OF CEILING. NO BULLHEAD TEES WILL BE PERMITTED IN THE PIPING.
5. PLUMBING AND HVAC INSTALLATION SHALL BE COORDINATED SO AS TO MAINTAIN AT LEAST TEN FEET OF CLEARANCE FROM ALL OUTDOOR AIR INTAKES AND BUILDING OPENINGS; TO ANY PLUMBING VENTS, EXHAUST AIR OUTLETS OR OTHER NOXIOUS CONDITIONS.
6. ALL PLUMBING SYSTEM PENETRATIONS THROUGH FIRE/SMOKE RATED ASSEMBLIES SHALL BE SEALED WITH FIRE AND SMOKE STOPPING COMPOUND SO AS TO MAINTAIN THE FIRE RESISTANCE RATING OF THE WALL PENETRATED. FIRE STOPPING COMPOUND, PIPE SLEEVES, AND PIPING INSTALLATION SHALL BE INSTALLED SO AS THE COMPLETE PENETRATION ASSEMBLY IS CLASSIFIED BY UL AS LISTED IN THE UL BUILDING MATERIALS DIRECTORY.
7. UNLESS NOTED OTHERWISE, THIS CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL, STORAGE AND REINSTALLATION OF LAY-IN CEILING AS REQUIRED TO ACCOMPLISH HIS SCOPE OF WORK. UPON COMPLETION OF WORK, CEILING SHALL BE RESTORED TO ITS ORIGINAL CONDITION.
8. UNLESS NOTED OTHERWISE, THIS CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL, STORAGE AND REINSTALLATION OF LAY-IN CEILING AS REQUIRED TO ACCOMPLISH HIS SCOPE OF WORK. UPON COMPLETION OF WORK, CEILING SHALL BE RESTORED TO ITS ORIGINAL CONDITION.
9. SEE SANITARY ISOMETRIC FOR DRAIN AND VENT PIPE SIZES. SEE PLUMBING FIXTURE SCHEDULE FOR WATER, DRAIN AND VENT SIZES TO INDIVIDUAL FIXTURES.
10. GAS PIPING SHALL BE INSTALLED IN ACCORDANCE WITH THE INTERNATIONAL FUEL GAS CODE. ALL EXTERIOR EXPOSED PIPING SHALL BE PAINTED WITH WEATHER RESISTANT GLOSS YELLOW PAINT.
11. UPON COMPLETION OF THE DOMESTIC WATER PIPING INSTALLATION, THE ENTIRE SYSTEM SHALL BE FLUSHED, DISINFECTED, AND FLUSHED AGAIN IN ACCORDANCE WITH THE LATEST AWWA STANDARDS. UPON COMPLETION OF THE DISINFECTION PROCESS, BACTERIOLOGICAL TESTS SHALL BE PERFORMED IN ACCORDANCE WITH AWWA STANDARDS AND THE LOCAL HEALTH DEPARTMENT TO VERIFY SATISFACTORY POTABLE WATER QUALITY.

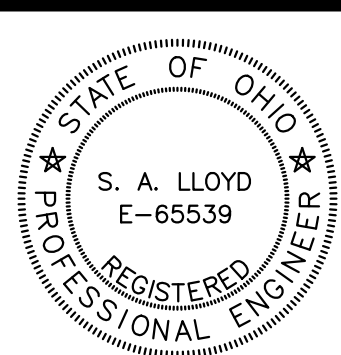
PLUMBING SYMBOLS LEGEND	
DWH-1	EQUIPMENT IDENTITY TAG
100	ROOM NUMBER
1	CODED NOTE
10	PLUMBING FIXTURE
SAN	SANITARY WASTE BELOW FLOOR OR GRADE
V	NATURAL GAS
STM	STORM DRAIN BELOW FLOOR OR GRADE
STM	STORM DRAIN ABOVE FLOOR
ESTM	EMERGENCY STORM DRAIN ABOVE FLOOR
G	NATURAL GAS
CA	COMPRESSED AIR
CW	COLD WATER
SCW	SOFT COLD WATER
HW	HOT WATER (120°F)
RHW	RECIRCULATED HOT WATER (120°F)
Gate Valve	GATE VALVE
Ball Valve	BALL VALVE
Balance Valve	BALANCE VALVE
Gas Valve	GAS VALVE
Swing Check Valve	SWING CHECK VALVE
Piping Union	PIPING UNION
Piping Connection	PIPING CONNECTION
Piping Increaser/Reducer	PIPING INCREASER/REDUCER
Pipe Riser Section	PIPE RISER SECTION
Pipe Drop	PIPE DROP
Shock Stop	SHOCK STOP
Faucet or Hose Bibb	FAUCET OR HOSE BIBB
Frostproof Wall Hydrant	FROSTPROOF WALL HYDRANT
Floor Drain	FLOOR DRAIN
Floor Cleanout: Flush with Finish Floor	FLOOR CLEANOUT: FLUSH WITH FINISH FLOOR
Yard Cleanout: Flush with Grade	YARD CLEANOUT: FLUSH WITH GRADE
GC	GENERAL CONTRACTOR
PC	PLUMBING CONTRACTOR
FPC	FIRE PROTECTION CONTRACTOR
MC	MECHANICAL CONTRACTOR (HVAC)
EC	ELECTRICAL CONTRACTOR
AFF	ABOVE FINISH FLOOR
TYP	TYPICAL

PLUMBING EQUIPMENT AND DRAIN SCHEDULE			
SYM	TYPE	MAKE, MODEL	DESCRIPTION
FWH-1	FROSTPROOF WALL HYDRANT	WOODFORD #65	EXPOSED NON-FREEZE CHROME PLATED WALL HYDRANT WITH ANTI-SIPHON VACUUM BREAKER, LOOSE KEY TEE HANDLE, 3/4" INLET AND A 3/4" HOSE THREAD OUTLET. HYDRANT SHALL BE SUPPLIED WITH AN ADJUSTABLE WALL CLAMP.
EXT-1	EXPANSION TANK	AMTROL THERM-X-TROL #ST-20VC	NON-ASME STEEL TANK WITH A RIGID POLYPROPYLENE LINER AND A HEAVY-DUTY BUTYL DIAPHRAGM TO SEPARATE THE WATER FROM THE PRE-CHARGED (40 PSIG) AIR CHAMBER. TOTAL TANK VOLUME EQUALS 8 GALLONS, MAXIMUM ACCEPTANCE FACTOR OF 0.40 AND MAXIMUM ACCEPTANCE VOLUME EQUALS 3.2 GALLONS. SYSTEM CONNECTION OF 3/4".
RWP-1	RECIRCULATING HOT WATER PUMP	TACO CARTRIDGE #0010-BF3	IN-LINE CIRCULATOR OF ALL BRONZE CONSTRUCTION WITH 3/4" FLANGE CONNECTIONS, 5 GPM AT 10 FOOT PUMP HEAD CAPACITY, 1/8 HP MOTOR AT 3250 RPM, 1.17 AMPS AND AN 115-1-60 ELECTRIC POWER REQUIREMENT.
SS-1	SHOCKSTOP	J.R. SMITH #5010	PRE-CHARGED PERMANENTLY SEALED WATER HAMMER ARRESTER WITH 1" PIPE SIZE. PDI SYMBOL "B" FOR 12-32 WATER SUPPLY FIXTURE UNITS.
SS-2	SHOCKSTOP	J.R. SMITH #5030	PRE-CHARGED PERMANENTLY SEALED WATER HAMMER ARRESTER WITH 1" PIPE SIZE. PDI SYMBOL "D" FOR 6-1-13 WATER SUPPLY FIXTURE UNITS.
RD-1	ROOF DRAIN	J.R. SMITH #1010	CAST IRON ROOF DRAIN WITH FLASHING CLAMP, GRAVEL STOP, LOW PROFILE CAST IRON DOME AND UNDERDECK CLAMP. PROVIDE A SUMP RECEIVER IN ALL BUT POURED-IN-PLACE ROOF DRAIN INSTALLATIONS AND AN EXTENSION WHEN REQUIRED FOR EXTERIOR ROOF INSULATION INSTALLATIONS.
SRD-1	SECONDARY ROOF DRAIN	J.R. SMITH #1070	CAST IRON ROOF DRAIN WITH FLASHING CLAMP, GRAVEL STOP, LOW PROFILE CAST IRON DOME, ADJUSTABLE PVC STANDPIPE, AND UNDERDECK CLAMP. PROVIDE A SUMP RECEIVER IN ALL BUT POURED-IN-PLACE ROOF DRAIN INSTALLATIONS AND AN EXTENSION WHEN REQUIRED FOR EXTERIOR ROOF INSULATION INSTALLATIONS.
FCO-1	FLOOR CLEANOUT	J.R. SMITH #4023	LIGHT TO MEDIUM DUTY CAST IRON FLOOR CLEANOUT WITH FLASHING FLANGE AND ROUND ADJUSTABLE SCORRIATED SECURED CAST IRON TOP. GRADE APPLICATIONS TO UTILIZE A SPEEDI-SET GASKET.
FCO-2	FLOOR CLEANOUT	J.R. SMITH #4223	HEAVY DUTY CAST IRON FLOOR CLEANOUT WITH FLASHING FLANGE AND ROUND ADJUSTABLE SCORRIATED SECURED CAST IRON TOP. GRADE APPLICATIONS TO UTILIZE A SPEEDI-SET GASKET.
MXV-1	TEMPERING MIXING VALVE	POWERS HYDROGUARD XP #LFMM431ADUS200	MASTER TEMPERING MIXING VALVE ASSEMBLY WITH A THERMOSTATIC MIXING VALVE IN ROUGH BRONZE, WITH TOP/TOP INLETS/OUTLET, INTEGRAL CHECK STOPS, UNIONS, BALL VALVE, DIAL THERMOMETER AND PAINTED WALL CABINET. FLOW RANGE 0.5 TO 17 GPM AT MAXIMUM 8 PSI PRESSURE DIFFERENTIAL. MIXING VALVE TO MEET CURRENT REQUIREMENTS OF ASSE 1017.
FD-1	FLOOR DRAIN	J.R. SMITH #2415-C-P	NO HUB OUTLET CAST IRON FLOOR DRAIN WITH FLANGE, INTEGRAL REVERSIBLE CLAMPING COLLAR, SEEPAGE OPENINGS, 11" SQUARE CAST IRON HINGED GRATE LESS LOCKING DEVICE, SEDIMENT BUCKET AND 1/2" TRAP PRIMER CONNECTION. GRADE APPLICATIONS TO UTILIZE A SPEEDI-SET GASKET. ALL FLOOR DRAINS TO HAVE A 4" DEEP SEAL TRAP.
TD-1 CB-1	TRENCH DRAIN	ACO DRAIN ZIP TRENCH #9940	HEAVY DUTY 6" INTERNAL WIDTH PRECAST TRENCH DRAINAGE SYSTEM OF POLYPROPYLENE WITH COATED STEEL FRAME AND SECURED #9870-462-DG DUCTILE IRON GRATING. SYSTEM COMPLETE WITH SLOPED AND/OR NEUTRAL CHANNELS (AS REQUIRED FOR TOTAL LENGTH AS DETERMINED BY ARCHITECT). STEP CONNECTORS, CLOSING END CAPS, #9940 CATCH BASIN INC THE CENTER WITH TRASH BUCKET, FOUL AIR TRAP, AND 4" DIAMETER SIDE OUTLETS.
INT-1	OIL INTERCEPTOR	PROCEPTOR #OIMC 100 (TRAFFIC BEARING INSTALLATION)	FIBERGLASS OIL INTERCEPTOR WITH 24" DIAMETER ACCESSWAY, CLEANOUT PORT, SAMPLE PORT, INLET AND OUTLET PIPE CONNECTIONS, AND TOTAL 100 GALLON LIQUID CAPACITY. INSTALL IN ACCORDANCE WITH THE MANUFACTURERS INSTALLATION INSTRUCTIONS
YCO-1	YARD CLEANOUT	J.R. SMITH #4253	CAST IRON EXTERIOR YARD CLEANOUT WITH FREE FLOATING DOUBLE FLANGED HOUSING AND HEAVY DUTY SCORRIATED SECURED CAST IRON COVER AND INTERNAL CLEANOUT. GRADE APPLICATIONS TO UTILIZE A SPEEDI-SET GASKET.
HB-1	HOSE BIB	T&S BRASS #B-2271-CR	ROUGH CHROME SERVICE SINK FAUCET WITH INTEGRAL VACUUM BREAKER, STOPS, 3/4" HOSE END SPOUT AND PAUL HOOK.
HB-2	HOSE BIBB	WOODFORD #24	ANTI-SIPHON HOSE BIBB OF BRASS CONSTRUCTION WITH A POLYCARBONATE HANDLE AND A 3/4" HOSE THREAD OUTLET. HOSE BIBB SHALL BE COMPLETE WITH A NIDEL #34HF VACUUM BREAKER.
BFP-1	REDUCED PRESSURE BACKFLOW PREVENTER	WATTS REGULATOR #LF909	TWO INDEPENDENT CHECK VALVES WITH AN INTERMEDIATE RELIEF VALVE AND ISOLATING SHUT-OFF VALVES. ASSEMBLY TO BE FURNISHED COMPLETE WITH AN INTEGRAL STRAINER AND AN AIR GAP DRAINAGE FITTING. ASSEMBLY TO BE TESTED AND CERTIFIED IN ACCORDANCE WITH ASSE STD. 1013, AWWA STD. C511-92, OAC 3745-95-04, OAC 3745-95-05, OAC 3745-95-06.

PLUMBING FIXTURE SCHEDULE									
SYM	TYPE	MAKE, MODEL AND SIZE	DESCRIPTION	CONNECTIONS					MTG. HT.
				CW	HW	TRAP	DRAIN	VENT	
1	WATER CLOSET ADA	AMERICAN STANDARD MADERA FLOWISE #3461.001	VITREOUS CHINA ELONGATED BOWL, FLOOR MOUNT SIPHON JET WATER CLOSET WITH 1-1/2" TOP SPUD INLET FOR LOW WATER CONSUMPTION (1.60 GPF). INSTALLATION SHALL BE COMPLETE WITH CHURCH #2955SCT WHITE OPEN FRONT SEAT WITH CHECK HINGE AND SLOAN ROYAL #111-1.6 FLUSH VALVE. INSTALLATION SHALL BE IN COMPLIANCE WITH ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES ICC A117-1:2009 AND MOUNT THE FLUSH LEVER ON THE WIDE SIDE OF THE WATER CLOSET.	1"	NONE	INT.	4"	2"	FLOOR
2	WATER CLOSET	AMERICAN STANDARD MADERA FLOWISE #3451.001	VITREOUS CHINA ELONGATED BOWL, FLOOR MOUNT SIPHON JET WATER CLOSET WITH 1-1/2" TOP SPUD INLET FOR LOW WATER CONSUMPTION (1.60 GPF). INSTALLATION SHALL BE COMPLETE WITH CHURCH #2955SCT WHITE OPEN FRONT SEAT WITH CHECK HINGE AND SLOAN ROYAL #111-1.60 FLUSH VALVE.	1"	NONE	INT.	4"	2"	FLOOR
3	URINAL ADA	AMERICAN STANDARD WASHBROOK FLOWISE #6590.001	VITREOUS CHINA WASHOUT ACTION URINAL WITH 3/4" TOP SPUD INLET FOR LOW WATER CONSUMPTION (0.5 GPF). INSTALLATION SHALL BE COMPLETE WITH J.R. SMITH #0637 ADJUSTABLE CARRIER WITH FLOOR MOUNTED SUPPORT AND A SLOAN ROYAL #186-0.5 FLUSH VALVE. INSTALLATION SHALL BE IN COMPLIANCE WITH ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES ICC A117-1:2009.	3/4"	NONE	INT.	2"	1-1/2"	17" LIP TO FLOOR
4	URINAL	AMERICAN STANDARD WASHBROOK FLOWISE #6590.001	VITREOUS CHINA WASHOUT ACTION URINAL WITH 3/4" TOP SPUD INLET FOR LOW WATER CONSUMPTION (0.5 GPF). INSTALLATION SHALL BE COMPLETE WITH J.R. SMITH #0637 ADJUSTABLE CARRIER WITH FLOOR MOUNTED SUPPORT AND A SLOAN ROYAL #186-0.5 FLUSH VALVE.	3/4"	NONE	INT.	2"	1-1/2"	24" LIP TO FLOOR
5	LAVATORY ADA	AMERICAN STANDARD LUCERNE #0355.012 20.50" X 18.25" OVERALL 15" X 10" X 6.5" BASIN	VITREOUS CHINA WALL HUNG LAVATORY WITH FAUCET HOLES 4" ON CENTER. INSTALLATION SHALL BE COMPLETE WITH J.R. SMITH #0700 CONCEALED ARM CARRIER WITH FLOOR MOUNTED SUPPORT, DELTA #21C353 CHROME FINISH FAUCET WITH TWO LEVER TYPE HANDLES AND AERATOR FOR 0.5 GPM MAX FLOW REGARDLESS OF PRESSURE AND POWERS HYDROGUARD #e480 ASSE 1070 TEMPERING VALVE SET FOR 100°F DISCHARGE TEMPERATURE. ADDITIONAL TRIM SHALL INCLUDE A PERFORATED GRID STRAINER WITH 1-1/4" TAIL PIECE, 1-1/4" CHROME PLATED P-TRAP WITH INTEGRAL CLEANOUT, ANGLE STOP AND 12" LONG 3/8" O.D FLEXIBLE RISERS AND WALL FLANGE. INSTALLATION SHALL BE IN COMPLIANCE WITH ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES ICC A117-1:2009 AND HAVE ALL EXPOSED PIPING BENEATH THE LAVATORY SHALL BE INSULATED WITH ADA APPROVED TRAP, VALVES AND PIPING PROTECTION PRODUCTS.	1/2"	1/2"	1-1/4"	1-1/2"	1-1/2"	34" RIM TO FLOOR
6	UTILITY SINK	FIAT #FL-1 23" X 21.50" OVERALL	MOLDED STONE FLOOR MOUNTED UTILITY SINK WITH BUILT-IN FAUCET LEDGE, DRAIN ASSEMBLY, AND METAL LEGS. INSTALLATION SHALL BE COMPLETE WITH DELTA LAUNDRY FAUCET #2131LF HAVING A 7" SWING SPOUT WITH HOSE THREAD OUTLET AND WING HANDLES.	1/2"	1/2"	1-1/2"	1-1/2"	1-1/2"	FLOOR
7	COUNTER SINK	JUST SYRUS-T-4 #SL-2122-A-GR 21" X 22" OVERALL 19" X 16" X 7.5" BASIN	SINGLE COMPARTMENT 18 GAUGE TYPE 304 STAINLESS STEEL SELF-RIMMING, UNDERCOUNTER SINK COMPLETE WITH J-35 STAINLESS STEEL CUP STRAINER WITH REMOVABLE BASKET AND 1-1/2" CHROME PLATED BRASS TAILPIECE AND DELTA #27C4834 DECK MOUNTED WASHERLESS MIXING FAUCETS WITH 6" SWIVEL GOOSENECK SPOUT, AERATOR AND 4" BLADE HANDLES. ADDITIONAL TRIM SHALL INCLUDE A 1-1/2" CHROME PLATED CAST BRASS P-TRAP WITH INTEGRAL CLEANOUT, ANGLE STOPS AND 12" LONG 3/8" O.D. FLEXIBLE RISERS AND WALL FLANGES. CONTRACTOR TO VERIFY SINK FIT WITH COUNTERTOP PRIOR TO PROCUREMENT AND INSTALLATION.	1/2"	1/2"	1-1/2"	1-1/2"	1-1/2"	C TOP
8	LAVATORY	BRADLEY EXPRESS LAVATORY SYSTEM #TLX-2	TWO STATION, ONE PIECE LAVATORY SYSTEM, TERREON FINISH, COMPLETE WITH TWO (2) DELTA #21C353 CHROME FINISH FAUCET WITH TWO LEVER HANDLES AND AERATOR FOR 0.5 GPM MAX FLOW REGARDLESS OF PRESSURE, P-TRAP, TAILPIECE, SUPPLY CONNECTIONS, AND ASSE #1070 THERMOSTATIC MIXING VALVE WITH COMBINATION STOP, STRAINER AND CHECK VALVES. COLOR SELECTED BY ARCHITECT.	1/2"	1/2"	INC.	1-1/2"	1-1/2"	30" FLOOR TO RIM
9	MOP BASIN	FIAT #TSB-100 24" X 24" X 10"	TERRAZZO MOP SERVICE BASIN WITH STAINLESS STEEL CAPS ON ALL CURBS. BASIN SHALL INCLUDE AN INTEGRAL 3" DRAIN WITH SEAL AND A REMOVABLE STAINLESS STEEL STRAINER. INSTALLATION SHALL INCLUDE STAINLESS STEEL WALL GUARD #MSG 2424, HOSE AND HOLDER #832-AA AND DELTA #28T9 ROUGH CHROME SERVICE SINK FAUCET WITH INTEGRAL VACUUM BREAKER, STOPS, 3/4" HOSE END SPOUT AND PAUL HOOK.	1/2"	1/2"	3"	3"	1-1/2"	FLOOR
10	SHOWER	FIELD FRABRICATED	SHOWER TO BE FIELD FABRICATED BY GENERAL CONTRACTOR. INSTALLATION SHALL INCLUDE A POWERS #e710J10000 THERMOSTATIC THREE PORT T/P MIXING VALVE WITH SWEAT END CONCEALED CHECKSTOPS, HIGH LIMIT TEMP STOP, METAL LEVER HANDLE, AND TYPE J, CP ADJUSTABLE SHOWER HEAD.	1/2"	1/2"	2"	2"	1-1/2"	FLOOR

PLUMBING PIPE AND INSULATION SCHEDULE						
TYPE	SIZE	PIPE	FITTINGS	JOINTS	INSULATION THICKNESS*	NOTES
CW	UP TO 1-1/4"	TYPE "L" COPPER	WROUGHT COPPER	SOLDER	1/2"	
CW	1-1/2" TO 4"	TYPE "L" COPPER	WROUGHT COPPER	SOLDER	1"	
HW	UP TO 1-1/4"	TYPE "L" COPPER	WROUGHT COPPER	SOLDER	1"	
HW	1-1/2" TO 4"	TYPE "L" COPPER	WROUGHT COPPER	SOLDER	1-1/2"	
GAS	UP TO 2"	SCH 40 BLACK STL	125# MAL. IRON	SCREWED	N/A	
GAS	2-1/2" TO 10"	SCH 40 BLACK STL	BLACK STEEL	WELDED	N/A	
GAS	BELOW GRADE	POLYETHYLENE	POLYETHYLENE	FUSION WELDED	N/A	SEE NOTE 5
AIR	UP TO 3"	SCH 40 GALV. STL	GALV. IRON	SCREWED	N/A	
AIR	UP TO 4"	TYPE "K" COPPER	WROUGHT COPPER	SOLDER	N/A	
DWV	2" & LARGER	CAST IRON	CAST IRON	NO-HUB	N/A	SEE NOTE 4
MATERIAL STANDARDS						
1. COPPER PIPE SHALL BE IN ACCORDANCE WITH ASTM B88.						
2. STEEL PIPE 1-1/2" AND SMALLER SHALL BE ASTM A120 BUTT WELDED CARBON STEEL.						
3. STEEL PIPE 2" AND LARGER SHALL BE ASTM A53 GRADE B SEAMLESS CARBON STEEL OR ELECTRIC RESISTANCE WELDED.						
4. CAST IRON PIPE SHALL BE IN ACCORDANCE WITH ASTM A74.						
5. PVC PIPE AND FITTINGS SHALL BE SOLID WALL SCHEDULE 40 IN ACCORDANCE WITH ASTM D2665.						
6. POLYETHYLENE PIPE SHALL BE IN ACCORDANCE WITH ASTM D2513.						
7. PIPE INSULATION SHALL BE EITHER FIBERGLASS OR FLEXIBLE UNICELLULAR TYPE WITH A MAXIMUM THERMAL CONDUCTIVITY "K" FACTOR OF 0.24 AT 75°F MEAN TEMPERATURE. FIBERGLASS PIPE INSULATION SHALL HAVE AN ALL SERVICE JACKET. * INSULATION THICKNESS IS PER ASHRAE 90.1-2013.						
NOTE 1. SEE PLUMBING SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.						
NOTE 2. WHERE MORE THAN ONE TYPE OF PIPE OR INSULATION IS INDICATED THE INSTALLING CONTRACTOR MAY SELECT FROM THE OPTIONS ACCORDING TO HIS PREFERENCE.						
NOTE 3. HORIZONTAL RAIN WATER CONDUCTORS SHALL BE INSULATED WITH 1" THICK FIBERGLASS PIPE INSULATION.						
NOTE 4. BURIED CAST IRON SOIL PIPE SHALL BE HUB AND SPIGOT TYPE WITH COMPRESSION GASKET JOINTS.						
NOTE 5. INSTALL POLYETHYLENE GAS PIPING MINIMUM 18" BELOW GRADE.						

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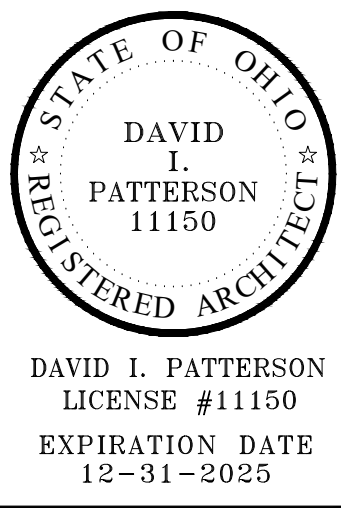
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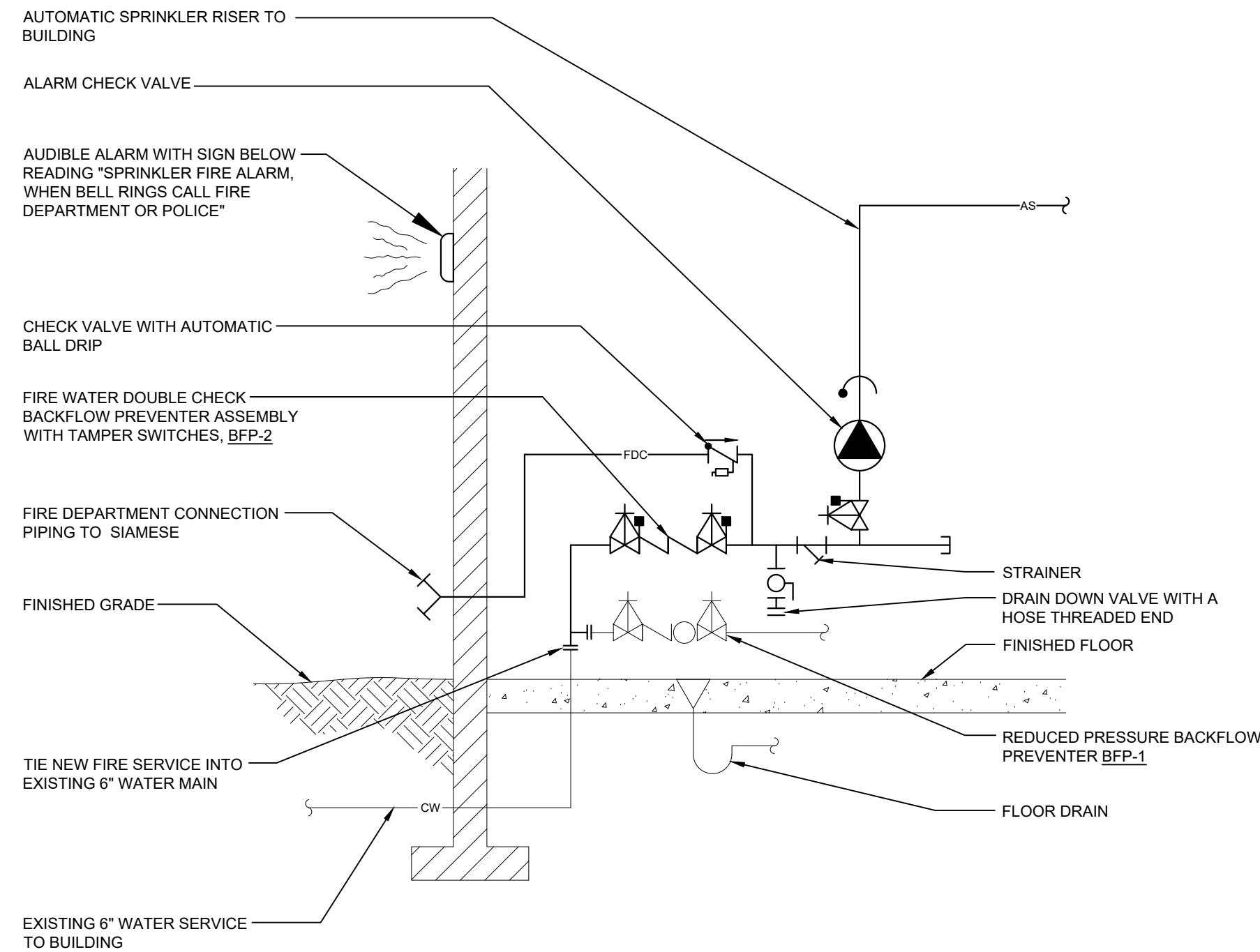
GARAGE ADDITION
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THIS DWG :
PLUMBING SCHEDULES,
NOTES, AND LEGENDS

COMM 21161-B
DATE 02-01-2024

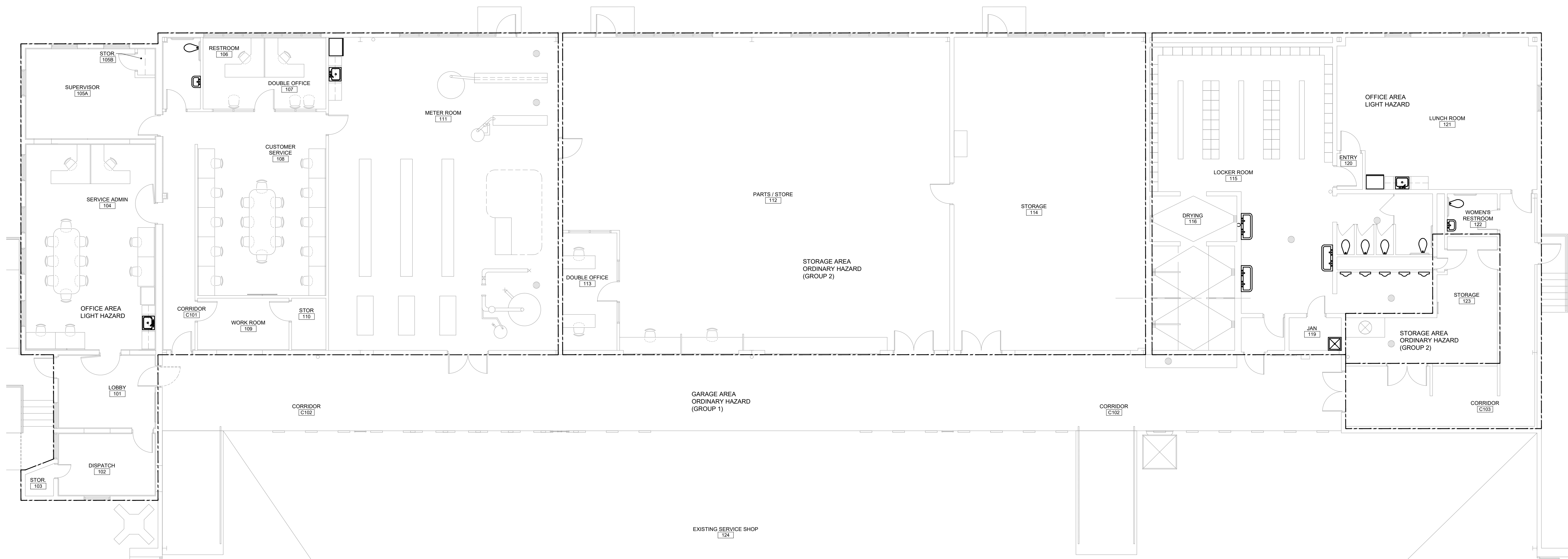
DWG
P-3.3



AUTOMATIC SPRINKLER SYSTEM RISER DIAGRAM
NOT TO SCALE

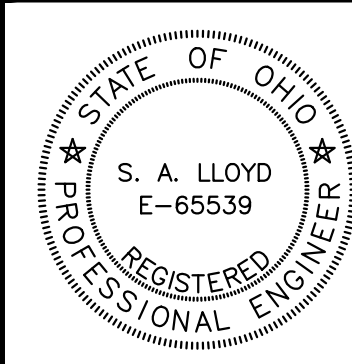
FIRE PROTECTION SPRINKLER NOTES

1. A WET PIPE AUTOMATIC SPRINKLER SYSTEM SHALL BE HYDRAULICALLY CALCULATED, SIZED AND INSTALLED AS INDICATED ON THE PLANS AND IN COMPLETE ACCORDANCE WITH THE REQUIREMENTS OF THE OHIO BUILDING CODE ARTICLE 9 AND NFPA 13 LIGHT HAZARD OCCUPANCY EXCEPT WHERE INDICATED OTHERWISE.
2. THE PLUMBING/FIRE PROTECTION CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF THE FIRE PROTECTION SYSTEM. IN ACCORDANCE WITH OBC 106.2, DESIGN SHALL BE BY EITHER A REGISTERED ENGINEER (ORC 3701.04) OR BY A CERTIFIED SPRINKLER SYSTEM DESIGNER (ORC 3781.105). THE INSTALLING CONTRACTOR SHALL BE CERTIFIED WITH THE FIRE MARSHALL.
3. THE AUTOMATIC SPRINKLER SYSTEM DESIGN SHALL INCLUDE ALL LAYOUT DRAWINGS (LAYOUT OF SPRINKLER HEADS AND WATER DISTRIBUTION PIPING), INSTALLATION DETAILS, WATER SUPPLY INFORMATION, AND HYDRAULIC PIPE SIZING CALCULATIONS AS DESCRIBED IN NFPA 13 FOR APPROVAL BY THE AUTHORITY HAVING JURISDICTION.
4. AUTOMATIC SPRINKLER HEADS SHALL BE OF THE FUSIBLE LINK TYPE WITH A NOMINAL 1/2" DISCHARGE ORIFICE FOR "ORDINARY" TEMPERATURE RANGE. SPRINKLER HEADS SHALL BE OF THE UPRIGHT TYPE WITH A ROUGH BRONZE FINISH IN AREAS WITH NO CEILING AND SHALL BE OF THE RECESSED PENDENT TYPE WITH A WHITE FINISH AND WHITE ESCUTCHEON RING IN AREAS WITH A FINISHED CEILING. SPRINKLER HEADS SHALL BE AS MANUFACTURED BY AUTOMATIC SPRINKLER CORP. OF AMERICA, CENTRAL SPRINKLER CORP., GEM SPRINKLER CORP., STAR SPRINKLER CORP., OR VIKING CORP.
5. FIRE PROTECTION DESIGN SHALL INCLUDE THE DETERMINATION OF AVAILABLE WATER VOLUME AND PRESSURE TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION BY EITHER NEW OR EXISTING FLOW TEST DATA.
6. THIS CONTRACTOR IS TO BE AWARE OF LIMITED SPACE ABOVE CEILING AND SHOULD COORDINATE HIS WORK WITH ALL OTHER TRADES.
7. UNLESS NOTED OTHERWISE, THIS CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING OF EXISTING WALLS, FLOORS, AND CEILINGS AS REQUIRED FOR THE INSTALLATION OF AUTOMATIC SPRINKLER SYSTEMS. NO STRUCTURAL OR REINFORCING MEMBERS SHALL BE CUT.
8. THIS CONTRACTOR TO COORDINATE FINAL PLACEMENT OF SPRINKLER HEADS WITH ARCHITECTURAL CEILING PLANS. SPRINKLER HEADS TO BE CENTERED IN CEILING TILES WHERE APPLICABLE.



PARTIAL FLOOR PLAN EXISTING ADMINISTRATION - FIRE PROTECTION
SCALE: 1/8" = 1'-0"

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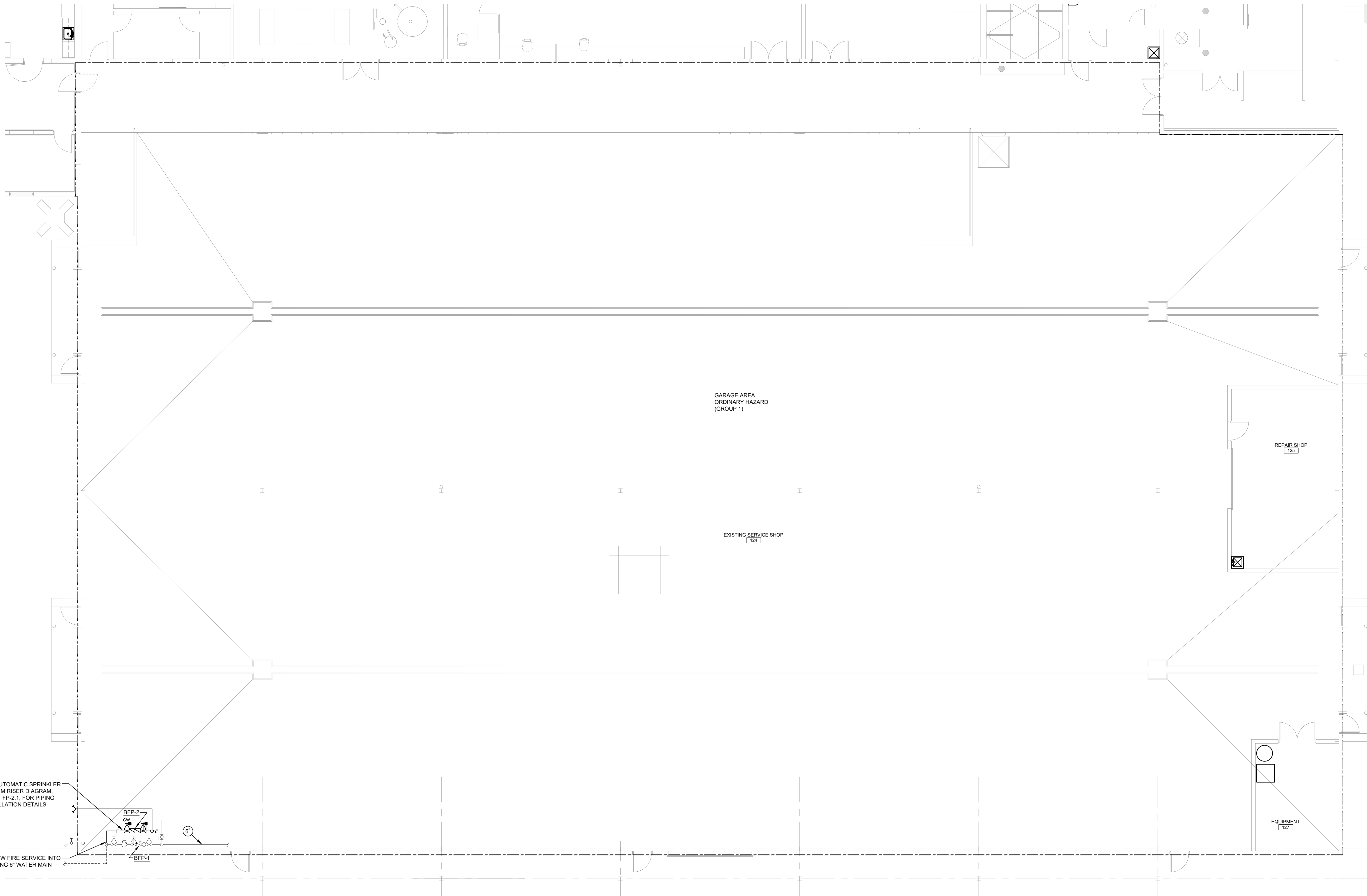


DAVID I. PATTERSON
LICENSE #111150
EXPIRATION DATE
12-31-2025

THIS DWG :
PARTIAL FLOOR PLAN
EXISTING
ADMINISTRATION - FIRE
PROTECTION

COMM 21161-B
DATE 02-01-2024

DWG
FP-2.1



SEE AUTOMATIC SPRINKLER
SYSTEM RISER DIAGRAM,
SHEET FP-2.1, FOR PIPING
INSTALLATION DETAILS

TIE NEW FIRE SERVICE INTO
EXISTING 6" WATER MAIN

BFP-2

BFP-1

6"

REPAIR SHOP
125

EQUIPMENT
127

GARAGE AREA
ORDINARY HAZARD
(GROUP 1)

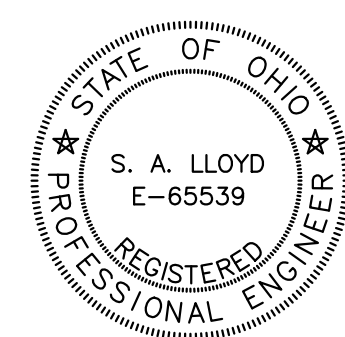
EXISTING SERVICE SHOP
124

PARTIAL FLOOR PLAN EXISTING SERVICE SHOP - FIRE PROTECTION

SCALE: 1/8" = 1'-0"



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DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
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EXISTING SERVICE
SHOP - FIRE
PROTECTION

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DWG
FP-2.2

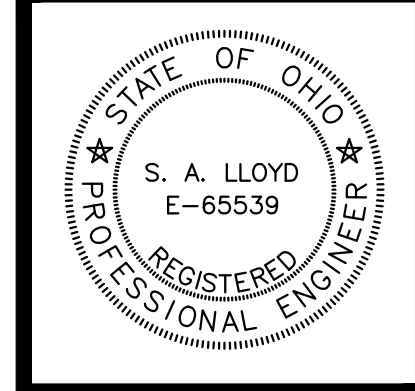


PARTIAL FLOOR PLAN NEW ADDITION - FIRE PROTECTION

SCALE: 1/8" = 1'-0"



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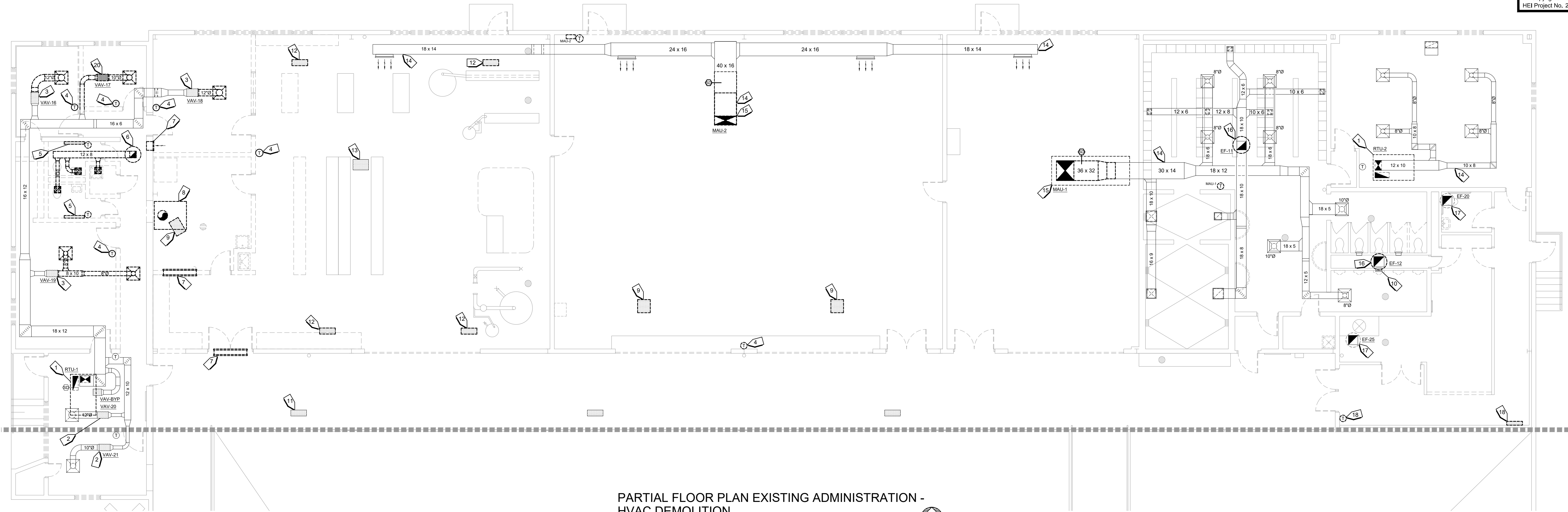


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LICENSE #11150
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NEW ADDITION - FIRE
PROTECTION

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FP-2.3



PARTIAL FLOOR PLAN EXISTING ADMINISTRATION -
HVAC DEMOLITION

SCALE: 1/8" = 1'-0"

DEMOLITION NOTES

1. THE INTENT OF THE DEMOLITION DRAWINGS IS TO INDICATE THE SCOPE OF DEMOLITION WORK REQUIRED TO PERMIT THE INSTALLATION OF NEW WORK INDICATED ON THE CONTRACT DRAWINGS. THE DEMOLITION DRAWINGS ARE BASED ON THE ORIGINAL CONSTRUCTION DOCUMENTS AND MAY NOT REFLECT THE ACTUAL EXISTING CONDITIONS. THIS CONTRACTOR SHALL VISIT THE PROJECT SITE AND COORDINATE DEMOLITION WORK REQUIRED WITH BOTH THE NEW WORK INDICATED AND THE ACTUAL FIELD CONDITIONS ENCOUNTERED.
2. UNLESS NOTED OTHERWISE, EXISTING MECHANICAL SYSTEM ITEMS WHICH ARE TO BE DEMOLISHED ARE SHOWN WITH DARK DASHED LINE TYPE.
3. UNLESS NOTED OTHERWISE, EXISTING MECHANICAL SYSTEM ITEMS WHICH ARE TO REMAIN ARE SHOWN WITH LIGHT SOLID LINE TYPE.
4. ALL MECHANICAL EQUIPMENT AND MATERIALS WHICH ARE INDICATED TO BE DEMOLISHED SHALL FIRST BE OFFERED TO THE OWNER FOR HIS RETENTION. IF THE OWNER DOES NOT WANT THE DEMOLISHED MATERIALS, THEN THIS CONTRACTOR SHALL REMOVE FROM THE SITE AND LEGALLY DISPOSE.
5. THIS CONTRACTOR SHALL COORDINATE SHUTDOWN OF ANY MECHANICAL SYSTEMS REQUIRED AS PART OF THE DEMOLITION WORK WITH THE OWNER PRIOR TO INTERRUPTION OF SERVICES.
6. UNLESS NOTED OTHERWISE, DUCTWORK AND PIPING INDICATED FOR DEMOLITION SHALL BE REMOVED BACK TO THE NEAREST MAIN AND CAPPED AIR/WATER TIGHT. DUCTWORK AND PIPING WITHIN WALLS WHICH ARE TO REMAIN MAY BE CAPPED AND ABANDONED WITHIN THE WALL. SERVICES MUST BE CAPPED FAR ENOUGH IN THE WALL TO ALLOW FOR FLUSH PATCHING AND FINISHING OF THE WALL.
7. UNLESS NOTED OTHERWISE, ANY EXISTING FIRE DAMPERS IN DUCTWORK WHICH IS BEING DEMOLISHED SHALL REMAIN IN THE EXISTING WALL.
8. PRIOR TO DISCONNECTING OR REMOVING ANY MECHANICAL EQUIPMENT CONTAINING A REFRIGERANT, THIS CONTRACTOR SHALL RECOVER ALL REFRIGERANT WITHOUT VENTING AND LEGALLY DISPOSE OF SAME IN COMPLETE COMPLIANCE WITH ALL EPA REGULATIONS.
9. IF ANY MATERIAL IS ENCOUNTERED IN THE COURSE OF DEMOLITION WORK WHICH IS SUSPECT TO BE ASBESTOS, THEN THE WORK IN THE AREA SHALL CEASE UNTIL THE OWNER OR OWNER'S REPRESENTATIVE IS CONTACTED FOR A DETERMINATION OF WHETHER THE MATERIAL IS SAFE, SHOULD BE TESTED OR SHOULD BE REMOVED. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING ALL TRADESMAN ON THE JOB OF THE POTENTIAL PRESENCE AND HAZARD OF ASBESTOS MATERIALS.
10. PRIOR TO ANY DEMOLITION, THIS CONTRACTOR SHALL PERFORM AND DOCUMENT EXISTING AIR / WATER FLOW READINGS WHERE NOTED.
11. THIS CONTRACTOR SHALL REPAIR ANY EXISTING DUCTWORK OR PIPE INSULATION AS A RESULT OF DEMOLITION.
12. UNLESS NOTED OTHERWISE, THIS CONTRACTOR SHALL REMOVE ALL UNUSED SUPPORT HANGERS, CONTROL WIRING, CONTROL PANELS, VALVES, THERMOSTATS, ETC.

HVAC DEMOLITION CODED NOTES

1. EXISTING ROOF-TOP UNIT TO REMAIN; REMOVE & CLEAN ALL EXISTING CEILING DEVICES TO REMAIN FOR REINSTALL WITHIN NEW CEILING GRID
2. EXISTING VAV TERMINAL UNIT, THERMOSTAT AND ASSOCIATED AIR DISTRIBUTION TO REMAIN
3. EXISTING VAV TERMINAL UNIT TO REMAIN; REMOVE EXISTING AIR DISTRIBUTION AS SHOWN
4. REMOVE EXISTING THERMOSTAT FOR RELOCATION WITH NEW WORK
5. REMOVE EXISTING ELECTRIC BASEBOARD HEATER INCLUDING THERMOSTAT
6. REMOVE EXISTING EXHAUST FAN AND ALL ASSOCIATED DUCTWORK; EXISTING CURB TO REMAIN
7. REMOVE EXISTING WALL TRANSFER GRILLE; GC TO INFILL WALL WHERE TO REMAIN
8. REMOVE EXISTING PAINT BOOTH AND ASSOCIATED DUCTWORK THRU ROOF; GC TO PATCH ROOF
9. REMOVE EXISTING GAS-FIRED UNIT HEATER, THERMOSTAT AND ASSOCIATED VENTING THRU ROOF; GC TO PATCH ROOF
10. ABANDON EXISTING WALL GRILLE IN PLACE (TYP OF 3)
11. UNLESS NOTED OTHERWISE, EXISTING GAS-FIRED INFRARED HEATER TO REMAIN (TYP)
12. REMOVE EXISTING GAS-FIRED INFRARED HEATER
13. EXISTING GAS-FIRED UNIT HEATER TO REMAIN
14. EXISTING DUCTWORK TO REMAIN; REMOVE EXISTING DUCT DETECTOR FOR RELOCATION WITH NEW WORK
15. REMOVE EXISTING MAKE-UP AIR UNIT, ROOF CURB AND REMOTE TEMPERATURE CONTROL PANEL AND/OR SENSORS; COORDINATE WITH GC AND MODIFY EXISTING ROOF OPENING FOR NEW WORK; MC TO REFER TO PRE-CONSTRUCTION READING NOTES FOR ADDITIONAL INFORMATION
16. REMOVE EXISTING EXHAUST FAN; ASSOCIATED ROOF CURB TO REMAIN FOR NEW WORK MC TO REFER TO PRE-CONSTRUCTION READING NOTES FOR ADDITIONAL INFORMATION
17. EXISTING EXHAUST FAN AND ASSOCIATED AIR DISTRIBUTION TO REMAIN; MC TO FIELD INVESTIGATE & DETERMINE IF EXISTING CONTROL TYPE FUNCTIONS PROPERLY
18. REMOVE EXISTING ELECTRIC WALL HEATER, INCLUDING LINE VOLTAGE THERMOSTAT; PREPARE FOR NEW WORK AND PROVIDE BLANK WALL PLATE
19. REMOVE & RELOCATE EXISTING GAS-FIRED INFRARED HEATER
20. REMOVE EXISTING VAV TERMINAL UNIT FOR RELOCATION WITH NEW WORK; REMOVE EXISTING AIR DISTRIBUTION AS SHOWN
21. REMOVE EXISTING GAS MONITORING CONTROL PANEL AND ASSOCIATED SENSOR(S)
22. PREPARE ROOF OPENING FOR NEW WORK
23. REMOVE EXISTING TUBE HEATER REFLECTOR ONLY AND REPLACE WITH NEW REFLECTOR; MC TO FIELD DETERMINE REQUIRED OVERALL HEATER LENGTH AND SOLARONICS MODEL PRIOR TO PROCUREMENT; MC TO FIELD VERIFY OVERALL OPERATING CONDITION OF HEATER AND REPAIR/REPLACE ANY NECESSARY COMPONENT(S)

FOR REFERENCE ONLY

EXISTING VAV TERMINAL UNIT SCHEDULE								
NO.	MFR	MODEL	SIZE	MIN CFM	MAX CFM	KW HEAT	MBH HEAT	VOLTAGE
VAV-16	CARRIER	35EC	08	190	430	4.5	15.4	208-3-60
VAV-17	CARRIER	35EC	05	85	150	2.5	8.5	208-3-60
VAV-18	CARRIER	35EC	07	140	360	6.5	22.2	208-3-60
VAV-19	CARRIER	35EC	07	140	550	4.5	15.4	208-3-60
VAV-20	CARRIER	35EC	07	140	430	6.0	20.5	208-3-60
VAV-21	CARRIER	35EC	05	85	270	4.5	15.4	208-3-60

FOR REFERENCE ONLY

EXISTING EXHAUST FAN SCHEDULE						
NO.	MFR	MODEL	CFM	ESP	HP	VOLTAGE
EF-11	GREENHECK	165ACE	2,200	0.50"	1/2	120-1-60
EF-12	GREENHECK	100ACE	750	0.375"	1/6	120-1-60
EF-13 THRU 16	GREENHECK	195ACE	3,000	0.25"	1/3	120-1-60
EF-17 & 18	GREENHECK	402ACE	15,000	0.25"	3	208-3-60
EF-20	GREENHECK	70ACEH	100	0.50"	1/20	120-1-60
EF-25	GREENHECK	100ACE	350	0.25"	1/6	120-1-60

PRE-CONSTRUCTION EXISTING EQUIPMENT READINGS

PRIOR TO THE START OF DEMOLITION WORK THE MC SHALL OBTAIN & DOCUMENT AIR READINGS NEAR THE OUTLET OF EXISTING MAKE-UP AIR UNIT MAU-1 AND THEN AT ALL SUPPLY DIFFUSERS CONNECTED TO MAU-1 TO DETERMINE IF THE EXISTING DUCTWORK IS IN GOOD CONDITION OR IF LEAKAGE IS APPARENT; SUBMIT REPORT TO ARCHITECT / ENGINEER FOR REVIEW.

MC TO ALSO CONFIRM OPERATION & CONDITION OF THE EXISTING VAV TERMINAL UNIT CONTROLLERS (BY CARRIER MFR) AND THERMOSTATS, INCLUDING EXISTING RTU-1 BYPASS DAMPER

REVISIONS:



600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD, NE
CANTON, OHIO



DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
FLOOR PLAN - HVAC
DEMOLITION

COMM 21161-B
DATE 02-01-2024

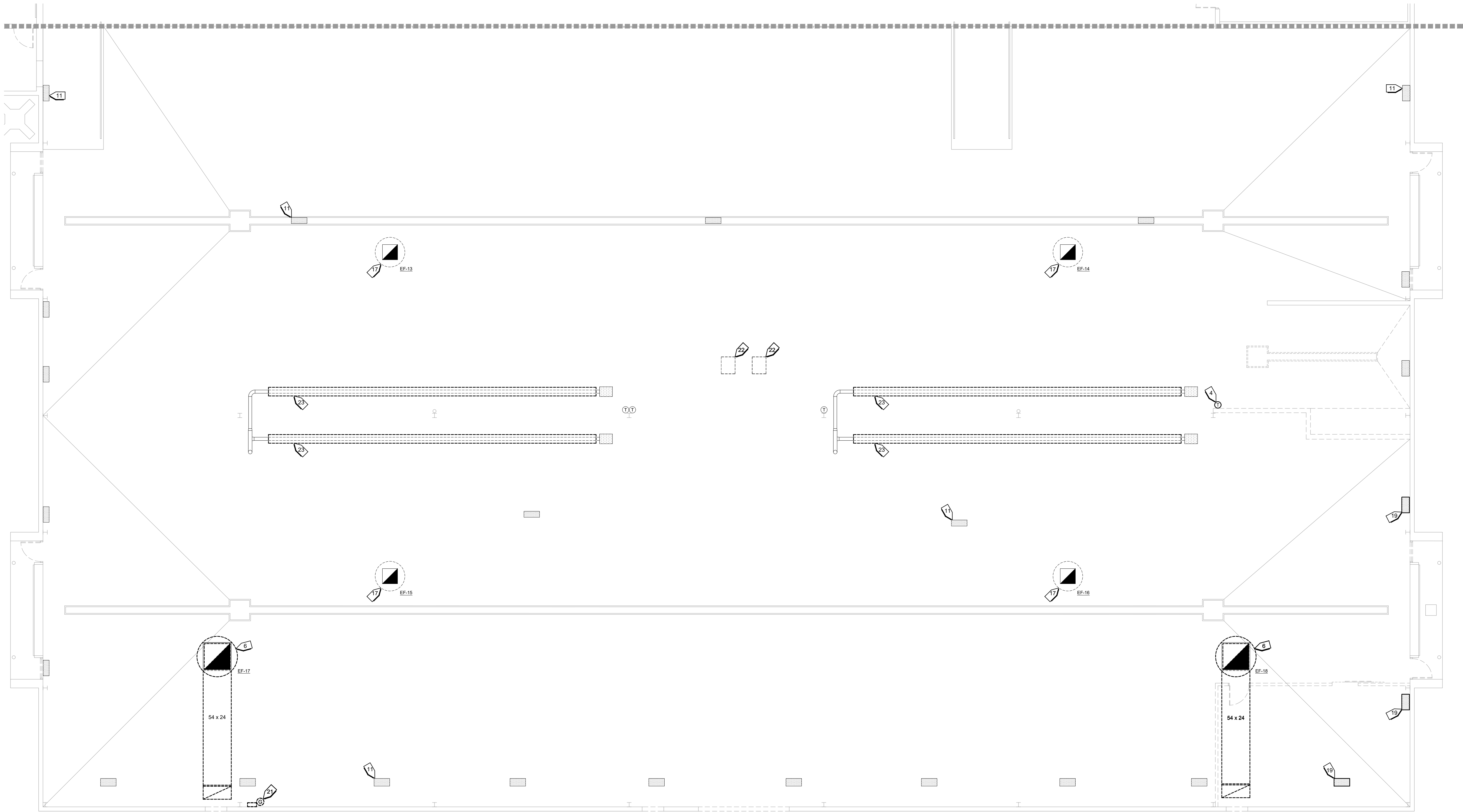
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H-1.1

EXISTING ROOF-TOP UNIT SCHEDULE

NO.	MFR	MODEL	NOMINAL TONS	CFM	NOM. COOLING TMBH / SMBH	HEATING INPUT / OUTPUT	VOLTAGE	MCA	MOCP
RTU-1	CARRIER	48TCEA06E	5	2000	60.0 / 45.0	115.0 / 93.0	208-3-60	32.9	45.0
RTU-2	CARRIER	48TCEA04E	3	1200	36.0 / 27.0	72.0 / 59.0	208-3-60	26.1	30.0
MAU-1	GREENHECK	MPX-P12-H24-11-DB	11	UNKNOWN	132.0 / 99.0	300.0 / 240.0	208-3-60	60.8	70.0
MAU-2	GREENHECK	DGX-P15-H22-DB	N/A	UNKNOWN	N/A	500.0	208-3-60	28.8	35.0

HVAC DRAWING INDEX

- H1.1 - PARTIAL FLOOR PLAN EXISTING ADMINISTRATION - HVAC DEMOLITION
- H1.2 - PARTIAL FLOOR PLAN EXISTING SERVICE SHOP - HVAC DEMOLITION
- H2.1 - PARTIAL FLOOR PLAN EXISTING ADMINISTRATION - HVAC
- H2.2 - PARTIAL FLOOR PLAN EXISTING SERVICE SHOP - HVAC
- H2.3 - PARTIAL FLOOR PLAN NEW ADDITION - HVAC
- H3.1 - HVAC SCHEDULES
- H3.2 - HVAC DETAILS
- H3.3 - HVAC DETAILS

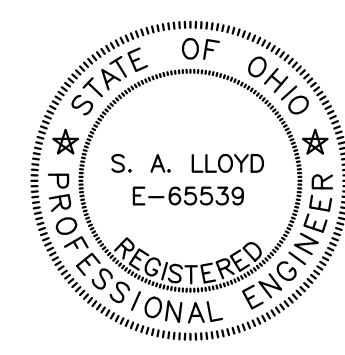


PARTIAL FLOOR PLAN EXISTING SERVICE SHOP -
HVAC DEMOLITION

SCALE: 1/8" = 1'-0"



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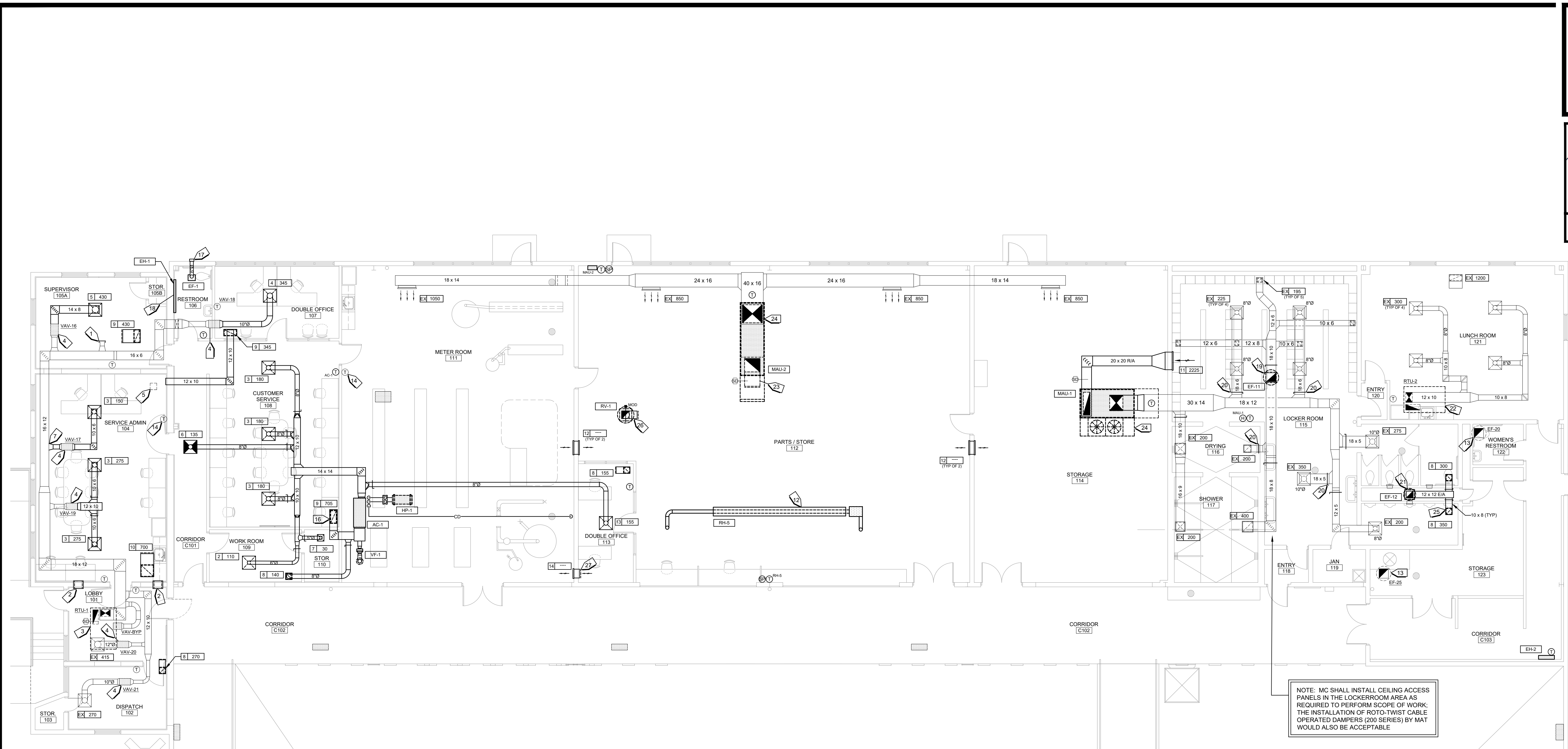


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H-1.2



PARTIAL FLOOR PLAN EXISTING ADMINISTRATION - HVAC
SCALE: 1/8" = 1'-0"

HVAC NEW WORK CODED NOTES

- 1

CAP EXISTING DUCT RUN-OUT BACK TO MAIN
- 2

18 x 10 TRANSFER OPENING WITH 1/2" DUCT LINER
- 3

BALANCE EXISTING ROOFTOP UNIT TO 1970 CFM (165 CFM O/A); REFER TO EXISTING HVAC UNIT RECONDITIONING NOTES ON THIS SHEET FOR MORE INFORMATION
- 4

BALANCE EXISTING VAV TERMINAL UNIT TO AIRFLOW INDICATED; FIELD VERIFY PROPER OPERATION OF EXISTING ASSOCIATED DDC CONTROLLER (BY CARRIER MFR), THERMOSTAT, VOLUME DAMPER, ELECTRIC HEAT, ETC AND REPAIR / REPLACE AS NECESSARY
- 5

ABANDON IN PLACE EXISTING ROOF CURB; MC TO SEAL WEATHER-TIGHT
- 6

REPLACE EXISTING TUBE HEATER REFLECTOR ONLY; MC TO FIELD DETERMINE REQUIRED OVERALL HEATER LENGTH AND SOLARONICS MODEL PRIOR TO PROCUREMENT; MC TO FIELD VERIFY OVERALL OPERATING CONDITION OF HEATER AND REPAIR/REPLACE ANY NECESSARY COMPONENT(S)
- 7

NEW LOCATION FOR EXISTING VAV TERMINAL UNIT; TIE-IN TO EXISTING DUCTWORK
- 8

30 x 30 S/A BRANCH TAP; OPEN-ENDED TERMINATION COMPLETE WITH 1" HEMMED EDGE EXTERNAL FLANGE AND BALANCE DAMPER WHERE SHOWN (TYP OF 4)
- 9

DROP 26 x 26 E/A DUCTWORK ALONG WALL AND TERMINATE OPEN-ENDED AT APPROXIMATELY 24" AFF; PROVIDE TURNING VANES WITHIN ALL DUCT ELBOWS
- 10

MOUNT GAS SENSOR AT 48"-60" AFF (TYP)
- 11

COORDINATE FINAL LOCATION OF 24V THERMOSTAT WITH OWNER; IF LOCATED ON EXTERIOR WALL, MOUNT THERMOSTAT ON 1/2" PLYWOOD BOARD WITH 1-1/2" RIGID INSULATION BACKER (TYP)
- 12

FIELD COORDINATE LOCATION OF TUBE HEATER WITH OWNER AND SUSPEND AS HIGH AS POSSIBLE WHILE MAINTAINING MFR RECOMMENDED CLEARANCES TO COMBUSTIBLES; OVERHEAD STRUCTURE AND SUSPENDED LIGHTING; ROUTE 4"Ø B-VENT & 4"Ø SCHEDULE 40 PVC INTAKE PIPING UP THRU ROOF PER MFR RECOMMENDATIONS; TERMINATION CAPS BY HEATER MFR
- 13

REPAIR OR REPLACE EXISTING EXHAUST FAN CONTROL TYPE AS NECESSARY
- 14

NEW LOCATION FOR EXISTING THERMOSTAT; MODIFY/EXTEND WIRING AS NECESSARY (TYP)
- 15

NEW LOCATION FOR EXISTING GAS-FIRED INFRARED HEATER; PC TO MODIFY GAS PIPING AS NECESSARY
- 16

14 x 14 R/A DUCT TO STUB INTO PLENUM SAME SIZE AS UNIT INLET (20 x 20)
- 17

FIELD COORDINATE EXACT FAN LOCATION WITH NEW CEILING GRID; WALL CAP BY FAN MFR
- 18

MOUNT RADIANT COVE HEATER NEAR CEILING PER MFR RECOMMENDATIONS
- 19

INSTALL NEW EXHAUST FAN ON EXISTING CURB AND TIE-IN TO EXISTING E/A DUCTWORK; MC TO PROVIDE ROOF CURB ADAPTER AS NECESSARY
- 20

MC TO FIELD VERIFY EXISTING DUCTWORK SIZE AND PROVIDE NEW BALANCE DAMPER WITHIN EXISTING DUCTWORK OR REPLACE EXISTING IF PRESENT; MC TO INSTALL ACCESS PANELS AS REQUIRED TO PERFORM NEW ABOVE CEILING WORK
- 21

INSTALL NEW EXHAUST FAN ON EXISTING CURB; MC TO PROVIDE ROOF CURB ADAPTER AS NECESSARY
- 22

BALANCE EXISTING ROOF-TOP UNIT TO 1200CFM (185CFM O/A); REFER TO EXISTING HVAC UNIT RECONDITIONING NOTES THIS SHEET FOR MORE INFORMATION
- 23

STUB R/A DUCT DN INTO SPACE WITH 90° ELBOW; DUCT SHALL BE SAME SIZE AS UNIT INLET
- 24

COORDINATE WITH GC TO MODIFY EXISTING ROOF OPENING; TIE-IN S/A DUCTWORK TO EXISTING S/A DUCTWORK AND INSTALL NEW R/A DUCTWORK AS SHOWN
- 25

MC TO INSTALL ACCESS PANELS AS REQUIRED TO PERFORM NEW ABOVE CEILING WORK
- 26

OPEN-ENDED 14x14 RELA DUCTWORK DN FROM ROOF HOOD AND STUBBED INTO SPACE BELOW WITH DUCT ELBOW AS SHOWN
- 27

INSTALL WALL TRANSFER GRILLE TO PROVIDE A PATH FOR RETURN / RELIEF AIR FROM ABOVE OFFICE CEILING SPACE

AIR DISTRIBUTION SCHEDULE

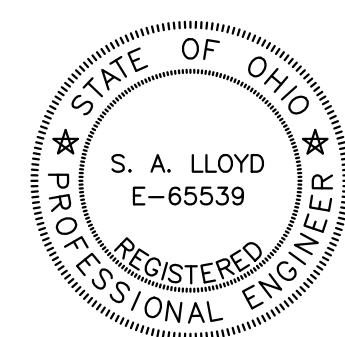
NO	MAKE	MODEL	FACE	NECK	DESCRIPTION		NOTES
					MAX CFM	MAX. APD	
1	PRICE	SCD	12" X 12"	6" DIA	150	0.10	
2	PRICE	SCD	24" X 24"	6" DIA	200	0.10	
3	PRICE	SCD	24" X 24"	8" DIA	350	0.10	
4	PRICE	SCD	24" X 24"	10" DIA	425	0.10	
5	PRICE	SCD	24" X 24"	12" DIA	650	0.10	
6	PRICE	SMD-2S	12" X 12"	8" DIA	275	0.10	24" X 24" CEILING MODULE
7	PRICE	SCD	12" X 12"	5" DIA	70	0.10	
8	PRICE	80	12" X 12"	10" X 10"	475	0.10	
9	PRICE	80	12" X 24"	10" X 22"	1100	0.10	
10	PRICE	80	24" X 24"	22" X 22"	2200	0.10	
11	PRICE	530	34" X 22"	32" X 20"	2400	0.10	
12	PRICE	530	26" X 20"	24" X 18"	1100	0.05	
13	ACUTHERM	ADV - SQ	24" X 24"	8" DIA	200	0.10	WALL TSTAT W/ LCD DISPLAY, 120-24V TRANSFORMER & RELIEF RING
14	PRICE	530	18" X 10"	16" X 8"	300	0.05	

- GENERAL NOTES FOR ALL APPLICABLE AIR DISTRIBUTION DEVICES
- NOT ALL DEVICES IN THE SCHEDULE ARE UTILIZED FOR THIS SPECIFIC PROJECT. DEVICES REQUIRED AND QUANTITIES OF SAME ARE AS INDICATED ON THE DRAWINGS.
 - THE SYMBOLS ON THE DRAWING INDICATE TYPE OF DEVICE AND AIR VOLUME IN CFM UNLESS NOTED OTHERWISE:
 - DEVICE SHALL BE RATED FOR A MAXIMUM NC LEVEL OF 30
 - DEVICE SHALL BE PROVIDED WITH A STANDARD WHITE FINISH
 - UNLESS NOTED OTHERWISE, ALL AIR DISTRIBUTION DEVICES TO BE BY SAME MANUFACTURER
 - FRAME TYPES PROVIDED SHALL BE IN ACCORDANCE WITH THE CEILING TYPE APPLICABLE
 - ALL RA & EA GRILLES USED IN A BOOT/PLENUM APPLICATION SHALL INCLUDE AN OBD
 - RUNOUT DUCT SIZE TO S/A DIFFUSER SHALL BE SAME SIZE AS DIFFUSER NECK UNLESS NOTED OTHERWISE

EXISTING RTU RECONDITIONING WORK

- CLEAN ALL COMPONENTS OF THE EXISTING ROOFTOP UNITS INCLUDING COILS, FAN BLADES, MOTORS, ETC
- REPLACE INDOOR UNIT AIR FILTERS
- INSPECT & TEST THE EXISTING ROOFTOP UNITS FOR ANY NECESSARY REPAIRS; LUBRICATE ALL MOVING PARTS PER MFR MAINTENANCE INSTRUCTIONS; CHECK REFRIGERANT & OIL LEVELS AND ADD AS REQUIRED; TAKE PRESSURE READINGS; CONFIRM O/A & R/A DAMPER OPERATION AND REPORT ANY DEFICIENCIES IMMEDIATELY

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2664 HARRISBURG RD, NE
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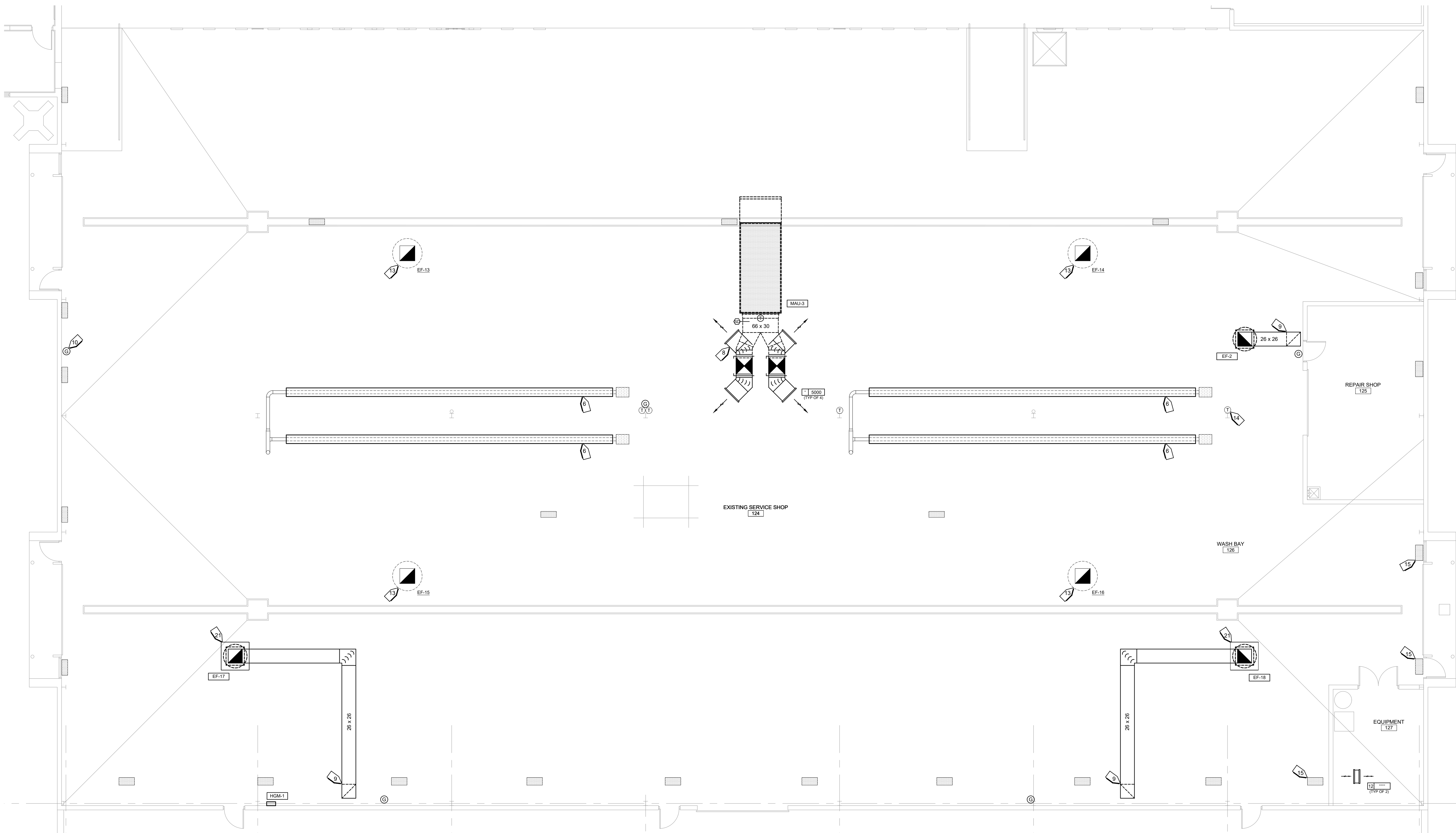


DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
PARTIAL FLOOR PLAN -
HVAC

COMM 21161-B
DATE 02-01-2024

DWG
H-2.1



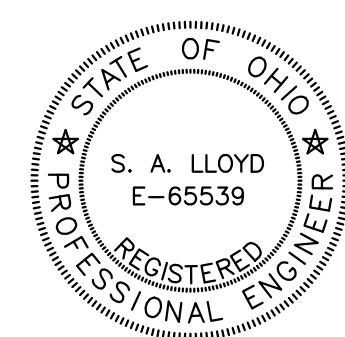
PARTIAL FLOOR PLAN EXISTING SERVICE SHOP - HVAC

SCALE: 1/8" = 1'-0"



GAS DETECTION SYSTEM			
NO	MAKE	MODEL	DESCRIPTION
Ⓒ	ARMSTRONG	AMC-UTX-M-400	COMBINATION CARBON MONOXIDE/NITROGEN DIOXIDE ELECTROCHEMICAL GAS SENSOR MODULE; RANGE 0-100PPM CO/0-3PPM NO2; 50FT COVERAGE RADIUS; ELECTRICAL REQUIREMENTS: 24V. REFER TO PLANS FOR QTY.
HGM-1 & HGM-2	ARMSTRONG	AMC-1DB1-30000B	HAZARDOUS GAS MONITOR WITH CSA APPROVED STEEL ENCLOSURE AND HINGED DOOR; PROGRAMMABLE ALARM THRESHOLDS SET AT SENSOR MODULE; DIGITAL CONCENTRATION DISPLAY; INCLUDES INTEGRAL DPDT RELAYS FOR UP TO 4 DEVICES; 85db AUDIBLE ALARM; UP TO 5 MINUTE ACTIVATION DELAY; MINIMUM RUNTIME UP TO 60 MINUTES; ELECTRICAL REQUIREMENTS: 120V-1-40.

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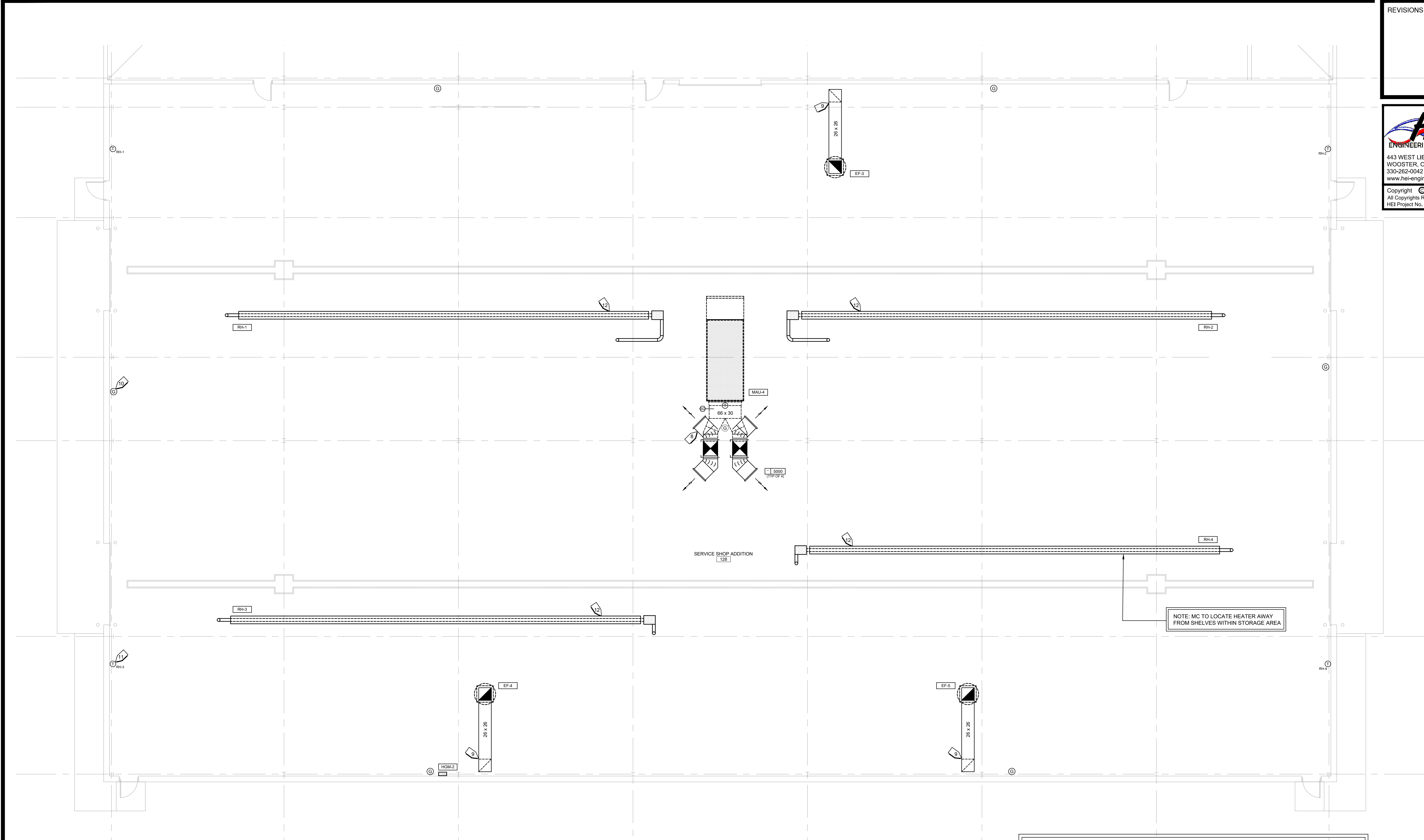


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HVAC

COMM 21161-B
DATE 02-01-2024

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H-2.2



HVAC & ELECTRICAL COORDINATION SCHEDULE														
ITEM	ELECTRIC VOLT/PH/Hz	TOTAL WATTS	TOTAL AMPS	TOTAL MOC	DISCONNECT BY		MOTOR STARTER TYPE / BY							NOTES
					DIV. 23	DIV. 26	MANUAL	MAGNETIC	HOA	VFD	NONE	DIV. 23	DIV. 26	
AC-1	230-1-60	1/2 HP + HEATER	33.5	35.0		X						X		CEILING HUNG FAN COIL WITH 5 KW ELECTRIC HEAT; SINGLE CIRCUIT
HP-1	208/230-1-60	-	23.0	30.0		X						X		OUTDOOR HEAT PUMP (ROOF MOUNTED)
VF-1	120-1-60	20 WATTS	-	-		X						X		CONTROL INTERLOCK WITH AC-1 BY MC
EF-1	120-1-60	16 WATTS	-	-	X		X						X	CONTROL VIA LIGHT SWITCH BY EC
EH-1	120-1-60	600 WATTS	5.0	-		X						X		POWER WIRING BY EC FOR LINE VOLTAGE THERMOSTAT
RH-5	120-1-60	-	1.3	-		X						X		
MAU-1	208-3-60	-	53.2*	60.0*	X							X		NEW UNIT COMPLETE WITH WIRED SERVICE OUTLET; SEE NOTE 1
MAU-2	208-3-60	-	10.1*	15.0*	X							X		NEW UNIT COMPLETE WITH WIRED SERVICE OUTLET; SEE NOTE 1
EF-11	120-1-60	1/2 HP*	-	-		X						X		CONTROL INTERLOCK WITH MAU-1 BY MC
EF-12	120-1-60	1/6 HP*	-	-	X							X		CONTROL INTERLOCK WITH MAU-1 BY MC
EH-2	208-3-60	3000 WATTS	-	-		X						X		HEATER COMPLETE WITH INTEGRAL THERMOSTAT
EF-17 & 18	208-3-60	2 HP*	-	-		X						X		CONTROL INTERLOCK VIA GAS MONITOR / PANEL BY MC
EF-2,3,4 & 5	208-3-60	2 HP	-	-		X						X		CONTROL INTERLOCK VIA GAS MONITOR / PANEL BY MC
RH-1 THRU 4	120-1-60	-	1.3	-	X		X					X		
MAU-3 & 4	208-3-60	-	40.5	70.0	X								X	
HGM-1 & 2	120-1-60	-	-	-									X	NEW UNIT COMPLETE WITH WIRED SERVICE OUTLET; SEE NOTE 2
VAV DIFFUSER	120-24V	-	-	-										HAZARDOUS GAS MONITOR / PANEL
DEMOLITION														EC TO PROVIDE 120V JUNCTION BOX NEAR DOUBLE OFFICE 113
														REFER TO DRAWING #H-1.1 & #H-1.2 FOR MORE INFORMATION

*THIS IS A REPLACEMENT UNIT - SEE EXISTING EQUIPMENT SCHEDULES ON DRAWING #H-1.1 FOR ORIGINAL ELECTRICAL POWER REQUIREMENTS
NOTE 1: EXISTING DUCT SMOKE DETECTOR TO REMAIN FOR REUSE; MC/EC TO FIELD COORDINATE AND RELOCATE AS REQUIRED FOR NEW WORK
NOTE 2: DUCT SMOKE DETECTOR TO BE FURNISHED BY EC, INSTALLED BY MC AND WIRED BY EC

PARTIAL FLOOR PLAN NEW ADDITION - HVAC
SCALE: 1/8" = 1'-0"

MISCELLANEOUS SEQUENCES OF OPERATION

INFRARED RADIANT TUBE HEATERS

A 24 VOLT SPACE THERMOSTAT, PROVIDED BY THE HEATER MANUFACTURER FOR INSTALLATION AND WIRING BY THE MC, SHALL ENERGIZE THE GAS VALVE SUBSEQUENTLY FIRING THE BURNER WHENEVER SPACE TEMPERATURE FALLS BELOW THE ADJUSTABLE THERMOSTAT SET POINT. WHEN THE THERMOSTAT SET POINT IS SATISFIED, THE GAS VALVE SHALL BE DE-ENERGIZED SUBSEQUENTLY SHUTTING DOWN THE BURNER. THE HEATER SHALL BE COMPLETE WITH INTEGRAL BURNER SAFETY CONTROLS, GAS VALVE, 24V CONTROL TRANSFORMER AND AIR PRESSURE SWITCH.

EXHAUST FAN (EF-1)

THE TOILET ROOM EXHAUST FANS SHALL BE ENERGIZED BY A MOTION/OCCUPANCY SENSOR PROVIDED BY THE EC.

TERMINAL ELECTRIC HEAT - RADIANT HEATER

THE EC SHALL PROVIDE ELECTRICAL POWER TO EACH ELECTRIC HEAT DEVICE. A REMOTE LINE VOLTAGE THERMOSTAT PROVIDED BY THE HEATER MANUFACTURER LOOSE FOR FIELD INSTALLATION AND WIRING BY THE ELECTRICAL CONTRACTOR SHALL CYCLE THE HEATER ON/OFF TO MAINTAIN SET POINT.

TERMINAL ELECTRIC HEAT - WALL HEATER

THE EC SHALL PROVIDE ELECTRICAL POWER TO EACH ELECTRIC HEAT DEVICE. AN INTEGRAL THERMOSTAT PROVIDED BY THE HEATER MANUFACTURER SHALL CYCLE THE HEATER ON/OFF TO MAINTAIN SET POINT.

REVISIONS:

STATE OF OHIO
S. A. LLOYD
E-65539
REGISTERED
PROFESSIONAL ENGINEER

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ENGINEERING GROUP, INC.

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WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD, NE CANTON, OHIO

STATE OF OHIO
DAVID I. PATTERSON
11150
REGISTERED ARCHITECT

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H-2.3

OUTDOOR HEAT PUMP UNIT SCHEDULE																				
NO.	MAKE	MODEL	SIZE	SERVICE	COOLING		HEATING		ELECTRIC	MIN. CIRCUIT AMPS	MOP AMPS	MIN. ALLOW SEER	ACTUAL SEER	MIN. ALLOW COP	ACTUAL COP	WEIGHT LBS	PIPING CONNECTIONS		OPTIONS	
					NOMINAL TONS	AMB. OAT	MIN. OAT	MBH @ 47°F									MBH @ 17°F	RL 3/8"		RS 5/8"
HP-1	CARRIER	38MARBQ30	030	AC-1	2-1/2	95°F	0°F	30.0	19.0	208/230-140	23.0	30.0	13.0	16.0	3.3	3.3	150	RL 3/8"	RS 5/8"	ALL APPLY
GENERAL NOTES FOR ALL HEAT PUMP UNITS										OPTIONS (SEE SCHEDULE ABOVE FOR APPLICABLE OPTIONS FROM LIST BELOW)										
1. HEAT PUMP UNITS SHALL BE BY THE SAME MANUFACTURER AS THE HVAC EQUIPMENT IT SERVES										A. ANTI-CYCLE TIMER SWITCH										
2. REFER TO SPLIT A/C UNIT SCHEDULE FOR MATCHED RATING PERFORMANCE										B. CRANKCASE HEATER										
3. HEAT PUMP UNITS SHALL BE FACTORY WIRED FOR A SINGLE POINT POWER CONNECTION WITH ALL TRANSFORMERS AND CONTACTORS AS REQUIRED FOR OPERATION OF ALL UNIT COMPONENTS										C. REFRIGERANT HIGH PRESSURE SWITCH										
4. DISCONNECT SWITCH SHALL BE PROVIDED BY EC										D. LOW AMBIENT COOLING & HEATING										
										E. HERMETIC SCROLL COMPRESSORS										
										F. THERMOSTATIC EXPANSION VALVE										
										G. TIME DELAY RELAY										
										H. COIL HAIL GUARD										

SPLIT A/C UNIT SCHEDULE																						
GENERAL DATA				BLOWER DATA								COOLING DATA				AUX ELECTRIC HEAT				WEIGHT LBS	OPTIONS	
NO.	MAKE	MODEL	ARRANGEMENT	S.A. CFM	ESP IN. WC	O.A. CFM	FAN HP	FAN BHP	ELECTRICAL DATA	EAT AMPS	MOCF AMPS	TMBH	SMBH	EAT °F	LAT °F	KW	MBH	EAT °F	LAT °F			
AC-1	CARRIER	FV4CNF003	MULTI-POSITION	970	0.60"	125	1/2	-	230-1-60	33.5	35.0	27.7	22.7	77/64°F			5.0	17.1	70°F	86°F	150	A & B

GENERAL NOTES FOR SPLIT A/C COIL UNITS

- COORDINATE WITH SEQUENCE OF OPERATIONS FOR ADDITIONAL REQUIREMENTS
- DISCONNECT SWITCH SHALL BE PROVIDED BY EC

OPTIONS (SEE SCHEDULE ABOVE FOR APPLICABLE OPTIONS FROM LIST BELOW)

- 7 DAY PROGRAMMABLE AUTO-CHANGEOVER WALL MOUNT THERMOSTAT
- 1" THROWAWAY FILTER

HVAC PIPE AND INSULATION SCHEDULE							
TYPE	SIZE	PIPE	FITTINGS	JOINTS	INSULATION		NOTES
					TYPE	THICK	
REFRIG SUCTION	ALL SIZES	ACR COPPER	WROUGHT COPPER	BRAZED	FUE	1/2"	MAT. STD. #2
	ALL SIZES	ACR COPPER	WROUGHT COPPER	BRAZED	FIBER GLASS	1"	MAT. STD. #2
A/C COND	UP TO 2"	COPPER OR PVC	WROUGHT CU / PVC	SOLDER/PRESS FIT/CEMENT	FUE	1/2"	
	UP TO 2"	COPPER OR PVC	WROUGHT CU / PVC	SOLDER/PRESS FIT/CEMENT	FIBER GLASS	1"	

WHERE MORE THAN ONE TYPE OF PIPE OR INSULATION IS INDICATED THE INSTALLING CONTRACTOR MAY SELECT FROM THE OPTIONS ACCORDING TO HIS PREFERENCE.

MATERIAL STANDARDS AND GENERAL REQUIREMENTS

1. COPPER REFRIGERANT PIPE IS ASTM B280 TYPE ACR HARD-DRAWN
2. FIBER GLASS PIPE INSULATION SHALL HAVE A MAXIMUM CONDUCTIVITY "K" FACTOR OF 0.24 AT 75 DEG F MEAN TEMPERATURE AND AN ALL SERVICE JACKET
3. FLEXIBLE UNICELLULAR ELASTOMERIC (FUE) PIPE INSULATION SHALL HAVE A MAXIMUM FLAME-SPREAD RATING OF 25 AND SMOKE DEVELOPMENT RATING OF 50 WHEN TESTED IN ACCORDANCE WITH ASTM E-84

NOTES

1. REFRIGERANT LIQUID OR HOT GAS PIPING ON THE EXTERIOR OF THE BUILDING SHALL BE INSULATED THE SAME AS THE SUCTION PIPING. PIPING LOCATED ON THE EXTERIOR OF THE BUILDING SHALL BE COATED WITH A WEATHER RESISTANT, PROTECTIVE FINISH COMPATIBLE WITH THE INSULATION

FAN SCHEDULE														
NO	MAKE	MODEL	DESCRIPTION	DRIVE	CFM	SP	BHP	RPM	MHP	SONES	ELECTRIC	WEIGHT (LBS)	CONTROL	OPTIONS
EF-1	GREENHECK	SP-A110	CEILING CABINET	DIRECT	70	0.30"	-	945	16W	1.0	120-160	20	LIGHT SWITCH	D,G,J & K
EF-2 THRU EF-5	GREENHECK	CUE-240-VG	UPBLAST CENTRIFUGAL	DIRECT	6,600	0.30"	1.2	796	2.0	17.4	208-360	220	COINQZ DETECTION	D,E,L,N & Q
EF-11	GREENHECK	G-133-VG	CENTRIFUGAL ROOF	DIRECT	1575	0.50"	0.3	1342	1/2	12.1	120-160	50	INTERLOCK W/ MAU-1	D,L,N & V
EF-12	GREENHECK	G-095-VG	CENTRIFUGAL ROOF	DIRECT	650	0.375"	0.1	1468	1/6	7.9	120-160	50	INTERLOCK W/ MAU-1	D,L,N & V
EF-17 & EF-18	GREENHECK	CUE-240-VG	UPBLAST CENTRIFUGAL	DIRECT	6,600	0.375"	1.3	817	2.0	17.7	208-360	220	COINQZ DETECTION	D,L,N,O & V
VF-1	FANTECH	FG-5	INLINE	DIRECT	125	0.20"	-	3000	20W	-	120-160	<20	INTERLOCK W/ AC-1	D,H & J
OPTIONS (SEE SCHEDULE ABOVE FOR APPLICABLE OPTIONS FROM LIST BELOW)														
A. BIRD SCREEN				J. FAN SPEED CONTROLLER				S. OUTLET SAFETY SCREEN						
B. DISCONNECT SWITCH				K. ISOLATION KIT				T. OSHA APPROVED BELT GUARD						
C. MOTOR OPERATED DAMPER				L. VARIEGATE MOTOR W/ SPEED ADJUSTMENT ON MOTOR				U. CEILING RADITION DAMPER						
D. GRAVITY BACKDRAFT DAMPER				M. VFD RATED MOTOR WITH CLASS "F" INSULATION				V. ROOF CURB ADAPTER BY MC						
E. 12" HIGH GALVANIZED STEEL ROOF CURB				N. NEMA 3P DISCONNECT SWITCH										
F. BRICK VENT				O. HINGED BASE WITH DRIN PIPE AND GREASE TERMINATOR										
G. WALL CAP				P. EXPLOSION PROOF MOTOR										
H. ROOF CURB WITH CURB CAP (GREENHECK MODEL RCC-7)				Q. SPARK RESISTANT CONSTRUCTION; AMCA " _ "										
I. ROOF JACK				R. WIRE GUARD										

LOW INTENSITY RADIANT TUBE HEATER SCHEDULE									
GENERAL DATA			ELECTRIC	HEATER DATA		MISCELLANEOUS DATA		OPTIONS	
NO	MAKE	MODEL		INPUT/OUTPUT MBH	TUBE LENGTH	BURNER	REFLECTOR ANGLE		WEIGHT LBS
RH-1 THRU RH-4	SOLARONICS	STG	120-1-60	200.0 / 170.0	70'-0"	1-STAGE	1° - 30° (ADJUSTABLE)	475	A,B,C,D & E
RH-5	SOLARONICS	STG	120-1-60	40.0 / 34.0	20'-0"	1-STAGE	1° - 30° (ADJUSTABLE)	150	A,B,C,D & E

GENERAL NOTES FOR ALL HEATERS

1. HEATER SHALL BE EQUIPPED WITH THERMAL OVERLOAD MOTOR PROTECTION, BALANCED AIR ROTOR & COMBUSTION AIR PROVING SAFETY PRESSURE SWITCH; PROVIDE REFLECTOR HANGERS, TURNBUCKLES, REFLECTOR AND ACCESSORIES FOR COMPLETE INSTALLATION
2. HEATER MAXIMUM CURRENT DRAW SHALL NOT EXCEED 30 AMPS
3. GAS PRESSURE SHALL BE MINIMUM 7" WC/ MAXIMUM 14" WC. HEATER SHALL BE COMPLETE WITH 36" LONG FLEXIBLE GAS CONNECTOR


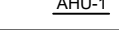
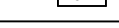
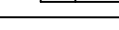
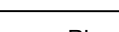
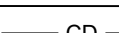

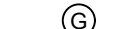
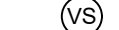

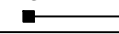

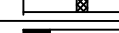

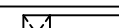
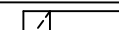
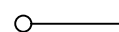
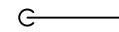
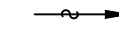

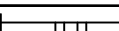
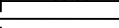
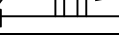


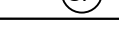
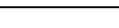
OPTIONS (SEE SCHEDULE ABOVE FOR APPLICABLE OPTIONS FROM LIST BELOW)

- A. 24 VOLT REMOTE WALL MOUNT THERMOSTAT & 24V CONTROL TRANSFORMER (AT HEATER TERMINAL BOARD)
- B. HANGER KIT
- C. 3'-0" POWER CORD WITH PLUG CAP
- D. VENT CAP ROOF TERMINATION (4"Ø)
- E. COMBUSTION AIR ROOF INLET (4"Ø)

GRAVITY VENTILATOR SCHEDULE														
NO	MAKE	MODEL	TYPE	DESCRIPTION	HT. IN.	THROAT SIZE			HOOD AREA (FT2)	MAX CFM	MAX APD IN. WC	WEIGHT LBS	SERVICE REFERENCE	OPTIONS
						LENGTH	WIDTH	MIN. AREA (FT2)						
RV-1	GREENHECK	GRSR-15	DUCTED	RELIA HOOD	11.25"	14"Ø	14"Ø	1.12	-	650	0.05"	20	MAU-2	A & C
GENERAL NOTES FOR ALL VENTILATORS														
1. ALL VENTILATORS SHALL BE SUPPLIED BY THE SAME MFR														
2. UNLESS NOTED OTHERWISE, ALL VENTILATORS SHALL BE ALUMINUM CONSTRUCTION AND SUPPLIED WITH BIRD SCREENS OF SAME MATERIAL AS THE VENTILATOR														
3. VENTILATOR FINISH COLOR SHALL BE SELECTED BY ARCHITECT UNLESS NOTED OTHERWISE														
4. TAPERED ROOF CURBS SHALL BE UTILIZED FOR SLOPE ROOF APPLICATIONS. THE M.C. TO VERIFY THE ROOF SLOPE														
5. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS														
OPTIONS (SEE SCHEDULE ABOVE FOR APPLICABLE OPTIONS FROM LIST BELOW)														
A. MOTOR OPERATED DAMPER- 24 VOLT MODULATING														
B. GRAVITY BACKDRAFT DAMPER														
C. 12" HIGH GALVANIZED STEEL INSULATED ROOF CURB														
D. 1" HOOD INSULATION														

INDIRECT-FIRED MAKE-UP AIR UNIT SCHEDULE		
		MAU-1
GENERAL DATA		
MAKE	GREENHECK	
MODEL	RV-25-12-SI-A-1	
ARRANGEMENT	END INTAKE WITH BOTTOM DISCHARGE & RECIRC	
SUPPLY FAN DATA		
CFM	2,225	
MIN O.A.	2,225	
ESP / TSP	1,007/1.42"	
BHP	0.77	
RPM	1311	
MHP	1-1/2	
COOLING CAPACITY DATA		
EAT DB/WB	90.9/76.0°F	
LAT DB/WB	57.7/57.7°F	
MBHT	152.3	
MBHS	79.3	
NOMINAL TONNAGE	12-1/2	
AMB. O.A. TEMP	95°F	
MIN O.A.T.	0°F	
COMPRESSOR QTY	INVERTER SCROLL	
COOLING STAGES	R-410A	
REFRIGERANT		
HOT GAS REHEAT		
EAT DB	57.7°F	
LAT DB MAX.	83.8°F	
CONTROL	MODULATING	
HEATING CAPACITY DATA		
TYPE	NATURAL GAS - INDIRECT	
INPUT MBH	300.0	
OUTPUT MBH	240.0	
ENTERING AIR TEMP (°F)	0°F	
LEAVING AIR TEMP (°F)	99.9°F	
TURNDOWN CONTROL	12-1	
ELECTRICAL DATA		
SERVICE	208-3-60	
MIN AMPACITY	53.2 A	
MAX FUSE SIZE	60.0 A	
MISCELLANEOUS DATA		
WEIGHT (LBS)	2,300	
OPTIONS	ALL APPLY	
GENERAL NOTES		
1. COORDINATE WITH SEQUENCE OF OPERATIONS FOR ADDITIONAL REQUIREMENTS		
OPTIONS (SEE SCHEDULE ABOVE FOR APPLICABLE OPTIONS FROM LIST BELOW)		
A. 2" MERV-8 THROW AWAY PLEATED FILTER		
B. FACTORY INSTALLED MOTORIZED 2-POSITION Q/A DAMPER OPEN-CLOSED		
C. SERVICE OUTLET (FACTORY INSTALLED AND WIRED)		
D. NON-FUSED DISCONNECT SWITCH		
E. DISCHARGE AIR TEMPERATURE SENSOR		
F. DIRECT DRIVE PLENUM BLOWER WITH VFD (CONSTANT VOLUME APPLICATION)		
G. 10-MINUTE CYCLE TIMER CONTROLS		
H. PHASE LOSS AND BROWN-OUT PROTECTION (AUTO RESTART)		
I. FREEZE/STAST		
J. MODULATING HOT GAS REHEAT WITH LOW AMBIENT HEAD PRESSURE CONTROL		
K. AUXILIARY EQUIPMENT CONTROL INTER-LOCK RELAY (I.E. EXHAUST FAN)		
L. SINGLE POINT POWER CONNECTION		
M. STAINLESS STEEL DRAIN PAN		
N. FACTORY UNIT CONTROLLER W/ REMOTE DISPLAY		
O. REMOTE WALL MOUNTED PROGRAMMABLE THERMOSTAT & HUMIDISTAT		
P. ALUMINUM DIRTY FILTER, REFRIGERANT PRESSURE AND SUPPLY FAN PROOF		
Q. ROTO CURB		
R. BOTTOM INLET OPENING & RECIRC DAMPER		

DIRECT-FIRED HEATING & VENTILATION UNIT SCHEDULE			
	MAU-2	MAU-3 & MAU-4	
GENERAL DATA			
MAKE	GREENHECK	GREENHECK	
MODEL	DGX-P116-H22-MF	DGX-P130-H35-MF2	
ARRANGEMENT	HORIZONTAL W/ RECIRC	HORIZONTAL	
SUPPLY FAN DATA			
CFM	3,600	20,000	
OUTDOOR AIR	720	20,000	
ESP/TSP	0.60/1.38"	0.30/1.15"	
PM1	1593	8.7	
PM10	1593	1196	
MHP	2.0	10.0	
HEATING CAPACITY DATA			
TYPE	NATURAL GAS	NATURAL GAS	
CAPACITY MBH IN/OUT	190.0 / 175.0	1643.5 / 1512.0	
EAT / LAT	50.0° F / 95.0° F	0.0° F / 70.0° F	
STAGES	30:1	30:1	
REQUIRED GAS PRESSURE			
ELECTRICAL DATA			
SERVICE	208-3-40	208-3-60	
MCAMOP	10.1 / 15.0	40.5 / 70.0	
MISCELLANEOUS DATA			
WEIGHT (LBS)	1,400	2,700	
GENERAL NOTES			
1. COORDINATE WITH SEQUENCE OF OPERATIONS FOR ADDITIONAL REQUIREMENTS			
2. OUTDOOR HORIZONTAL DIRECT NATURAL GAS-FIRED MAKE-UP AIR UNIT WITH GALVANIZED CABINET INSULATION COATED WITH PERMATECTOR AND SPARK IGNITION SYSTEM. UNIT SHALL BE COMPLETE WITH THE FOLLOWING: ROOF CURB, CONTROL CENTER, REMOTE CONTROL PANEL, DISCONNECT SWITCH, MOTOR STARTER, ELECTRICAL CONVENIENCE OUTLET, DISCHARGE AIR TEMPERATURE SENSOR, INLET AIR FLOW SENSOR, FIRESTART, FREEZESTART WITH TIME DELAY, 4" O/D DAMPER, INLET HOOD WITH ALUMINUM MESH, V-BANK FILTER SECTION WITH 2" MERV-8 FILTERS, INTERNAL BLOWER/MOTOR ISOLATION, DIRECTOR DRIVE MIXED FLOW PLENUM FAN WITH VFD, SERVICE OUTLET, DIRTY FILTER INDICATOR, STAINLESS STEEL MIXING PLATES AND CAST ALUMINUM BURNERS, HIGH AND LOW GAS PRESSURE SWITCHES & UV FLAME SENSOR. UNIT SHALL HAVE ELECTRONIC MODULATING GAS CONTROLS & MAXITROL 14			
3. UNIT SHALL ALSO BE COMPLETE WITH A 30 SECOND PRE-PURGE CYCLE (ADJUSTABLE)			
4. MAU-2 ONLY SHALL BE COMPLETE WITH BOTTOM INLET OPENING & RECIRC DAMPER			

ES	DUCTWORK NOTES	HVAC SYMBOL LEGEND	
			EQUIPMENT SYMBOL (NEW)
INDICATE MECHANICAL AND WORK	1. ALL DUCTWORK SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE," UNLESS NOTED OTHERWISE. DUCTWORK SHALL BE GALVANIZED STEEL FOR 2" SMACNA PRESSURE CLASSIFICATION. REGARDLESS OF PRESSURE CLASS, DUCTWORK SHALL BE FABRICATED OF MINIMUM 26 GAUGE SHEET METAL.		EQUIPMENT SYMBOL (EXISTING)
			ROOM NUMBER
BE INSTALLED BEING AND	2. FLEXIBLE DUCTWORK SHALL BE LISTED AND TESTED IN ACCORDANCE WITH UL 181 AND RATED FOR THE SMACNA PRESSURE CLASSIFICATION IN WHICH IT IS APPLIED. FLEXIBLE DUCTWORK SHALL NOT EXCEED FIVE FEET IN LENGTH.		AIR DISTRIBUTION DEVICE
			REFRIGERANT SUCTION PIPING
APPLIANCES, AGENCY FOR MECHANICAL AND ACCORDANCE	3. ALL DUCTWORK SHALL HAVE TRANSVERSE JOINTS AND LONGITUDINAL SEAMS SEALED WITH A UL LISTED DUCT SEALANT. UNLESS NOTED OTHERWISE, DUCTWORK SHALL BE INSULATED IN ACCORDANCE WITH THE FOLLOWING NOTATION WITH 1-1/2" THICK FLEXIBLE FIBER GLASS DUCT WRAP INSULATION WITH A FOIL FACED KRAFT PAPER VAPOR SEAL AND HAVE A "K" FACTOR OF 0.30 AT 75°F MEAN TEMPERATURE.		REFRIGERANT LIQUID PIPING
			A/C CONDENSATE LINE
MECHANICAL ENDEPENDENTLY DUCTURE.	4. WHEN NOTED, HVAC DUCTWORK SHALL BE INTERNALLY INSULATED FOR PROTECTIVE OR ACOUSTICAL CONSIDERATIONS WITH FIBER GLASS DUCT LINER INSULATION FACED WITH A BLACK FIRE-RESISTANT COATING AGAINST THE AIRSTREAM. HVAC DUCTWORK THAT IS INTERNALLY INSULATED DOES NOT NEED TO BE EXTERNALLY INSULATED. DUCTWORKS NOTED INDICATE FREE AREA DIMENSIONS. ACTUAL DUCT SIZE MUST BE INCREASED TO ACCOUNT FOR THE INSULATION LINER.		THERMOSTAT / HUMIDISTAT
			GAS SENSOR (CO/NO2)
SHALL BE AT LEAST TEN FEET OR ANY SETS OR	5. RETURN AIR DUCTWORK IN PLENUM RETURN SYSTEMS SHALL BE INTERNALLY INSULATED FOR ACOUSTICAL CONSIDERATIONS WITH 1/2" THICK DUCT LINER INSULATION.		VARIABLE SPEED CONTROLLER
			MANUAL BALANCING DAMPER
DOPTO TO TO OR OF 24" OR	6. ALL EXHAUST AIR AND RELIEF AIR DUCTWORK WITHIN THE BUILDING FROM THE POINT OF TERMINATION AT THE BUILDING ENVELOPE TO A POINT TEN FEET UPSTREAM SHALL BE INSULATED WITH 1-1/2" THICK FLEXIBLE FIBER GLASS DUCT WRAP INSULATION.		MOTOR OPERATED DAMPER
			DUCT TYPE SMOKE DETECTOR
ATIONS SHALL BE PIPING FIRE RETRATED, AS SO AS IS BUILDING	7. SUPPLY AND RETURN AIR DUCTWORK EXTERIOR TO THE BUILDING SHALL BE 4" SMACNA PRESSURE CLASSIFICATION PAINTABLE GALVANIZED STEEL WITH 2" THICK INTERNAL DUCTLINER INSULATION.		DUCTWORK FLEXIBLE CONNECTION
			POSITIVE PRESSURE DUCT RISER
CONTRACTOR AND AND IS INSTALLATION OF NO OTHERS SHALL	8. SUPPLY AND RETURN AIR DUCTWORK IN VENTILATED ATTIC / TRUSS SPACE SHALL BE INSULATED WITH EITHER 1-1/2" THICK FLEXIBLE FIBERGLASS DUCT WRAP INSULATION OR 1" THICK INTERNAL DUCTLINER INSULATION.		NEGATIVE PRESSURE DUCT RISER
			POSITIVE PRESSURE DUCT DROP
CONTRACTOR COVAL, CEILINGS POPE OF CEILING CONDITION.	9. DUCTWORK PENETRATIONS THROUGH FIRE RESISTANT RATED ASSEMBLIES SHALL BE MADE WITH UL LABELED FIRE DAMPERS. DAMPER RATING SHALL BE 1-1/2 HOURS FOR 1" OR 2 HOUR RATED ASSEMBLIES AND 3 HOUR RATED 2 HOUR RATED ASSEMBLIES. A DUCT ACCESS DOOR SHALL BE INSTALLED FOR FUSIBLE LINK REPAIR FOR EACH FIRE DAMPER.		NEGATIVE PRESSURE DUCT DROP
			PIPE RISER SECTION
DESIGN OF HVAC HAVC BILITY OF LL BE ADDITIONAL ED AS THE EQUIPMENT SHALL NOT ORT IS	10. THE AIR DISTRIBUTION DESIGN IS BASED ON LIMITED INFORMATION REGARDING SHAPES AND DEPTHS OF STRUCTURAL ELEMENTS AND CEILING HEIGHTS AND LAYOUT. INSTALLATION CONTRACTOR TO FIELD COORDINATE FOR ADEQUATE CLEARANCE WITH MINOR DEVIATIONS IN LAYOUT AND DUCT SIZES AS REQUIRED. REVISED DUCT SIZES SHALL PROVIDE EQUIVARIANT DUCT FREE AREA AS INDICATED. MAXIMUM AIR FLOW FOR ROUND DUCTWORK SHALL BE AS FOLLOWS: 4" DIA. 40 CFM 6" DIA. 100 CFM 8" DIA. 230 CFM 10" DIA. 400 CFM 12" DIA. 700 CFM 14" DIA. 1000 CFM 16" DIA. 1500 CFM		PIPE DROP
			AIRFLOW INDICATOR
BE INSTALLATION WITH THE HVAC SYSTEM SHALL WHEREVER TO BE USED FIELD UP TO AS TO ALL ALSO USTIBLES	11. AIR DISTRIBUTION SYSTEMS SHALL BE BALANCED IN ACCORDANCE WITH AABC OR NEBB STANDARDS. REFER TO SPECIFICATIONS FOR ADDITIONAL BALANCING REQUIREMENTS.		1/2 HR TYPE B FIRE DAMPER W/ DUCT ACCESS DOOR
			INCLINED DUCT RISE IN DIRECTION OF AIR FLOW
			INCLINED DUCT DROP IN DIRECTION OF AIR FLOW
			CODED NOTE
			CONNECT TO EXISTING (TIE-IN)
			SPACE PRESSURE SENSOR
		HVAC ABBREVIATIONS LEGEND	
		S/A	SUPPLY AIR
		R/A	RETURN AIR
		O/A	OUTDOOR AIR
		REL/A	RELIEF AIR
		E/A	EXHAUST AIR
		GC	GENERAL CONTRACTOR
		MC	MECHANICAL CONTRACTOR (HVAC)
		PC	PLUMBING CONTRACTOR
		EC	ELECTRICAL CONTRACTOR
		MFR	MANUFACTURER
		AF	ABOVE FINISH FLOOR
		TYP	TYPICAL
		RV	ROOF/RELIEF VENTILATOR
		VAV	VARIABLE AIR VOLUME TERMINAL UNIT
		EF	EXHAUST FAN
		VF	VENTILATION FAN
		EH	ELECTRIC HEATER
		AC	DUCTLESS SPLIT A/C UNIT
		HP	HEAT PUMP (AIR COOLED)
		RTU	ROOFTOP UNIT
		MAU	MAKE-UP AIR UNIT
		RH	INFRARED RADIANT HEATER
		HGM	HAZARDOUS GAS MONITOR

ELECTRIC HEATER SCHEDULE											
NO	MAKE	MODEL	TYPE	HEAT CAPACITY		BLOWER		ELECTRICAL VOLT/PH/Hz	AMPS	WT LBS	OPTIONS
				WATTS	BTUH	CFM	HP				
EH-1	MARKEL	CV6012X	RADIANT COVE	600	2048	-	-	120-1-60	5.0	10.0	C & E
EH-2	MARKEL	J332TD-RP	WALL HEATER	3000	10239	175	-	208-3-60	8.3	30.0	A/D & H

OPTIONS (SEE SCHEDULE ABOVE FOR APPLICABLE OPTIONS FROM LIST BELOW)

A. INTEGRAL THERMOSTAT (TAMPERPROOF)	H. SURFACE MOUNTING FRAME
B. INTEGRAL THERMOSTAT (KNOB-OPERATED)	I. T-BAR MOUNTING FRAME
C. REMOTE WALL MOUNTED LINE VOLTAGE THERMOSTAT	J. 24V THERMOSTAT
D. POWER DISCONNECT SWITCH	K. LINE VOLTAGE THERMOSTAT
E. HANGING BRACKET	L. SUMMER FAN SWITCH
F. AIR FLOW SWITCH	M. DISPOSABLE FILTERS
G. RECESS MOUNTING FRAME	

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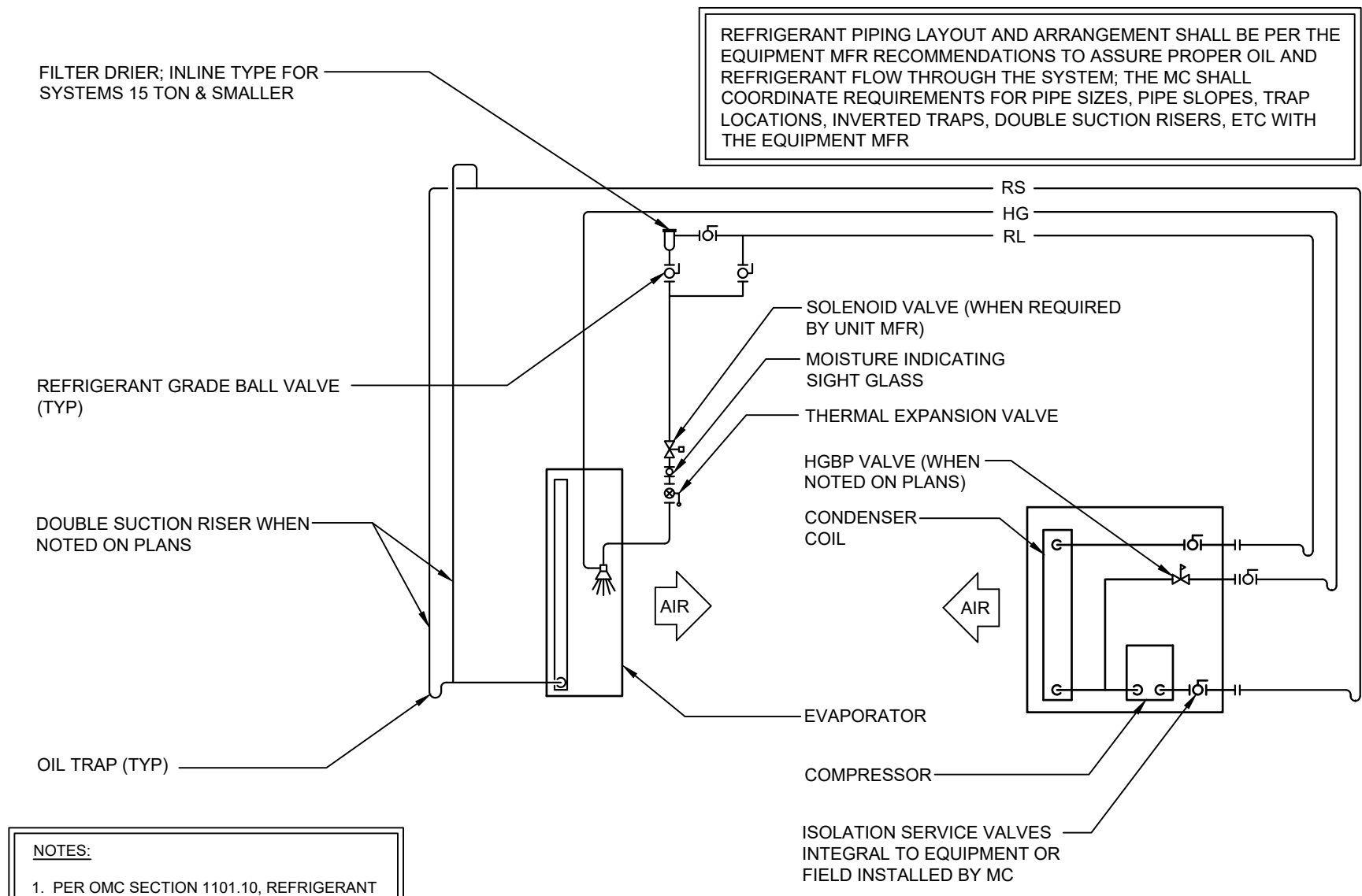
600 MARKET AVENUE NORTH
CANTON, OHIO

STATE OF OHIO
DAVID
I.
PATTERSON
11150
REGISTERED ARCHITECT
DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
HVAC SCHEDULES

COMM	21161-B
DATE	02-01-2024

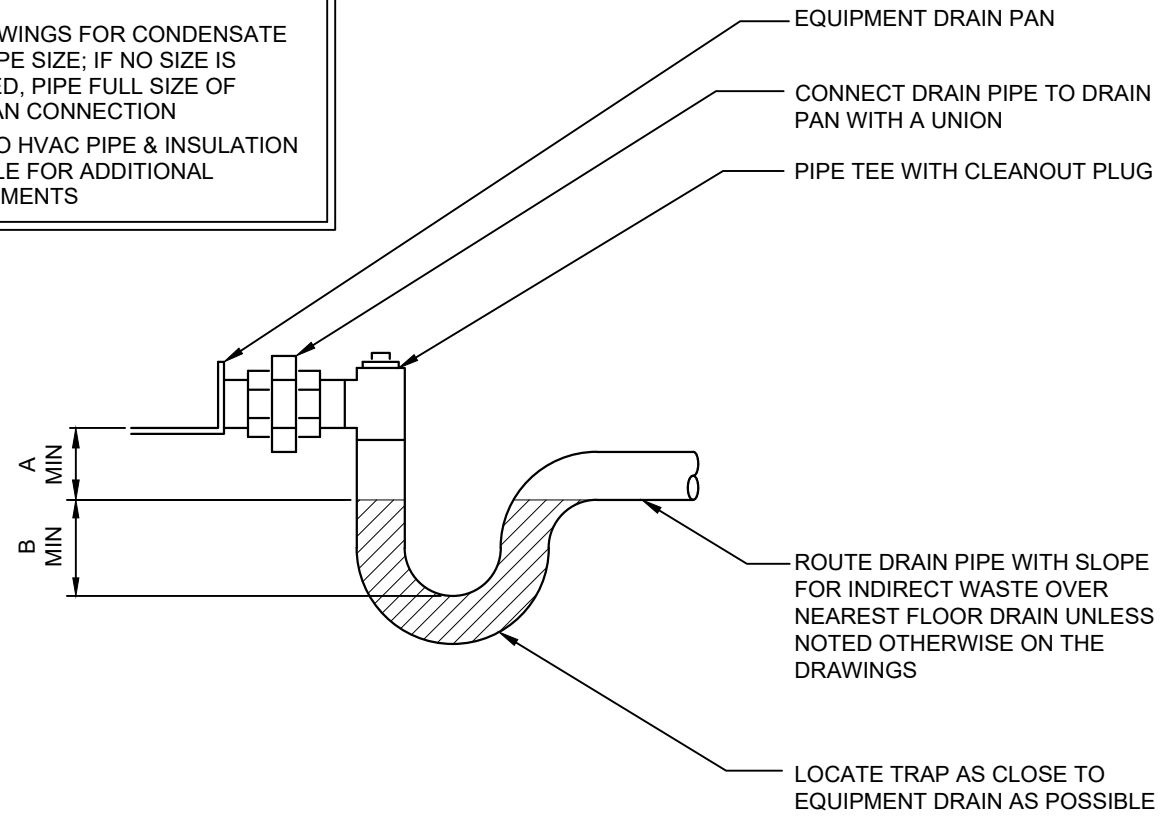
DWG
H-3.1



TYPICAL REFRIGERANT PIPING DETAIL
NOT TO SCALE

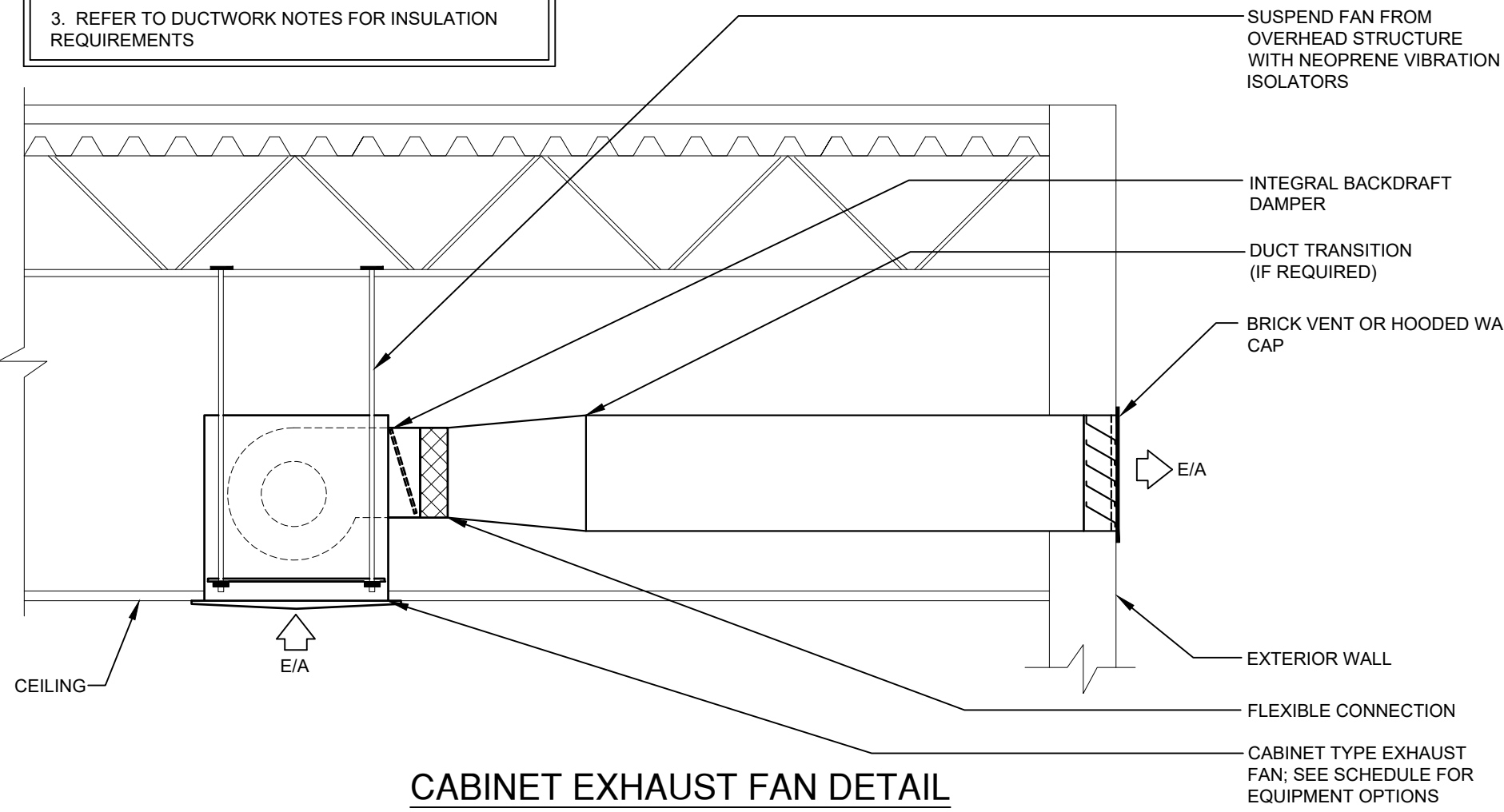
TRAP DIMENSIONS		
DRAIN CONNECTION LOCATION	A	B
SUCTION SIDE OF FAN	3"	2"
DISCHARGE SIDE OF FAN	1-1/2"	3-1/2"

- NOTE:
- SEE DRAWINGS FOR CONDENSATE DRAIN PIPE SIZE. IF NO SIZE IS INDICATED, PIPE FULL SIZE OF DRAIN PAN CONNECTION
 - REFER TO HVAC PIPE & INSULATION SCHEDULE FOR ADDITIONAL REQUIREMENTS

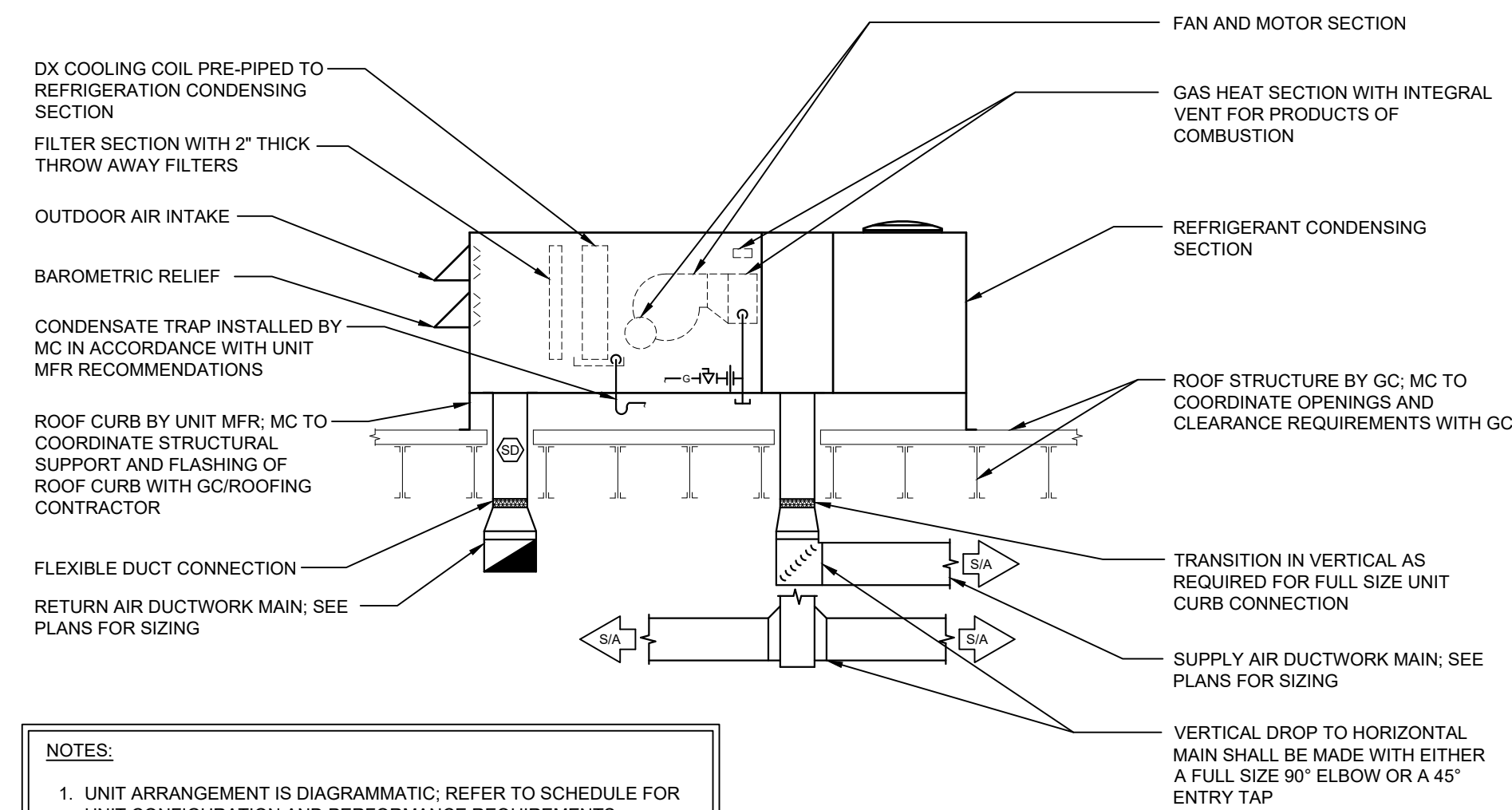


A/C CONDENSATE TRAP DETAIL
NOT TO SCALE

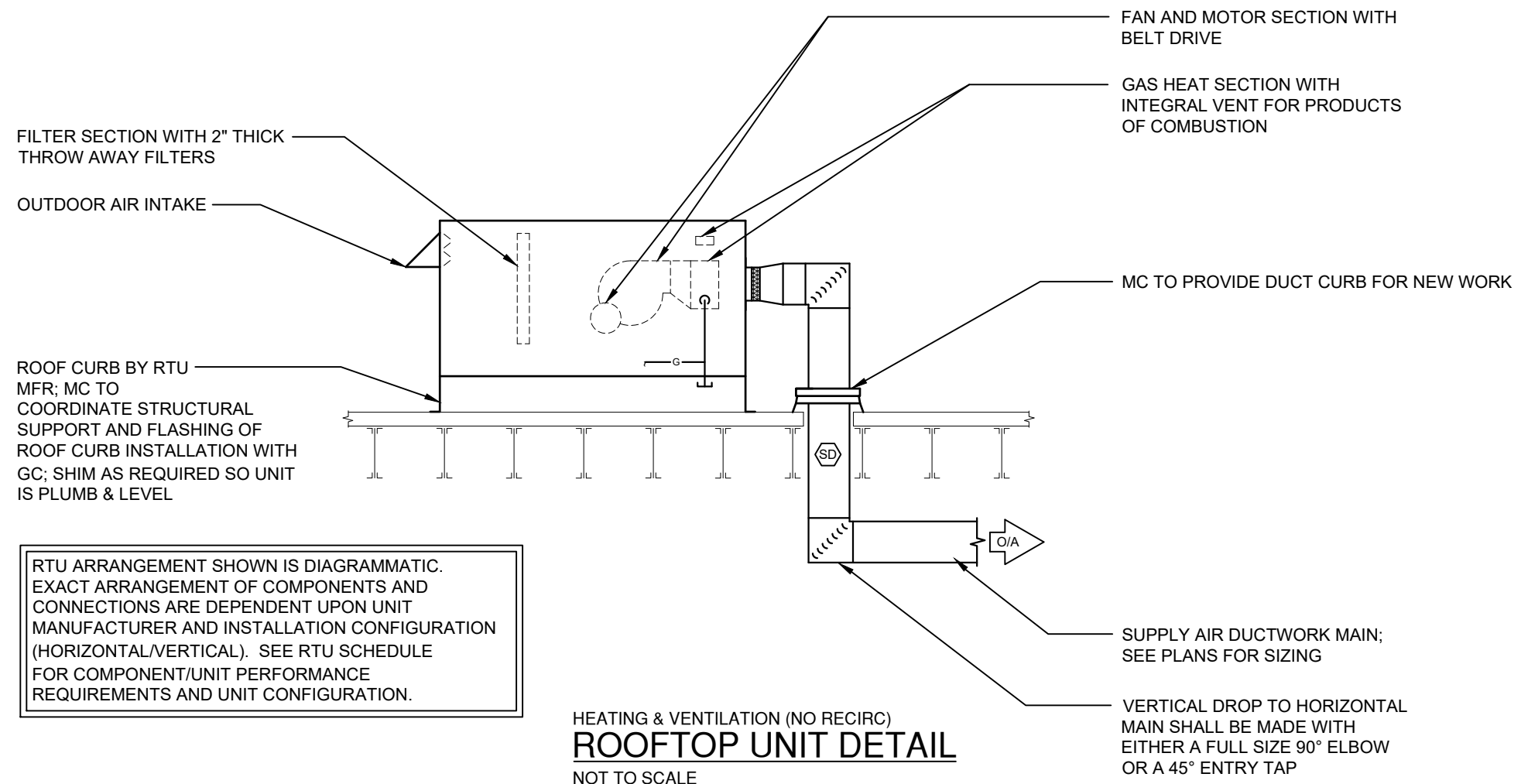
- NOTES:
- INSTALLATION OF CABINET FAN VENTED THROUGH THE ROOF SHALL BE SIMILAR
 - REFER TO FAN SCHEDULE FOR SPECIFIC WALL OR ROOF TERMINATION TYPE
 - REFER TO DUCTWORK NOTES FOR INSULATION REQUIREMENTS



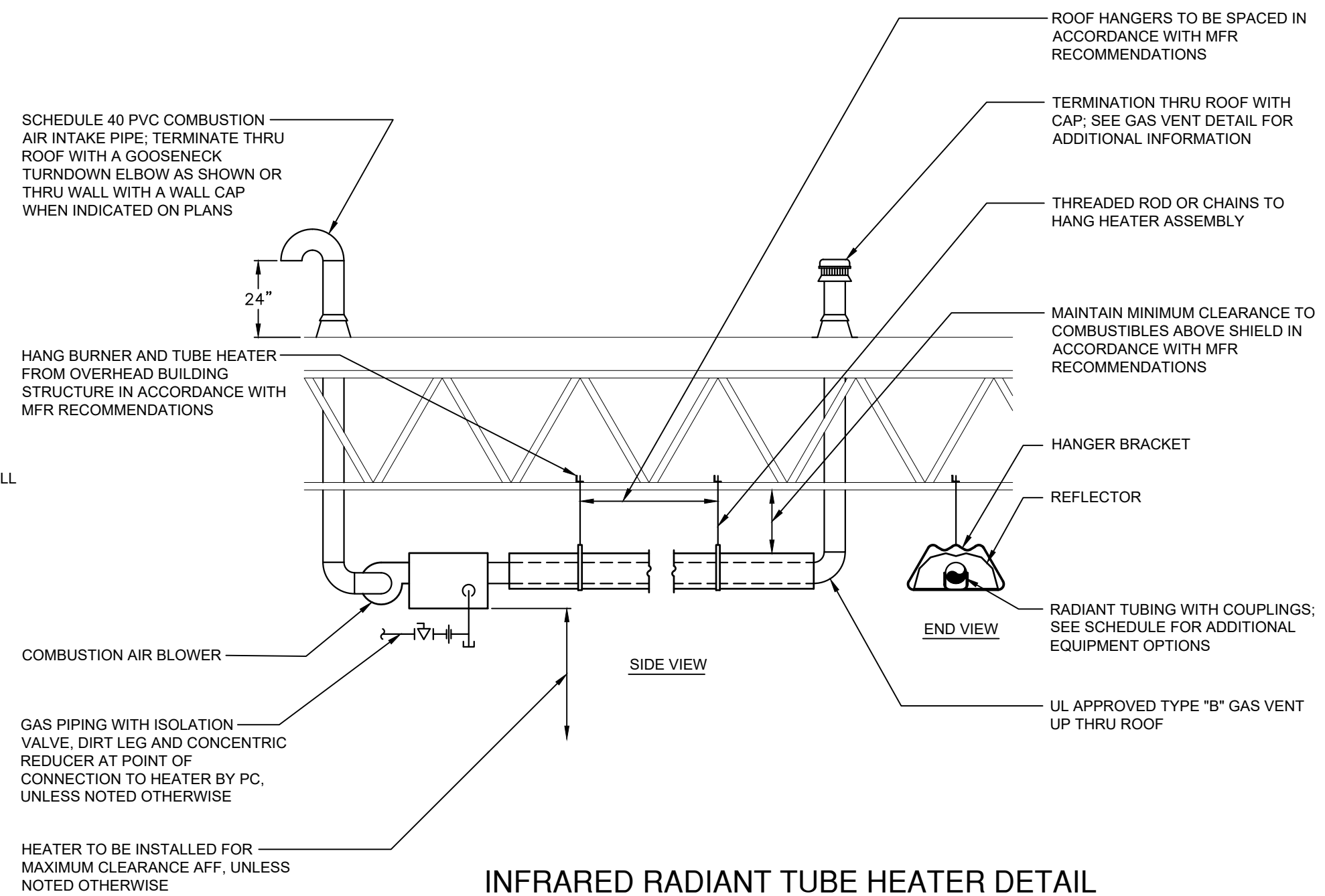
CABINET EXHAUST FAN DETAIL
NOT TO SCALE



ROOF-TOP UNIT DETAIL
NOT TO SCALE



HEATING & VENTILATION (NO RECIRC)
ROOFTOP UNIT DETAIL
NOT TO SCALE



INFRARED RADIANT TUBE HEATER DETAIL
NOT TO SCALE

SPLIT A/C UNIT SEQUENCE OF OPERATION

GENERAL: A SEVEN DAY ELECTRONIC PROGRAMMABLE THERMOSTAT PROVIDED BY THE UNIT MANUFACTURER FOR FIELD INSTALLATION SHALL START/STOP THE SUPPLY FAN BASED ON AN OCCUPANCY SCHEDULE AND AUTOMATICALLY DETERMINE HEATING OR COOLING MODE OF OPERATION. A THERMOSTAT DEADBAND SHALL BE PROVIDED BETWEEN HEATING AND COOLING SEQUENCES.

OCCUPIED MODE: THE UNIT SUPPLY FAN SHALL START AND OPERATE CONTINUOUSLY WITH THE FAN ALREADY RUNNING. WHENEVER SPACE TEMPERATURE RISES ABOVE THE THERMOSTAT COOLING SET POINT, THE SPACE THERMOSTAT SHALL START THE OUTDOOR HEAT PUMP UNIT AND OPEN THE REFRIGERATION LIQUID LINE SOLENOID VALVE. WHEN THE THERMOSTAT SET POINT IS SATISFIED, THE REFRIGERATION LIQUID LINE SOLENOID VALVE SHALL CLOSE AND THE OUTDOOR HEAT PUMP UNIT SHALL CONTINUE TO OPERATE UNTIL SHUTTING OFF ON LOW SUCTION PRESSURE.

WHENEVER SPACE TEMPERATURE FALLS BELOW THE THERMOSTAT HEATING SET POINT, SIMILARLY, THE OUTDOOR HEAT PUMP SHALL START AND OPERATE UNTIL THE THERMOSTAT SETPOINT IS SATISFIED.

UNOCCUPIED MODE: UPON A CALL FOR COOLING OR HEATING, THE SAME SEQUENCES SHALL BE REPEATED AS FOR THE OCCUPIED MODE, BUT THE SUPPLY FAN SHALL CYCLE ON/OFF BY THE SPACE THERMOSTAT. THE MOTORIZED OUTDOOR AIR DAMPER SHALL BE CLOSED.

THE ASSOCIATED VENTILATION FAN VF-1 SHALL BE INTERLOCKED WITH THE UNIT TO OPERATE WHENEVER THE SUPPLY FAN IS "ON" AND SHUT-DOWN WHENEVER THE SUPPLY FAN IS "OFF".

VEHICLE EXHAUST SYSTEM SEQUENCE OF OPERATION

CO/NO2 GAS DETECTION >= 25PPM: THE REMOTE WALL MOUNTED HAZARDOUS GAS MONITOR SHALL START THE RESPECTIVE EXHAUST FANS AND MAKE-UP AIR UNIT UNTIL THE GAS LIMITS ARE WITHIN ACCEPTABLE RANGE AND THEN THE EXHAUST FANS AND MAKE-UP AIR UNIT SHALL DE-ENERGIZE.

EXISTING GARAGE: EF-2, EF-17, EF-18 & MAU-3
NEW GARAGE: EF-3, EF-4, EF-5 & MAU-4

A UNITARY CONTROLLER BY THE UNIT MANUFACTURER SHALL START/STOP THE MAKE-UP AIR UNIT SUPPLY FAN AND SEQUENCE THE HEATING AND VENTILATION CYCLE TO OPERATE CONTINUOUSLY. A REMOTE WALL MOUNTED PANEL FOR EACH MAKE-UP AIR UNIT PROVIDED BY THE MANUFACTURER SHALL DISPLAY ANY ALARM CONDITIONS, DIRTY FILTER CONDITION AND ALLOW FOR MANUAL OVER-RIDE OF THE DISCHARGE AIR TEMPERATURE.

UPON ACTIVATION THE OUTDOOR AIR DAMPER ON THE MAKE-UP AIR UNIT SHALL BE FULL OPEN, THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY AND THE GAS VALVE SHALL MODULATE AS NECESSARY TO MAINTAIN A DISCHARGE AIR TEMPERATURE OF 65-70°F (ADJUSTABLE) AS SENSED BY A DUCT MOUNTED THERMOSTAT.

STANDARD UNIT PACKAGED CONTROLS SHOULD INCLUDE 30 SECOND PRE-PURGE CYCLE, OUTDOOR AIR DAMPER, GAS BURNER CONTROLS, TEMPERATURE HIGH LIMIT SAFETIES AND GAS BURNER SAFETIES. A LOW LIMIT FREEZE STAT IN THE UNIT DISCHARGE SHALL SHUT DOWN THE UNIT, CLOSE THE OUTDOOR AIR DAMPER AND SIGNAL AN ALARM WHENEVER THE DISCHARGE TEMPERATURE DROPS BELOW 30°F (ADJUSTABLE).

A DUCT TYPE SMOKE DETECTOR SUPPLIED BY THE EC FOR INSTALLATION IN THE SUPPLY AIR DUCT BY THE MC SHALL BE WIRED TO THE EXISTING FIRE ALARM PANEL BY THE EC AND SHALL SHUTDOWN THE UNIT WHENEVER PARTICLES OF COMBUSTION ARE SENSED.

100% OA MAKE-UP AIR UNIT (MAU-1) SEQUENCE OF OPERATION

GENERAL: THE ROOFTOP MAKE-UP AIR UNIT SHALL START/STOP AND SEQUENCE THE COOLING, REHEAT AND HEATING STAGES BY THE FACTORY UNIT CONTROLLER. THE UNIT CONTROLLER SHALL BE COMPLETE WITH LCD DISPLAY FOR USER SET POINT ADJUSTMENT AND MONITORING UNIT OPERATION. STANDARD UNIT PACKAGED CONTROLS SHALL INCLUDE AN OUTDOOR AIR DAMPER POSITIONER, DX COOLING SYSTEM CONTROLS, GAS BURNER CONTROLS, TEMPERATURE HIGH LIMIT AND TEMPERATURE LOW LIMIT SAFETIES, REFRIGERATION SAFETIES AND GAS BURNER SAFETIES.

A DUCT TYPE SMOKE DETECTOR SUPPLIED BY THE EC FOR INSTALLATION IN THE SUPPLY AIR DUCT BY THE MC SHALL BE WIRED TO THE EXISTING FIRE ALARM PANEL BY THE EC AND SHALL SHUTDOWN THE UNIT WHENEVER PARTICLES OF COMBUSTION ARE SENSED.

OCCUPIED MODE: THE UNIT O/A DAMPER SHALL OPEN AND THE SUPPLY FAN SHALL START AND RUN CONTINUOUSLY AT A CONSTANT SPEED. EXHAUST FAN EF-11 & EF-12 SHALL BE INTER-LOCKED WITH MAU-1 TO ALSO RUN CONTINUOUSLY.

DISCHARGE AIR CONTROL: THE UNIT CONTROLLER SHALL MAINTAIN AN INITIAL DISCHARGE AIR TEMPERATURE OF 70°F (ADJUSTABLE) SIMILAR TO THE SPACE TEMPERATURE. UPON A CALL FOR COOLING OR HEATING FROM THE SPACE THERMOSTAT OR HUMIDISTAT, THE DISCHARGE AIR TEMPERATURE SHALL BE OVERRIDDEN UNTIL SPACE SET POINT IS SATISFIED.

COOLING: THE UNIT CONTROLLER SHALL STAGE THE DX COOLING (INVERTER SCROLL) AS REQUIRED TO LOWER THE DISCHARGE AIR TEMPERATURE SET POINT OR TO MAINTAIN SPACE TEMPERATURE OF 75°F (ADJUSTABLE). MECHANICAL COOLING SHALL LOCK-OUT WHEN OUTDOOR AIR TEMPERATURE IS < 55°F (ADJUSTABLE).

DEHUMIDIFICATION: THE UNIT CONTROLLER SHALL MEASURE THE SPACE HUMIDITY THEN STAGE THE DX COOLING AND MODULATE THE HOT GAS REHEAT AS REQUIRED TO MAINTAIN A HUMIDITY SETPOINT OF 50-55% RH (ADJUSTABLE).

HEATING: THE UNIT CONTROLLER SHALL MODULATE THE GAS VALVE AS REQUIRED TO RAISE THE DISCHARGE AIR TEMPERATURE SETPOINT OR TO MAINTAIN SPACE TEMPERATURE OF 70°F (ADJUSTABLE). GAS HEATING SHALL LOCK-OUT WHEN OUTDOOR AIR TEMPERATURE IS > 70°F (ADJUSTABLE).

UNOCCUPIED MODE: THE UNIT O/A DAMPER SHALL CLOSE AND THE SUPPLY FAN SHALL SHUTDOWN. EXHAUST FAN EF-11 & EF-12 SHALL ALSO SHUTDOWN. THE RECIRC DAMPER SHALL OPEN. THE UNIT CONTROLLER SHALL CYCLE THE SUPPLY FAN ON/OFF, STAGE THE DX COOLING/REHEAT AND MODULATE THE GAS HEATING AS REQUIRED TO MAINTAIN A NIGHT SETUP TEMPERATURE OF 80°F, 50-55% RH (ADJUSTABLE) AND NIGHT SETBACK OF 65°F (ADJUSTABLE) UNTIL SPACE SET POINT IS SATISFIED.

HEATING ONLY ROOF-TOP UNIT (MAU-2) SEQUENCE OF OPERATION

GENERAL: THE ROOFTOP MAKE-UP AIR UNIT SHALL START/STOP AND SEQUENCE THE HEATING STAGES BY THE FACTORY UNIT CONTROLLER. THE UNIT CONTROLLER SHALL BE COMPLETE WITH LCD DISPLAY FOR USER SET POINT ADJUSTMENT AND MONITORING UNIT OPERATION. STANDARD UNIT PACKAGED CONTROLS SHALL INCLUDE AN OUTDOOR AIR DAMPER POSITIONER, GAS BURNER CONTROLS, TEMPERATURE HIGH LIMIT AND TEMPERATURE LOW LIMIT SAFETIES AND GAS BURNER SAFETIES.

A DUCT TYPE SMOKE DETECTOR SUPPLIED BY THE EC FOR INSTALLATION IN THE SUPPLY AIR DUCT BY THE MC SHALL BE WIRED TO THE EXISTING FIRE ALARM PANEL BY THE EC AND SHALL SHUTDOWN THE UNIT WHENEVER PARTICLES OF COMBUSTION ARE SENSED.

OCCUPIED MODE: THE UNIT O/A DAMPER SHALL OPEN TO 20%. THE RECIRC DAMPER SHALL OPEN TO 80% AND THE SUPPLY FAN SHALL START AND RUN CONTINUOUSLY AT A CONSTANT SPEED.

THE SPACE PRESSURE SENSOR SHALL MODULATE THE 24V MOTOR-OPERATED DAMPER AS REQUIRED TO MAINTAIN A SLIGHTLY POSITIVE PRESSURE WITHIN THE SPACE AT ALL TIMES.

DISCHARGE AIR CONTROL: THE UNIT CONTROLLER SHALL MAINTAIN AN INITIAL DISCHARGE AIR TEMPERATURE OF 65-70°F (ADJUSTABLE) SIMILAR TO THE SPACE TEMPERATURE. UPON A CALL FOR HEATING FROM THE SPACE THERMOSTAT, THE DISCHARGE AIR TEMPERATURE SHALL BE OVERRIDDEN UNTIL SPACE SET POINT IS SATISFIED.

HEATING: THE UNIT CONTROLLER SHALL MODULATE THE GAS VALVE AS REQUIRED TO RAISE THE DISCHARGE AIR TEMPERATURE SETPOINT OR TO MAINTAIN SPACE TEMPERATURE OF 70°F (ADJUSTABLE). GAS HEATING SHALL LOCK-OUT WHEN OUTDOOR AIR TEMPERATURE IS > 70°F (ADJUSTABLE).

UNOCCUPIED MODE: THE UNIT O/A DAMPER SHALL CLOSE, THE SUPPLY FAN SHALL SHUTDOWN AND THE RECIRC DAMPER SHALL OPEN. THE UNIT CONTROLLER SHALL CYCLE THE SUPPLY FAN ON/OFF AND MODULATE THE GAS HEATING AS REQUIRED TO MAINTAIN A NIGHT SETBACK OF 65°F (ADJUSTABLE) UNTIL SPACE SET POINT IS SATISFIED. THE O/A DAMPER SHALL OPEN TO 20% FOR COMBUSTION AIR WHENEVER THE DIRECT-FIRED GAS BURNER IGNITES.

REVISIONS:

STATE OF OHIO
S. A. LLOYD
E-65539
REGISTERED
PROFESSIONAL ENGINEER

HEI
ENGINEERING GROUP, INC.
443 WEST LIBERTY STREET
WOOSTER, OHIO 44691
330-262-0042
www.hei-engineering.com
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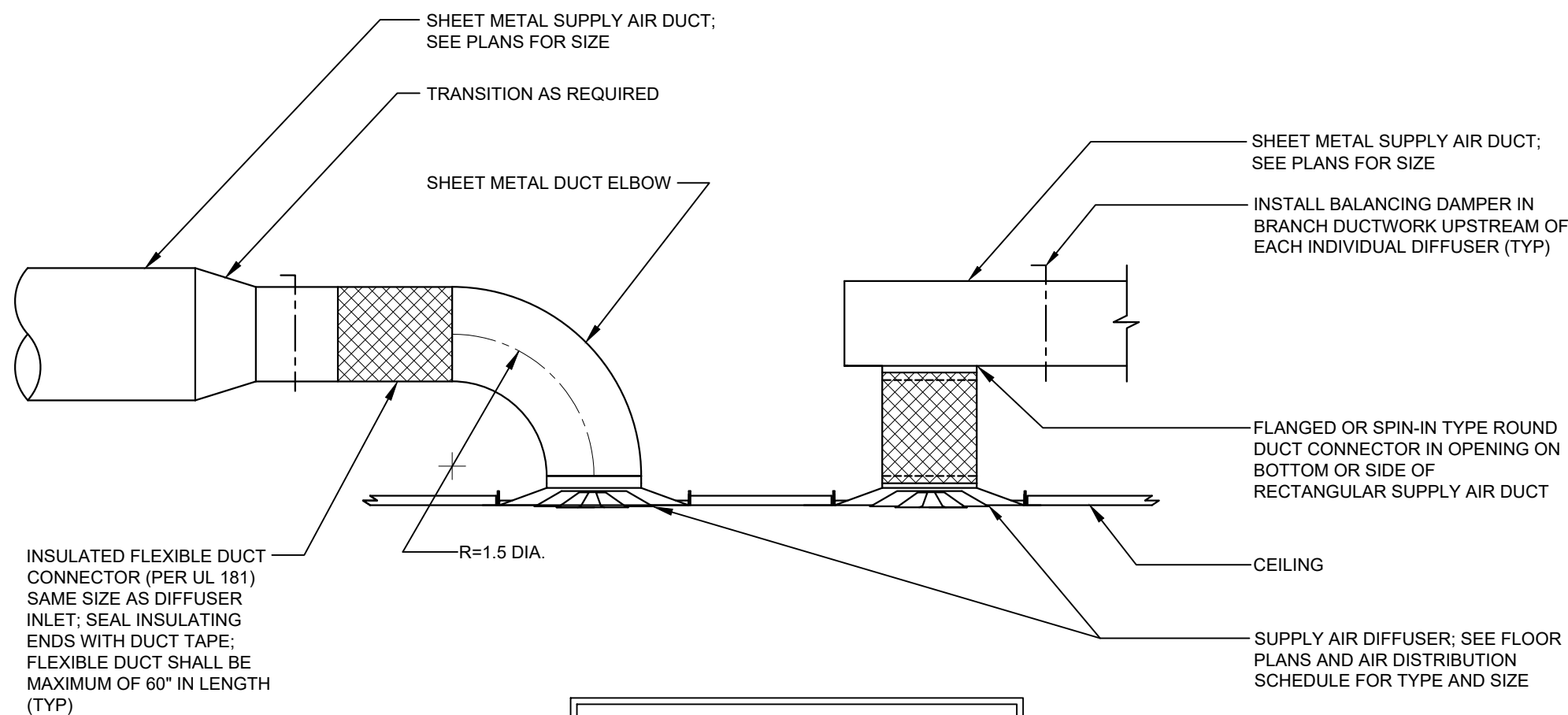
MOTTED MEADOWS
ARCHITECTS
GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD., NE
CANTON, OHIO
600 MARKET AVENUE NORTH
CANTON OHIO 44702

STATE OF OHIO
DAVID I. PATTERSON
11150
REGISTERED ARCHITECT
DAVID I. PATTERSON
LICENSE #11150
EXPIRATION DATE
12-31-2025

THIS DWG :
HVAC DETAILS

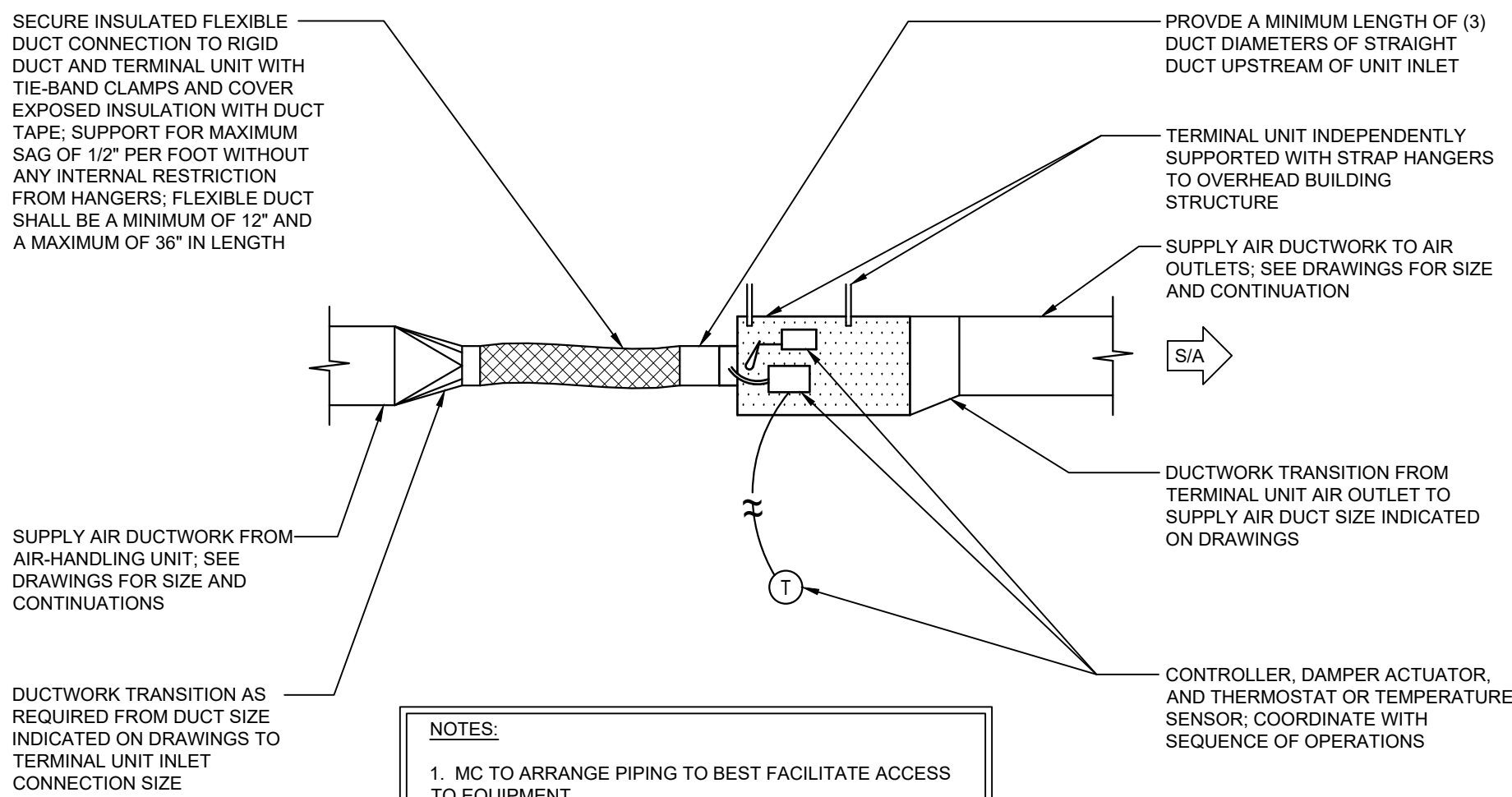
COMM 21161-B
DATE 02-01-2024

DWG
H-3.2



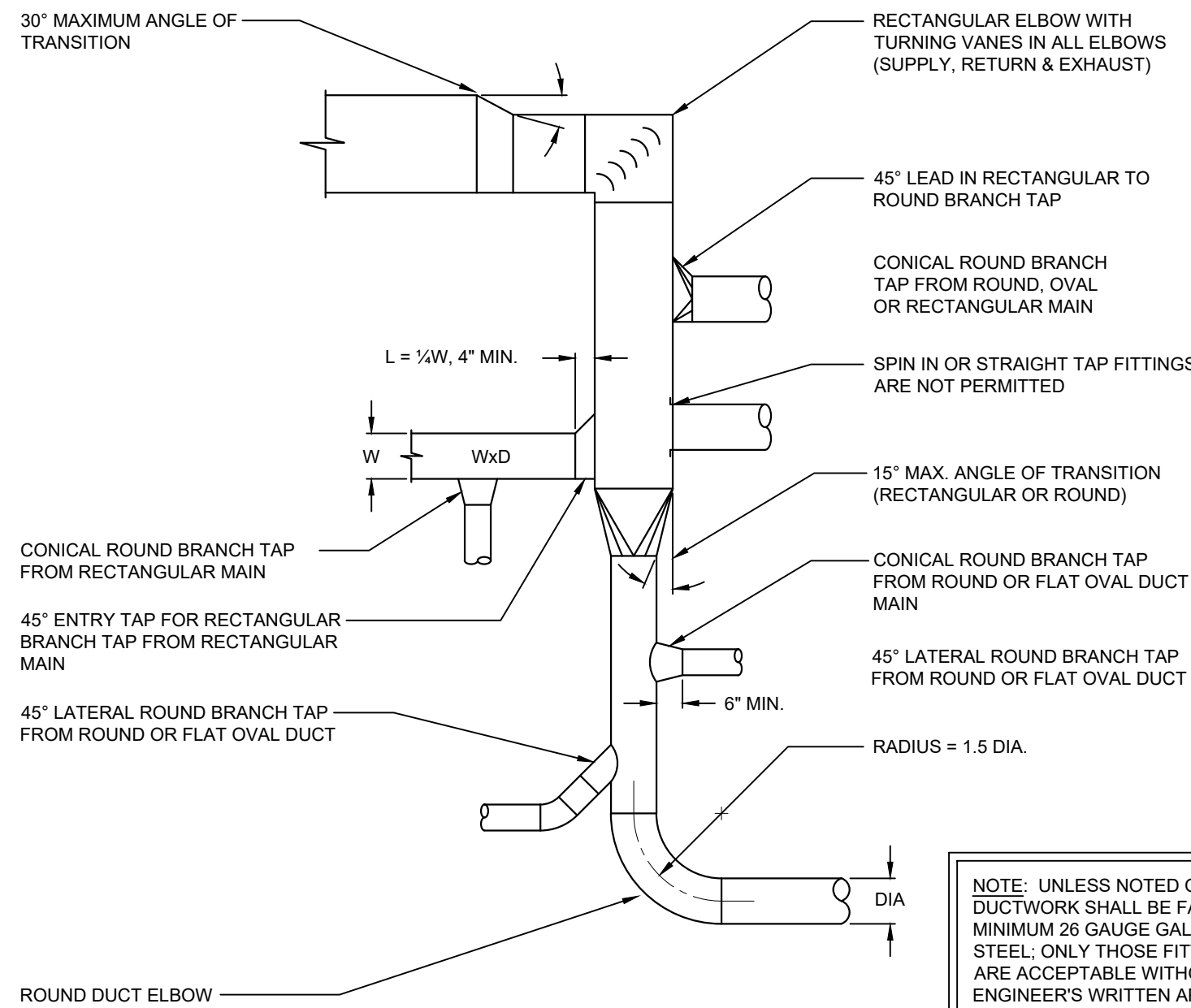
NOTE:
SUPPLY AIR DIFFUSER SHOWN WITH ROUND AND/OR RECTANGULAR DUCT BRANCH; AS LONG AS THERE IS ADEQUATE SPACE, MC MAY CHOOSE EITHER INSTALLATION METHOD

SUPPLY AIR DIFFUSER DETAIL
NOT TO SCALE



NOTES:
1. MC TO ARRANGE PIPING TO BEST FACILITATE ACCESS TO EQUIPMENT
2. SEE DRAWINGS FOR PIPE SIZES; REDUCE AS REQUIRED AT CONNECTION TO COIL
3. SINGLE DUCT UNIT SHOWN; DUAL DUCT AND FAN POWERED TERMINAL UNIT INSTALLATIONS ARE SIMILAR

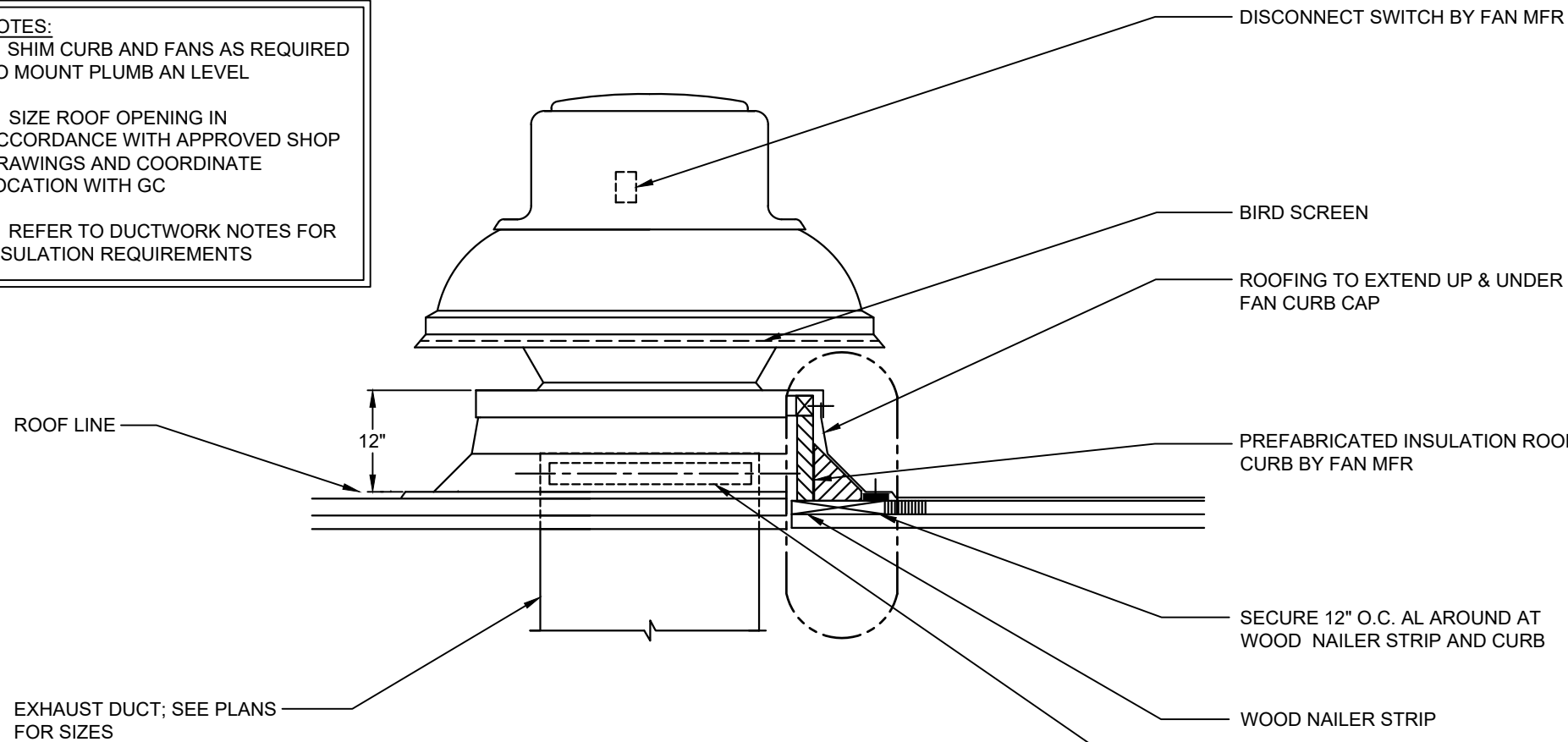
VARIABLE VOLUME AIR TERMINAL UNIT DETAIL
NOT TO SCALE



NOTE: UNLESS NOTED OTHERWISE, DUCTWORK SHALL BE FABRICATED OF MINIMUM 26 GAUGE GALVANIZED SHEET STEEL; ONLY THOSE FITTINGS SHOWN ARE ACCEPTABLE WITHOUT THE ENGINEER'S WRITTEN APPROVAL PRIOR TO INSTALLATION.

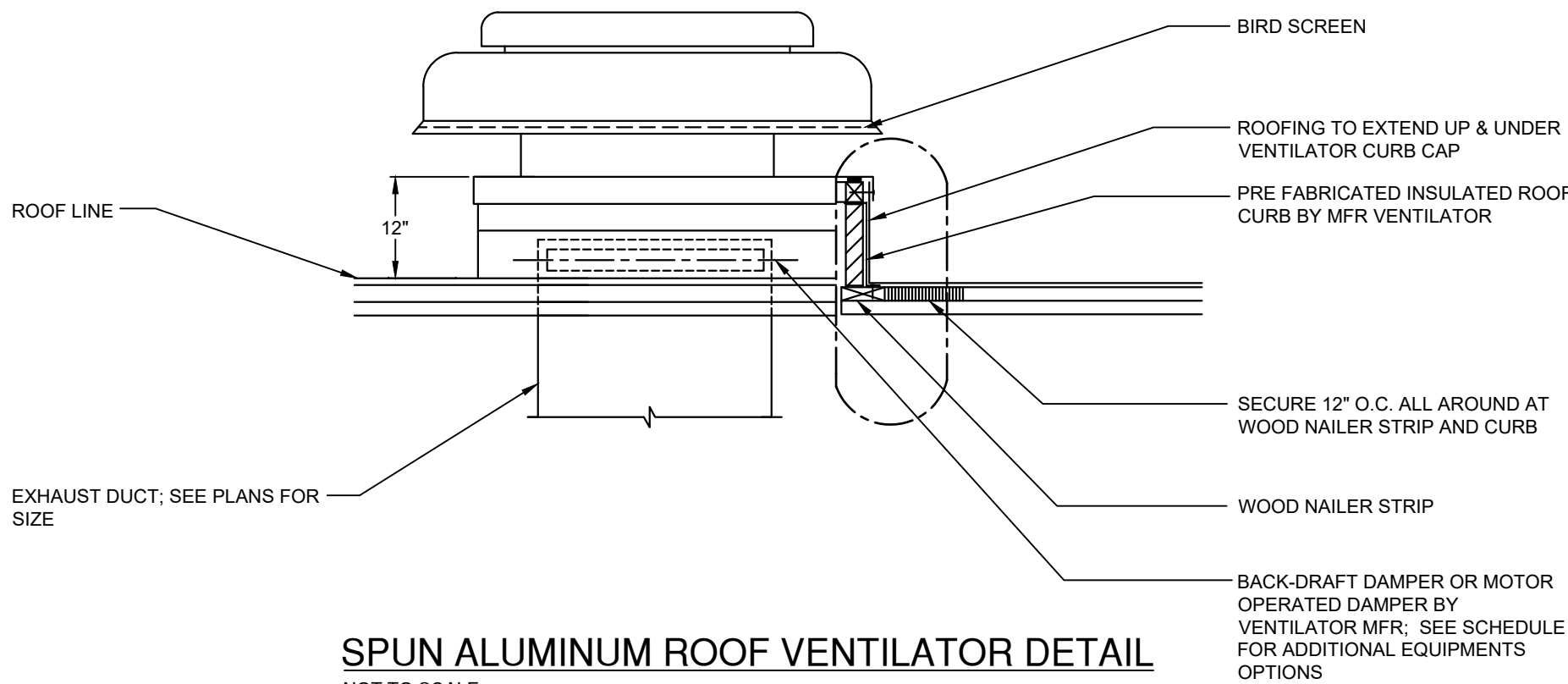
TYPICAL LOW PRESSURE (2" w.c. + LESS) DUCT FITTINGS
NOT TO SCALE

NOTES:
1. SHIM CURB AND FANS AS REQUIRED TO MOUNT PLUMB AN LEVEL
2. SIZE ROOF OPENING IN ACCORDANCE WITH APPROVED SHOP DRAWINGS AND COORDINATE LOCATION WITH GC
3. REFER TO DUCTWORK NOTES FOR INSULATION REQUIREMENTS

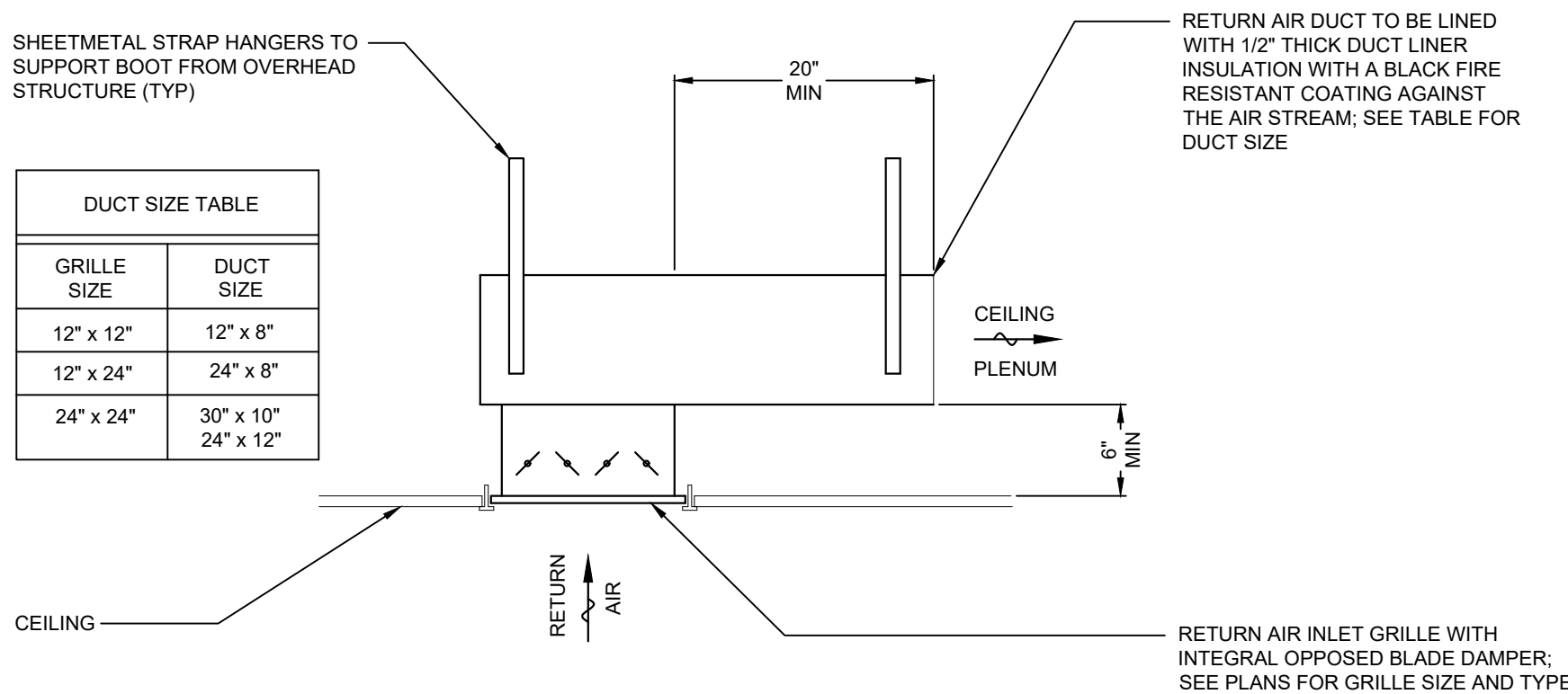


CENTRIFUGAL ROOF EXHAUST FAN DETAIL
NOT TO SCALE

NOTES:
1. SHIM CURB AN VENTILATOR AS REQUIRED TO MOUNT PLUMB AND LEVEL
2. SIZE ROOF OPENING IN ACCORDANCE WITH APPROVED SHOP DRAWINGS AND COORDINATE LOCATION WITH GC

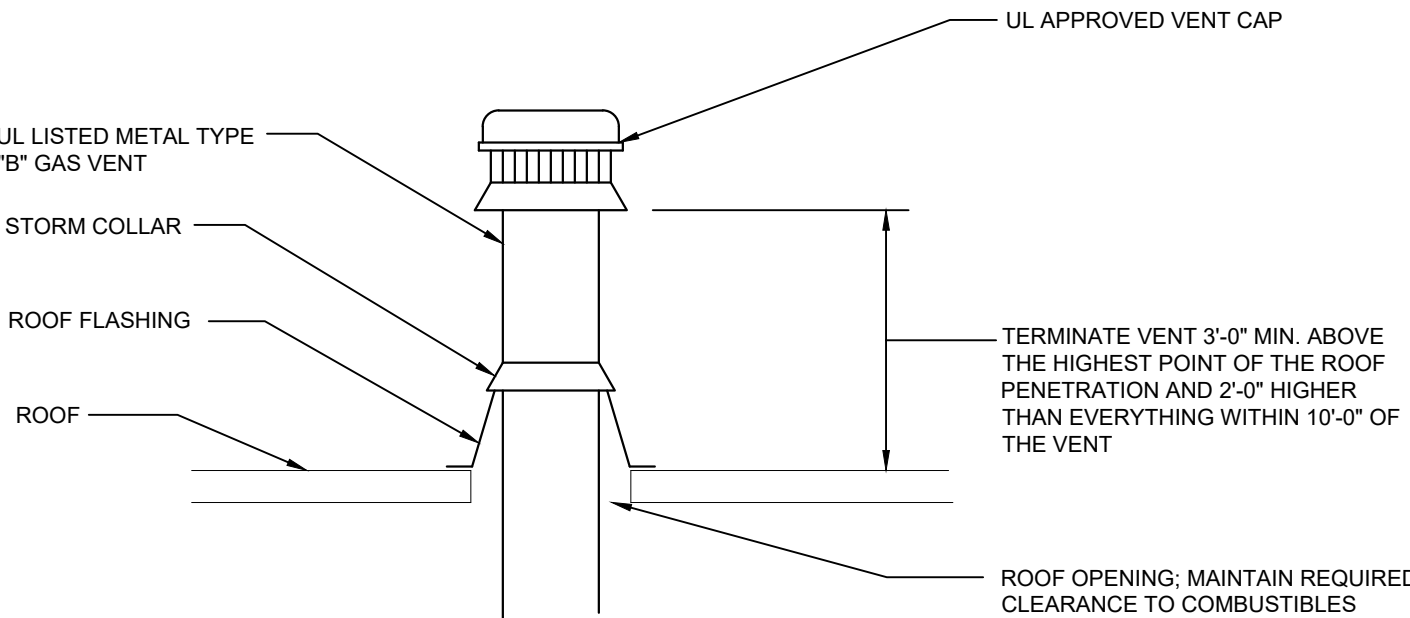


SPUN ALUMINUM ROOF VENTILATOR DETAIL
NOT TO SCALE

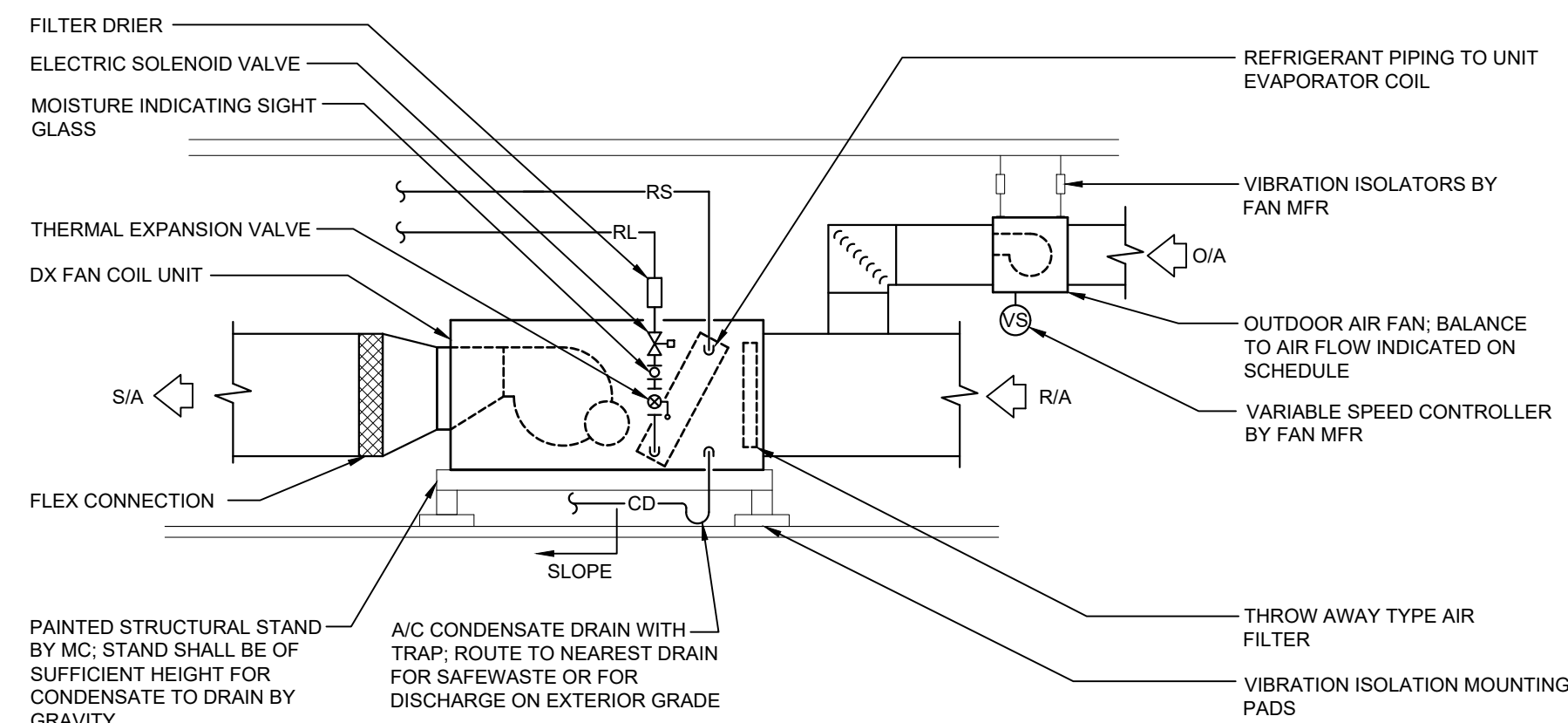


DUCT SIZE TABLE	
GRILLE SIZE	DUCT SIZE
12" x 12"	12" x 8"
12" x 24"	24" x 8"
24" x 24"	30" x 10" 24" x 12"

RETURN AIR BOOT DETAIL
NOT TO SCALE

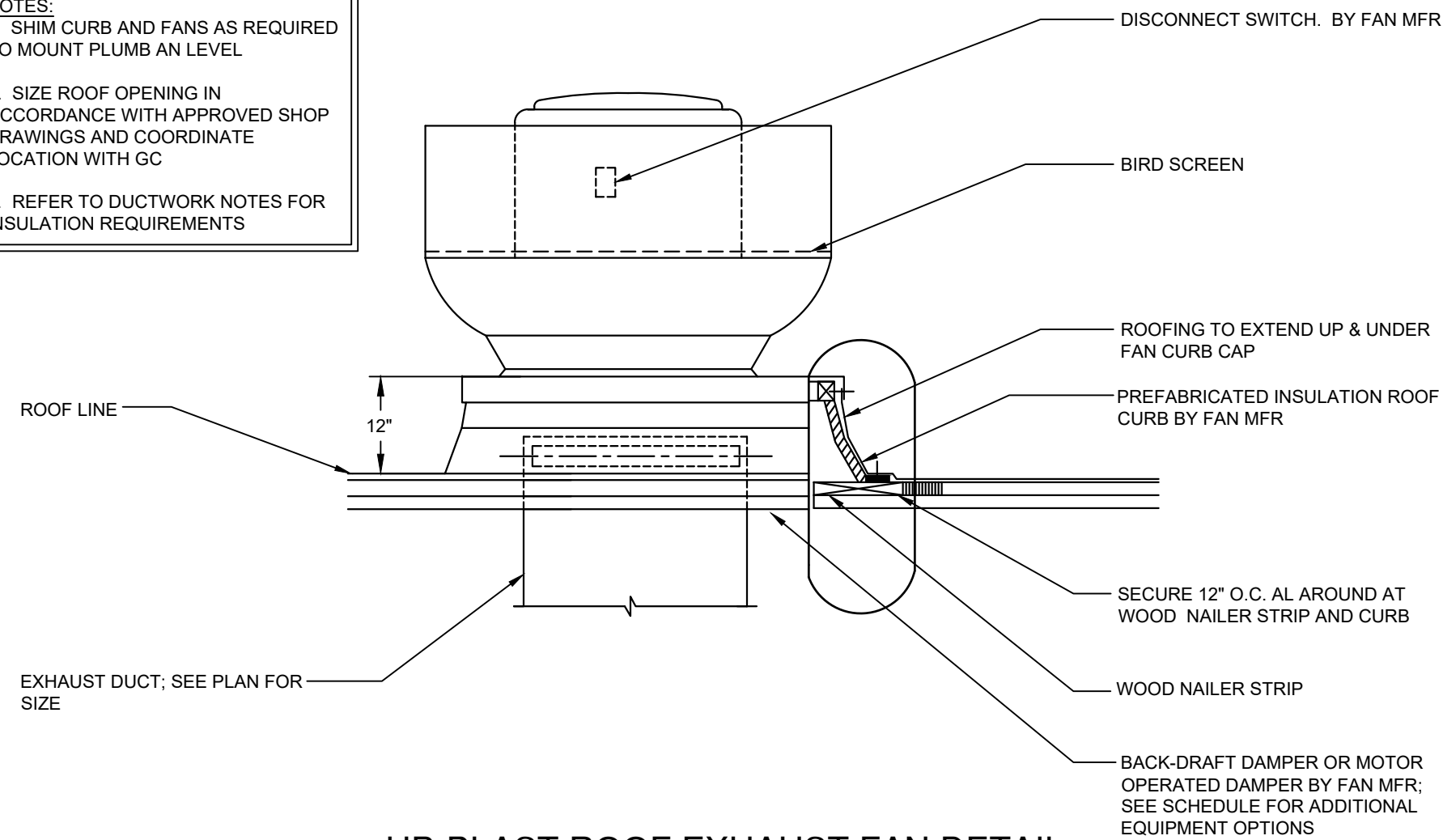


GAS VENT TERMINATION DETAIL
NOT TO SCALE



HORIZONTAL FAN COIL UNIT DETAIL
NOT TO SCALE

NOTES:
1. SHIM CURB AND FANS AS REQUIRED TO MOUNT PLUMB AN LEVEL
2. SIZE ROOF OPENING IN ACCORDANCE WITH APPROVED SHOP DRAWINGS AND COORDINATE LOCATION WITH GC
3. REFER TO DUCTWORK NOTES FOR INSULATION REQUIREMENTS



UP-BLAST ROOF EXHAUST FAN DETAIL
NOT TO SCALE

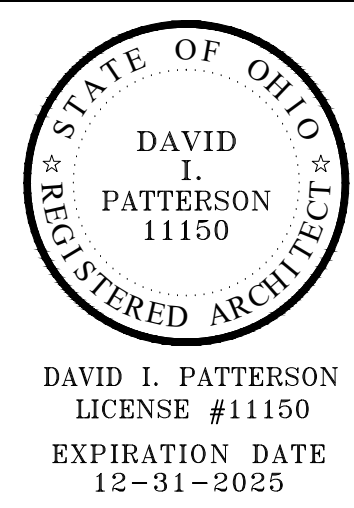
REVISIONS:



600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTED MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD, NE
CANTON, OHIO



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DATE 02-01-2024

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H-3.3

ELECTRICAL LEGEND



EMERGENCY LIGHT WITH BATTERY BACKUP



EXIT LIGHT WITH BATTERY BACKUP



COMBINATION EXIT AND EMERGENCY LIGHT WITH BATTERY BACKUP



REMOTE EMERGENCY HEAD



INTERMATIC K4121 PHOTO ELECTRONIC CELL



LED LIGHT FIXTURE



LED LIGHT FIXTURE WITH EMERGENCY BALLAST



LED STRIP LIGHT



"INTERMATIC" 24HR/365 DAY 4-CIRCUIT ELECTRONIC CONTROL, 120/277V, 4-SPST 2-DPST TIME SWITCH



20A 125V HUBBELL HBL SERIES DUPLEX RECEPTACLE, TAMPER RESISTANT



20A 125V HUBBELL HBL SERIES DUPLEX RECEPTACLE WITH GROUND FAULT PROTECTION, TAMPER RESISTANT.



20A 125V HUBBELL HBL SERIES DUPLEX RECEPTACLE WITH GROUND FAULT PROTECTION, TAMPER RESISTANT WITH WEATHERPROOF IN-USE COVER.



20A 125V HUBBELL HBL SERIES DOUBLE DUPLEX RECEPTACLE, TAMPER RESISTANT



20A 125V HUBBELL DUPLEX TAMPER RESISTANT RECEPTACLE WITH (2) USB PORTS



GROUND FAULT TEST SWITCH EQUAL TO A HUBBELL #GFBF20WL, MOUNTED ADJACENT TO RECEPTACLE IN AN ACCESSIBLE LOCATION PER N.E.C.



20A 120V, RECESSED DUPLEX RECEPTACLE LEVITON #690 DOUBLE GANG RECESSED BOX WITH LEVITON F-CONNECTOR FOR COAX/TV AND CAT 6 DATA JACK. 1" CONDUIT STUBBED TO ABOVE ACCESSIBLE CEILING SPACE.



20A 120V, DUPLEX RECEPTACLE AND DATA JACK, LOCATED IN A HUBBELL SYSTEM ONE FLOOR BOX WITH FLUSH COVER.



20A 125V OR 277V SINGLE POLE TOGGLE SWITCH HUBBELL, HBL SERIES



20A 125V THREE WAY TOGGLE SWITCH, HUBBELL HBL SERIES



20A 125V FOUR WAY TOGGLE SWITCH, HUBBELL HBL SERIES



20A 125V MOTOR RATED TOGGLE SWITCH PAD-LOCABLE IN THE OFF POSITION.



20A 125V OR 277V SINGLE POLE TOGGLE SWITCH HUBBELL, HBL SERIES WITH PILOT LIGHT



LUTRON "DIVA" 0-10V ON/OFF DIMMER SWITCH



LUTRON MAESTRO 0-10V SINGLE POLE DIMMER SENSOR



2"x4" SINGLE GANG J-BOX WITH COVER PLATE



DISCONNECTING MEANS PROVIDED INTEGRAL TO EQUIPMENT. WIRED BY E.C. AS INDICATED.



20A 120V OR 277V SINGLE POLE PHILIPS OCCUSWITCH CLASSIC WALL SENSOR #LRS2220



20A 120V OR 277V CEILING MOUNT, PHILIPS OCCUSWITCH CLASSIC SENSOR #LRM2226 (500SQ.FT.)



20A 120V OR 277V CEILING MOUNT, PHILIPS OCCUSWITCH CLASSIC SENSOR #LRM2255 (2000 SQ.FT.)



WIRING CONCEALED IN CEILING OR WALLS; SLASH MARKS INDICATE NUMBER OF CONDUCTORS EXCLUDING GROUNDS;



UNDERGROUND CABLE OR DUCT; TYPE, SIZE, CONDUCTORS, AND ARRANGEMENT BY NOTATION OR SCHEDULE.



WIRING RUN OVERHEAD.



WIRING RUN UNDERGROUND.



WIRING RUN TO A PANEL FED BY THE EMERGENCY GENERATOR.

DRY TYPE LOW VOLTAGE TRANSFORMER

PANEL DESIGNATION (SEE PANEL SCHEDULE FOR DETAILS)

CIRCUIT BREAKER PANELBOARD

HORSEPOWER

SINGLE PHASE MOTOR

HORSEPOWER

THREE PHASE MOTOR

DISCONNECT SWITCH (PLAN VIEW) SEE DISCONNECT SCHEDULE

DISCONNECT SWITCH PROVIDED INTEGRAL TO EQUIPMENT

BURIED CONDUIT LABEL DETAIL

N.T.S.

CONDUIT LABEL DETAIL

N.T.S.

ELECTRICAL NOTES

- ALL BRANCH CIRCUIT CONDUITS, INTERIOR, SHALL BE 3" MINIMUM. MC CABLE SHALL BE ACCEPTABLE FOR FIXTURE WHIPS (6' MAXIMUM LENGTH) AND CIRCUITS UNDER 30AMP (240V MAX) CONCEALED IN WALLS OR ABOVE CEILING. MC TYPE CABLE MAY ONLY BE INSTALLED ON BRANCH CIRCUITS 30AMPS OR LESS WHERE CIRCUIT IS IN WALLS OR CONCEALED CEILING SPACES. E.C. MUST INSTALL ALL HOMERUNS IN EMT CONDUIT. MC CABLE IS UNACCEPTABLE IN ALL OPEN SPACES EXCEPT FOR FIXTURE WHIPS (6' MAXIMUM LENGTH). ENTIRE INSTALLATION SHALL BE IN COMPLIANCE WITH N.E.C. 2020 AND ALL FEDERAL, STATE, AND LOCAL CODES.
- ALL ELECTRICAL PANELS SHALL HAVE COPPER BUSSING.
- ALL CONDUCTORS SHALL BE DELIVERED TO THE JOB SITE IN NEW PACKAGES AND SHALL BE COPPER UNLESS INDICATED OTHERWISE THROUGHOUT THIS PLAN.
- ALL GROUNDING SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, 2020 EDITION AND SHALL MEET ALL GROUNDING REQUIREMENTS AS INDICATED HEREIN AND PER ELECTRICAL SPECIFICATIONS AND ELECTRICAL GROUNDING DETAILS. ALL BRANCH CIRCUITS AND FEEDERS MUST INCLUDE AN EQUIPMENT GROUNDING CONDUCTOR. USING METAL CONDUIT AS THE ONLY GROUNDING PATH IS NOT ACCEPTABLE, PER THIS ENGINEER.
- ALL BRANCH CIRCUIT BREAKERS FEEDING HVAC EQUIPMENT SHALL BE HACR RATED. E.C. SHALL VERIFY ALL BREAKER AND BRANCH CIRCUIT REQUIREMENTS WITH HVAC MANUFACTURER'S SHOP DRAWINGS PRIOR TO INSTALLATION. IF A DISCREPANCY IS DISCOVERED, E.C. SHALL NOTIFY THIS DESIGN ENGINEER FOR FURTHER DIRECTION.
- SHARING OF NEUTRAL CONDUCTORS IS UNACCEPTABLE. EACH 120V OR 277V BRANCH CIRCUIT SHALL INCLUDE A DEDICATED NEUTRAL CONDUCTOR OF THE SAME GAUGE AS THE DESIGNATED PHASE CONDUCTORS.
- ALL WORK SHALL BE DONE IN COMPLIANCE WITH N.E.C. 2020 AND ALL FEDERAL, STATE AND LOCAL CODES.
- E.C. SHALL PROVIDE A DETAILED, TYPED, PANEL SCHEDULE FOR EACH PANEL. PANEL SCHEDULE SHALL DETAIL BRANCH CIRCUIT LOADS BEING FED ALONG WITH A BRIEF DESCRIPTION OF THE LOAD LOCATION.
- ALL RECEPTACLES WITHIN 6'-0" OF A SINK BASIN SHALL BE GROUND FAULT PROTECTED, WHETHER OR NOT SHOWN ON PLAN VIEW.
- ANY NEW OR EXISTING CONSTRUCTION NEAR ELECTRICAL UTILITY COMPANY TRANSFORMERS, POLES OR SERVICE LINES SHALL BE COORDINATED WITH UTILITY CO. PRIOR TO THE START OF CONSTRUCTION. COORDINATION DOCUMENTATION & EMAILS SHALL BE FORWARDED TO THIS ENGINEER, CONSTRUCTION MANAGER, GENERAL CONTRACTOR AND ARCHITECT PRIOR TO THE COMMENCEMENT OF WORK.
- ALL PENETRATIONS THROUGH FIRE-RATED FLOORS, WALLS OR OTHER STRUCTURAL COMPONENTS SHALL BE FIRE-STOPPED WITH FIRE RATED MATERIAL (FLAMESAFE FS-900+ OR EQUAL) PER NFPA, AND ALL FEDERAL, STATE AND LOCAL CODES.
- EQUIPMENT SPECIFIED ON THESE PLANS AND IN THE SPECIFICATIONS IS PROVIDED AS THE "BASIS OF DESIGN" AND IS PROVIDED FOR CODE COMPLIANCE AS WELL AS BIDDING PURPOSES. THE E.C. SHALL BE RESPONSIBLE FOR VERIFYING THEIR PRODUCT AND EQUIPMENT SUPPLIED MEETS THE SPECIFICATION INTENT AS INDICATED HEREIN. THIS ENGINEER WILL TAKE NO RESPONSIBILITY FOR THE EQUIPMENT SUPPLIED BY THE E.C. OR OWNER AND WILL NOT GUARANTEE IT MEETS THE INTENT OF THE DESIGN DOCUMENTS WITHOUT BEING CONTRACTED TO PROVIDE COMPLETE CONSTRUCTION ADMINISTRATION SERVICES INCLUDING THE FOLLOWING:
A. SITE INSPECTIONS DURING CONSTRUCTION TO VERIFY INSTALLATION PRACTICES.
B. SHOP DRAWING REVIEW OF ALL MAJOR EQUIPMENT.
C. FINAL INSPECTION AND "PUNCH LIST".
- PER THE REQUIREMENTS OF N.E.C. 110-16, CONTRACTOR SHALL BE CERTAIN THAT ALL ELECTRICAL EQUIPMENT (i.e. SWITCHBOARDS, PANELBOARDS, CONTROL PANELS, METER SOCKET ENCLOSURES, ETC.) SHALL BE FIELD MARKED TO WARN QUALIFIED PERSONNEL OF POTENTIAL ARC FLASH HAZARDS.

ELECTRICAL ABBREVIATIONS

AC	ABOVE COUNTER
AFF	ABOVE FINISHED FLOOR
CB	CIRCUIT BREAKER
EM	DEVICE CONNECTED TO CIRCUIT FEED FROM EMERGENCY GENERATOR
ET	ELECTRONIC TRIP
EX	EXISTING DEVICE TO REMAIN
EXP	EXPLOSION PROOF
GF	GROUND FAULT CIRCUIT INTERRUPTER
GND	GROUND
GRC	GALVANIZED RIGID CONDUIT
HG	HOSPITAL GRADE
HP	HORSEPOWER
LSI	LONG, SHORT & INSTANTANEOUS
MCB	MAIN CIRCUIT BREAKER
NEC	NATIONAL ELECTRICAL CODE.
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOC.
NL	NIGHT LIGHT, CONNECTED AHEAD OF SWITCHING (24HR OPERATION)
OH	OVERHEAD
PC	PHOTO CELL
RL	EXISTING DEVICE TO BE RELOCATED
RM	EXISTING DEVICE TO BE REMOVED
RP	EXISTING DEVICE TO BE REPLACED WITH NEW
SPD	SURGE PROTECTIVE DEVICE
SSBJ	SUPPLY SIDE BONDING JUMPER (NEC 250.30)
STP	SHIELDED TWISTED PAIR
TM	THERMAL MAGNETIC CIRCUIT BREAKER
UC	BELOW COUNTER
UG	UNDERGROUND
WP	WEATHER PROOF

TRAPEZE SUPPORT DETAIL

N.T.S.

POLE BASE DETAIL

N.T.S.

BURIED CONDUIT INSTALLATION DETAIL

N.T.S.

SITE ELECTRICAL PLAN

SCALE: 1" = 30'-0"

MJK

Electrical Engineering, LLC
3844 FRYS VALLEY RD.
PORT WASHINGTON, OHIO 43837
PHONE: 330-432-0781
EMAIL: MIKE@MJKPE.COM

REVISIONS:

CANTON OHIO 44702

600 MARKET AVENUE NORTH

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO

THIS DWG :
SITE
ELECTRICAL
PLAN

COMM 21161-B
DATE 02-01-2024

DWG
E-1.1

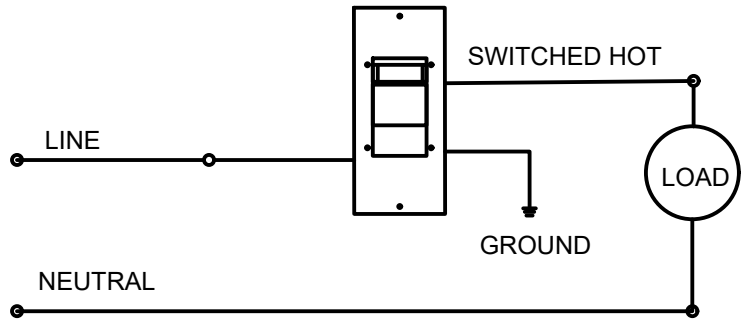
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LUMINAIRE SCHEDULE

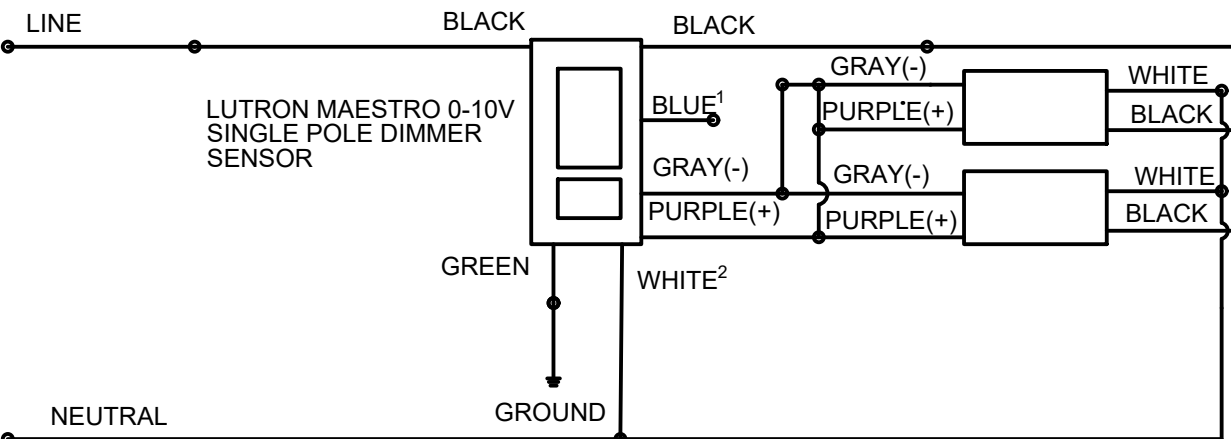
SYMBOL	MANUFACTURER	CATALOG NUMBER	DESCRIPTION	LAMPS	COLOR TEMPERATURE	WATTS	LUMEN OUTPUT	REMARKS
A	CURRENT-COLUMBIA	CCL24-LSCS	2x4 LED CENTER LENS TROFFER WITH SWITCHABLE LUMEN AND CCT TECHNOLOGY	INTEGRAL LED	4000K	32	4,424	CEILING-GRID
B	CURRENT-COLUMBIA	CCL24-LSCS	2x4 LED CENTER LENS TROFFER WITH SWITCHABLE LUMEN AND CCT TECHNOLOGY	INTEGRAL LED	4000K	42	5608	CEILING-GRID
C	CURRENT-COLUMBIA	CBT24-LSCS-SRPSMK24	2x4 LED BACK-LIT TROFFER WITH SWITCHABLE LUMEN AND CCT TECHNOLOGY. SURFACE MOUNT KIT	INTEGRAL LED	4000K	38	5185	CEILING-SURFACE
D	CURRENT-COLUMBIA	LXEM4-40-VL-RFA-E-U	4' LED ENCLOSED AND GASKETED STRIP LIGHT WITH ACRYLIC LENS	INTEGRAL LED	4000K	25	3200	CEILING-SURFACE
EM	DUAL LITE	LZ15-03L	2-HEAD, BATTERY BACK-UP DESIGNER EMERGENCY LIGHT	INTEGRAL				MH @ 7'-6" AFF
EM1	DUAL LITE	CU2HLHOSD	2-HEAD, BATTERY BACK-UP HIGH LUMEN EMERGENCY LIGHT	INTEGRAL	5000K	12	1092	MH @ 10'-0" AFF
E/EM	DUAL LITE	EVCURWDI	COMBO EXIT WITH 2 UNIT MOUNTED HEADS, BATTERY BACK-UP, UNIVERSAL MOUNTING SINGLE OR DOUBLE FACE, SELF DIAGNOSTICS	INTEGRAL				MH @ 7'-6" AFF
E/RH	DUAL LITE	EVCURWD4I	COMBO EXIT WITH 2 UNIT MOUNTED HEADS, BATTERY BACK-UP, 12 WATT OF REMOTE CAPACITY, UNIVERSAL MOUNTING SINGLE OR DOUBLE FACE, SELF DIAGNOSTICS	INTEGRAL				MH @ 7'-6" AFF
RH	DUAL LITE	EVODW	OUTDOOR RATED TWIN LAMPED EMERGENCY EGRESS HEADS, MOUNTS TO A 3-1/2" OCTAGONAL OR SINGLE GANG OUTLET BOX, UNIVERSAL MOUNTING	INTEGRAL				MH @ 7'-6" AFF
F	CURRENT-COLUMBIA	CSL4-LSCS	4' LED STRIP LIGHT WITH ACRYLIC LENS AND SWITCHABLE LUMEN/CCT TECHNOLOGY	INTEGRAL LED	4000K	38	5191	CEILING-SURFACE OR CHAIN SUSPEND AS REQUIRED
G	CURRENT-COLUMBIA	CSL8-LSCS	8' LED STRIP LIGHT WITH ACRYLIC LENS AND SWITCHABLE LUMEN/CCT TECHNOLOGY	INTEGRAL LED	4000K	80	9959	CEILING-SURFACE OR CHAIN SUSPEND AS REQUIRED
H	CURRENT-PRESCOLITE	LBSD-4RD-CS9-WH	4" DIA LED DISK WITH LUMEN AND CCT TECHNOLOGY	INTEGRAL LED	4000K	9	712	CEILING-SURFACE
J	CURRENT-BEACON	TRP2-24L-70-5K7-4-UNV-PC	LED TRAPAZOID WALL PACK WITH INTEGRAL PHOTO CELL	INTEGRAL LED	5000K	71	7728	WALL-SURFACE (VERIFY M.H. WITH ARCHITECT)
K	CURRENT-BEACON	VSH-30-5K7-UNV	LED EDGE-LIT CANOPY LIGHT	INTEGRAL LED	5000K	30	4793	CANOPY-SURFACE
L	ILP	EDV-48L-U-50-FRL	"E"DEAVOUR" LED LINEAR HIGH BAY WITH INTEGRAL	INTEGRAL LED	5000K	330	46148	CEILING-SUSPENDED 18'-0" AFF
M	CURRENT-LITE CONTROL	67L-W-D-4-SQ-40K-D055-D01-1C-UNV	4' LED WITH ACRYLIC LENS SQUARE LENS	INTEGRAL LED	4000K	17	2200	WALL-SURFACE (VERIFY M.H. WITH ARCHITECT)
S1	CURRENT-EXO	LBUL-20-120-4K	COMPACT LED FLOOD LIGHT	INTEGRAL LED	4000K	21	1979	SEE POLE BAES DETAIL

NOTES: 1) EQUALS: substitutions by Lithonia, Cooper, Philips. 2) ALL FIXTURES MUST BE APPROVED BY OWNER/ARCHITECT PRIOR TO PURCHASE.

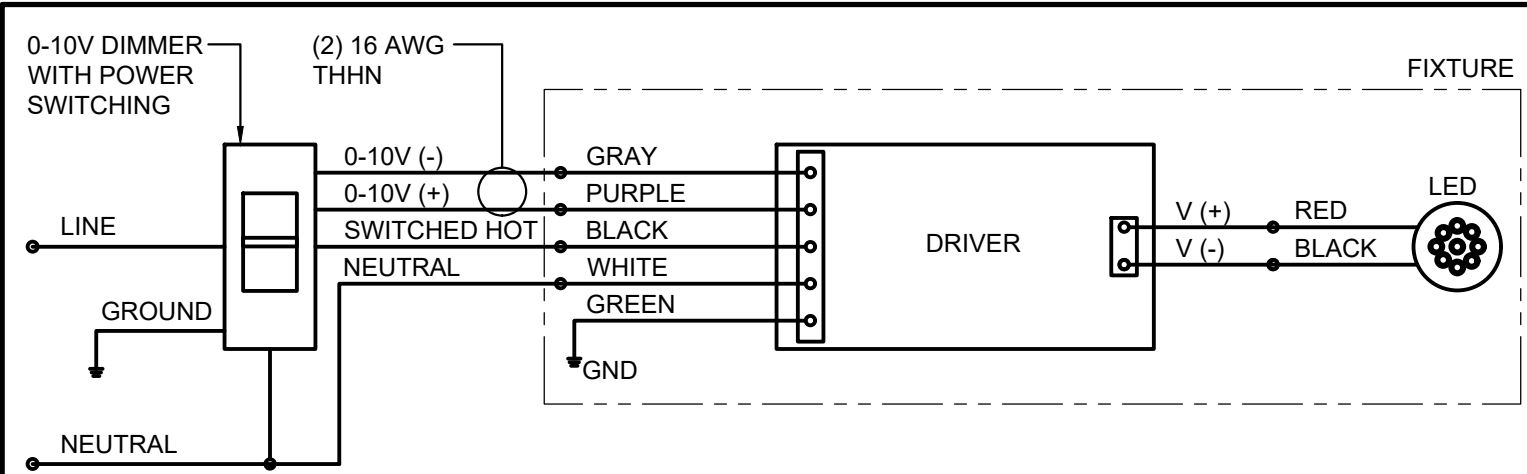
20A 120V OR 277V SINGLE POLE PHILIPS, OCCUSWITCH CLASSIC WALL SENSOR #LRS2220 OR EQUAL..



OCCUPANCY SENSOR SWITCH WIRING DIAGRAM
N.T.S.



0-10V DIMMER SENSOR WIRING DIAGRAM
N.T.S.

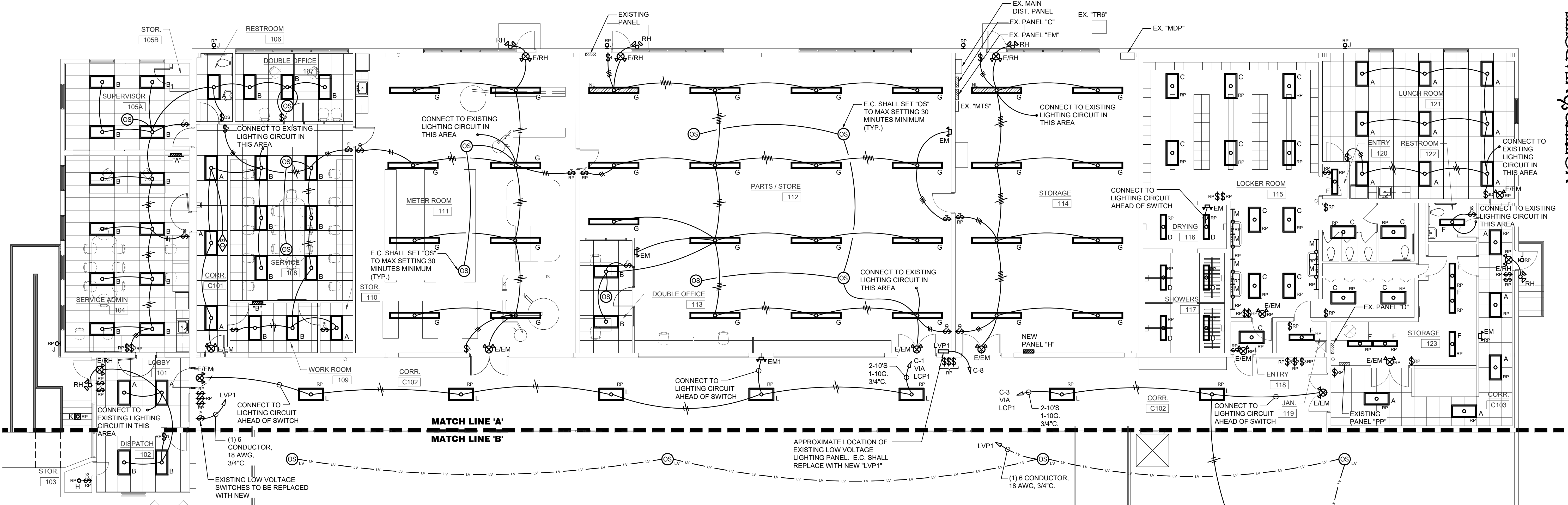


0-10V DIMMER WIRING DIAGRAM
N.T.S.

LOW VOLTAGE LIGHTING CONTROL SCHEDULE

DESCRIPTION	CATEGORY	MODEL #	ITEM
CX COMMERCIAL LIGHTING CONTROL PANELS	CX COMMERCIAL LIGHTING CONTROL	CX082S083LM	LVP1 LVP2
LOW VOLTAGE WALL CONTROL (SWITCH TO BE WIRED TO OVERRIDE "OS" AND TURN ALL LIGHTS ON).	WALLBOX DEVICES	LVSM1NPWH	\$V
WASP HIGH BAY OCCUPANCY SENSOR ON/OFF CONTROL WITH LENS	HIGH BAY SENSORS	WSPSM24V WITH A WSP-L360-WH (LENS)	OS LV

NOTE:
E.C. SHALL PROVIDE ALL CONTROL PANEL PROGRAMMING. E.C. SHALL COORDINATE ALL CONTROL REQUIREMENTS WITH OWNER AND SHALL INCLUDE START-UP, PROGRAMMING AND TRAINING IN THEIR BID.



PARTIAL MAIN FLOOR LIGHTING PLAN
EXISTING ADMINISTRATION
SCALE: 1/8" = 1'-0"



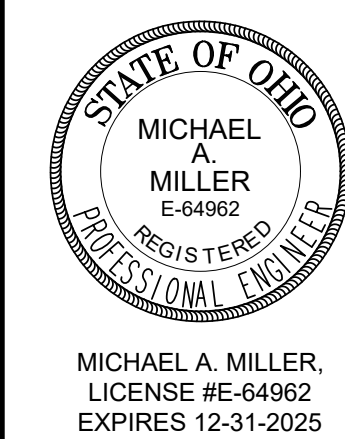
Electrical Engineering, LLC
3844 FRY'S VALLEY RD.
PORT WASHINGTON, OHIO 43837
PHONE: 330-432-0781
EMAIL: MIKE@MKPE.COM

REVISIONS:

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO

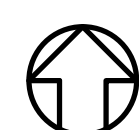
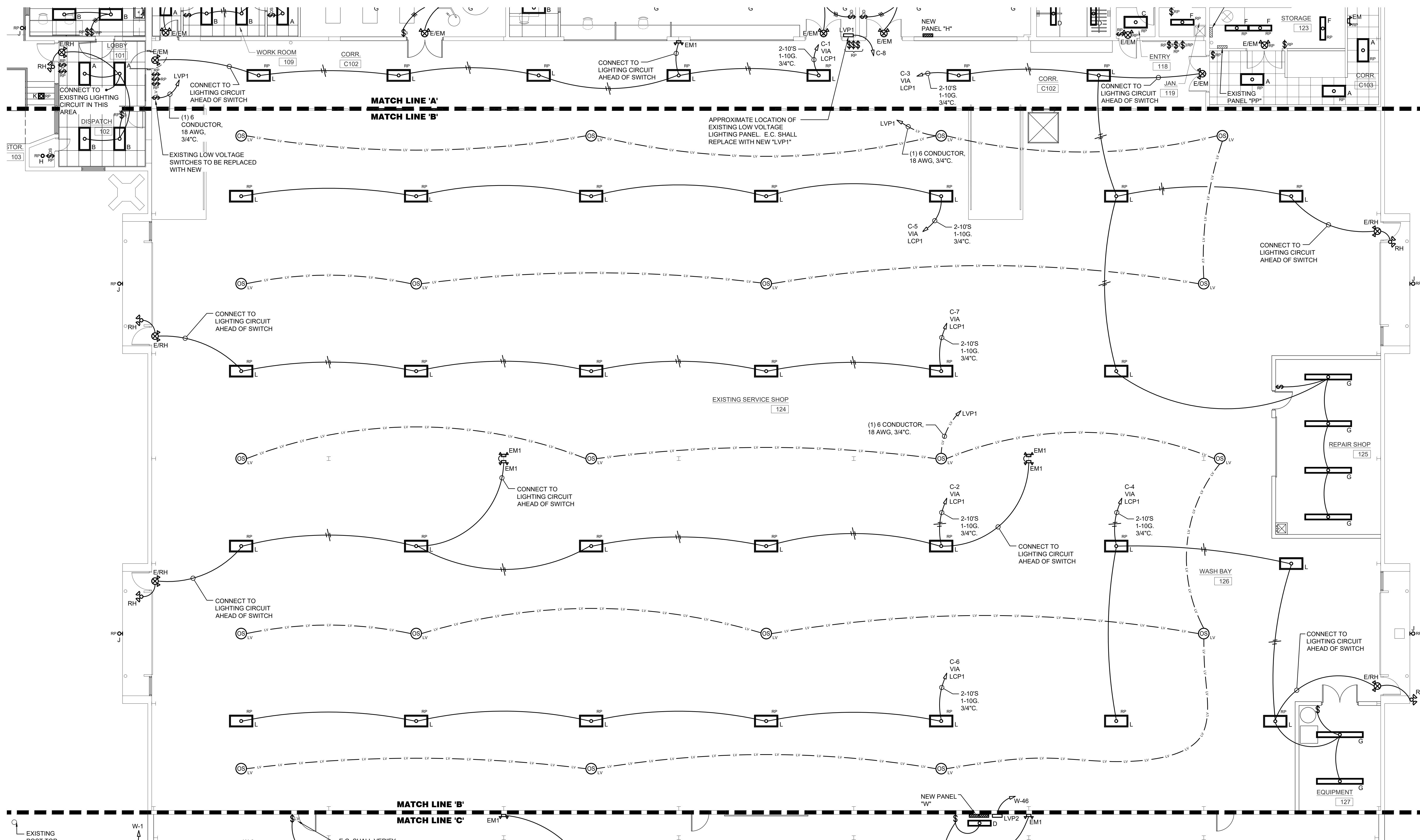


THIS DWG :
LIGHTING PLAN -
EXISTING
SERVICE SHOP

COMM 21161-B
DATE 02-01-2024

DWG
E-1.3

Plotted: 1/13/2024 10:13 PM
623 Canton City Water.dwg



PARTIAL MAIN FLOOR LIGHTING PLAN
EXISTING SERVICE SHOP
SCALE: 1/8" = 1'-0"



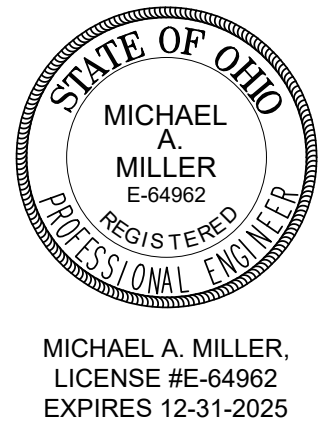
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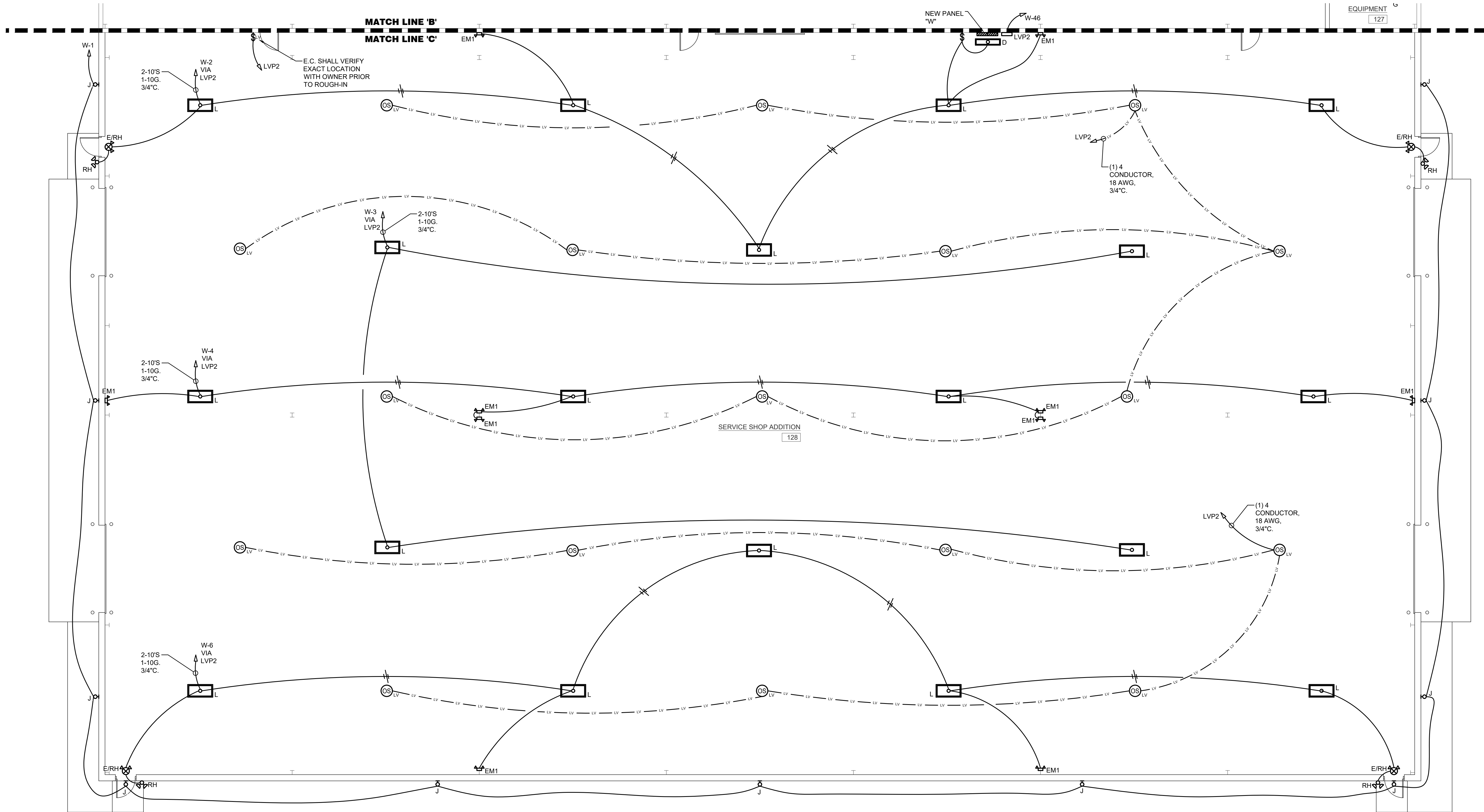
GARAGE ADDITION
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CANTON, OHIO



THIS DWG :
LIGHTING PLAN -
NEW ADDITION

COMM 21161-B
DATE 02-01-2024

DWG
E-1.4



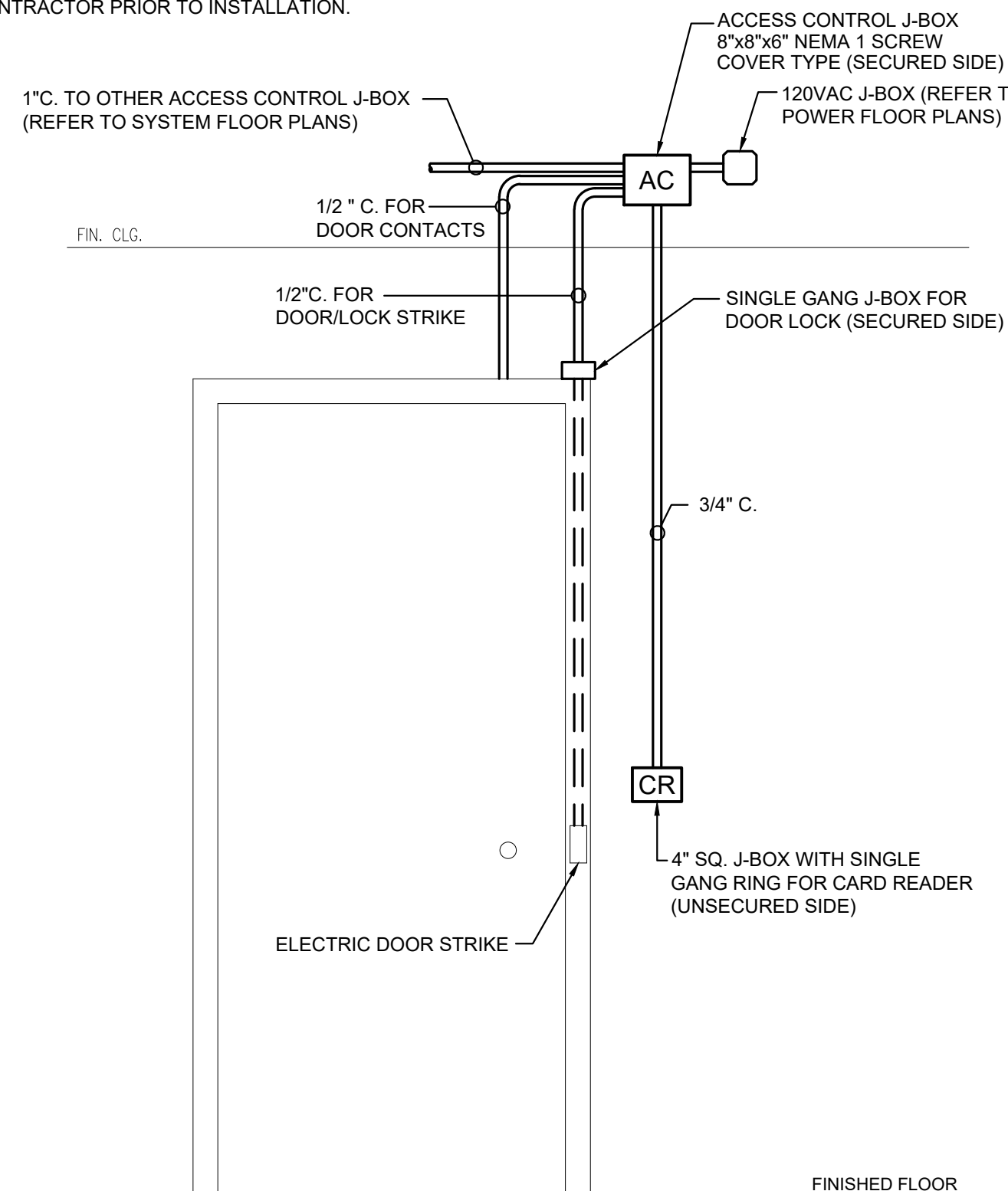
PARTIAL MAIN FLOOR LIGHTING PLAN
NEW ADDITION
SCALE: 1/8" = 1'-0"

MJK

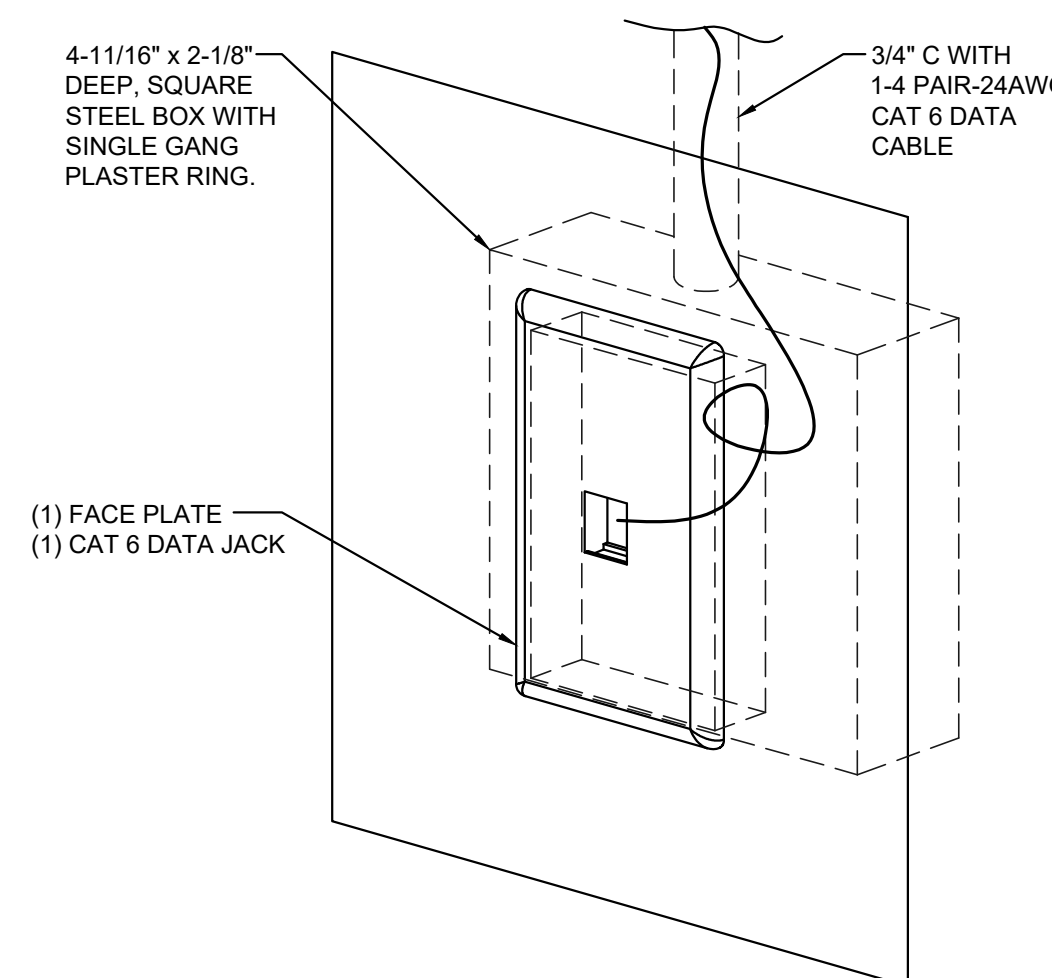
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PORT WASHINGTON, OHIO 43837
PHONE: 330-432-0781
EMAIL: MIKE@MJKPE.COM

REVISIONS:
02-24-2024 REVISION #1

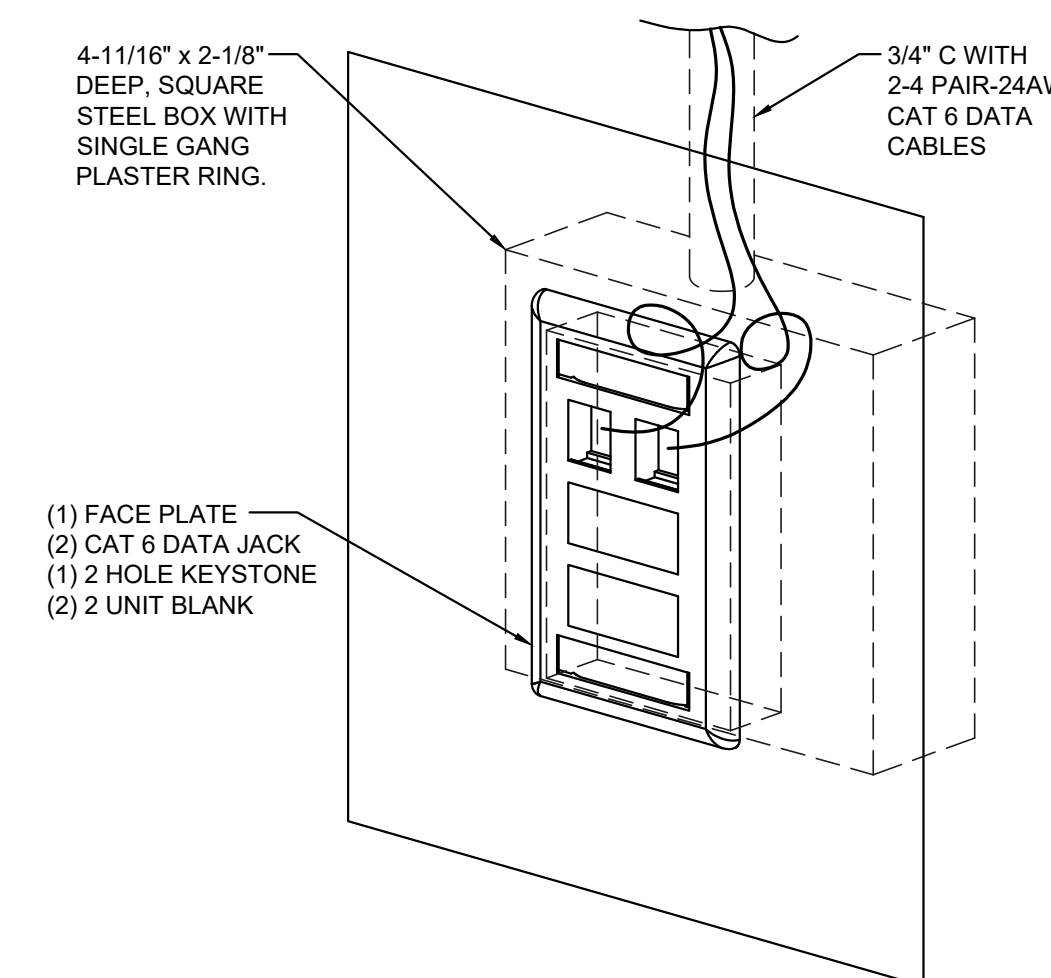
NOTE: SECURITY SYSTEM TO BE PROVIDED BY OTHERS. E.C. SHALL INSTALL BOXES AND CONDUIT AS NECESSARY TO ACCOMMODATE NEW SECURITY SYSTEM. COORDINATE WITH OWNER'S SECURITY SYSTEM CONTRACTOR PRIOR TO INSTALLATION.



ACCESS CONTROL CONDUIT DETAIL
FOR CARD READER SYSTEM
N.T.S.

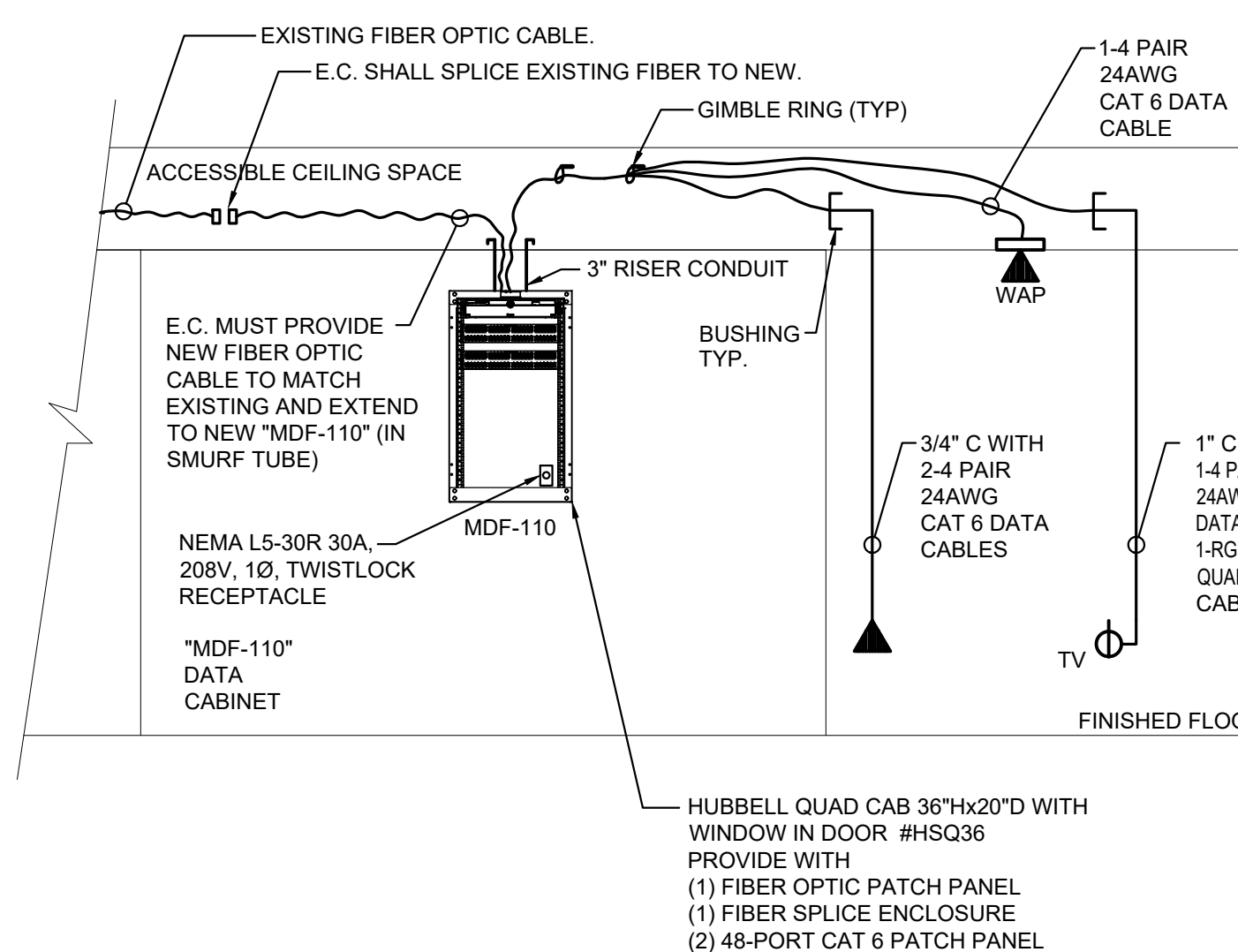


▼ TELE/DATA OUTLET DETAIL
N.T.S.

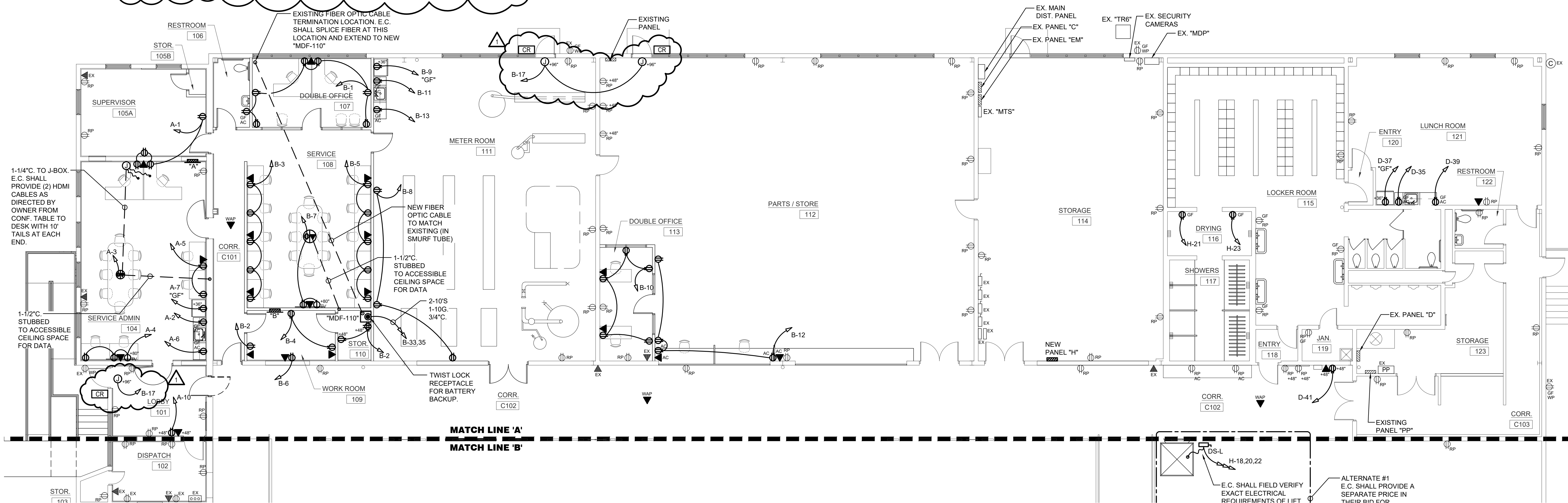


▼ TELE/DATA OUTLET DETAIL
N.T.S.

NOTE: ALL DATA JACKS, DATA RACKS, CONDUIT, BACK BOXES, CAT6 WIRING AND FINAL TERMINATIONS SHALL BE BY E.C. COORDINATE ENTIRE INSTALLATION WITH OWNER'S I.T. DEPARTMENT PRIOR TO ROUGH-IN.



TELEDATA/COMMUNICATIONS PREMISE WIRING DETAIL
N.T.S.



PARTIAL MAIN FLOOR POWER PLAN
EXISTING ADMINISTRATION
SCALE: 1/8" = 1'-0"

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO

STATE OF OHIO
MICHAEL
MILLER
E-64962
REGISTERED
PROFESSIONAL ENGINEER
MICHAEL A. MILLER,
LICENSE #E-64962
EXPIRES 12-31-2025

THIS DWG :
POWER PLAN -
EXISTING
ADMINISTRATION

COMM 21161-B
DATE 02-01-2024

DWG
E-2.1



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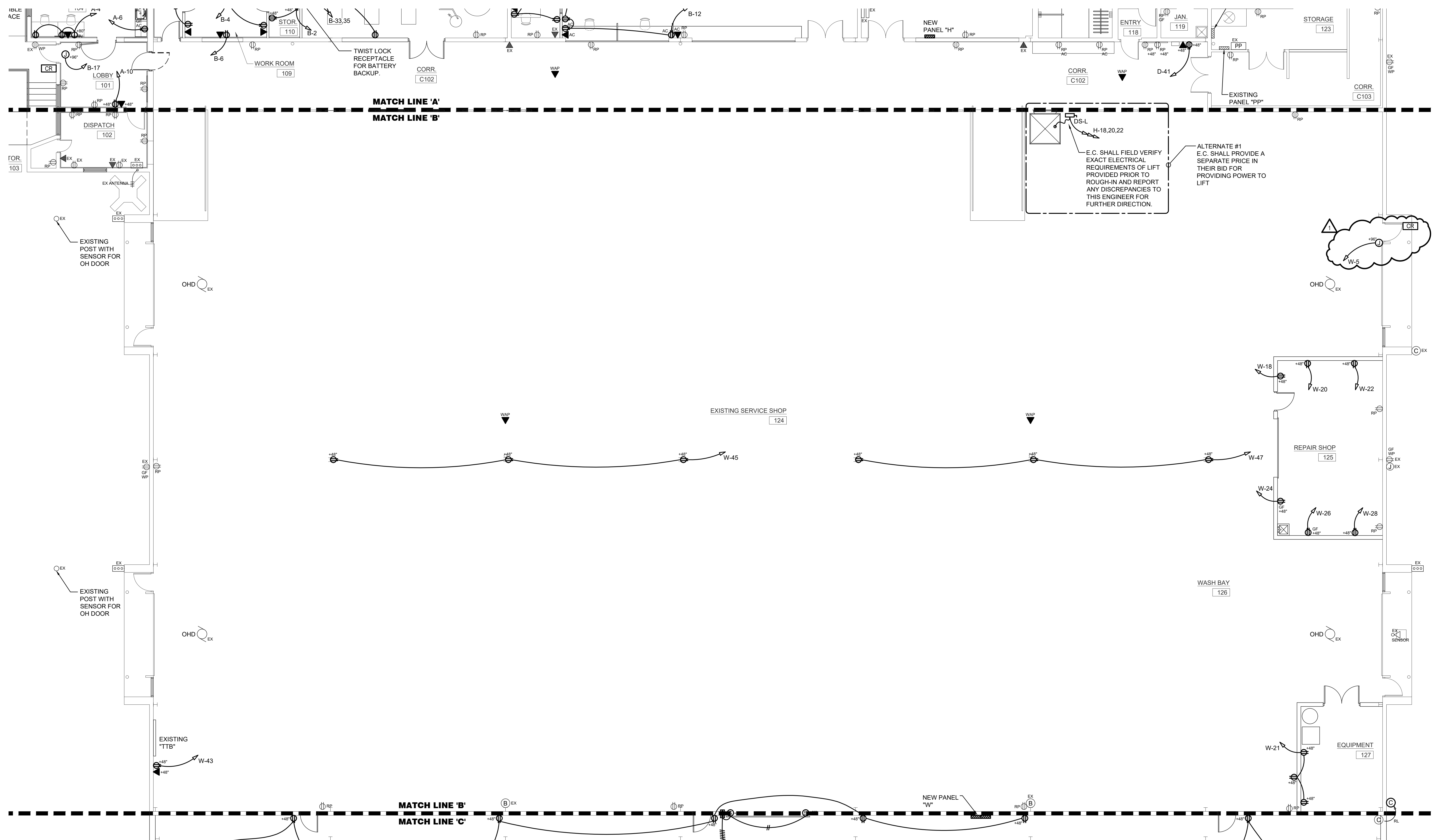


MICHAEL A. MILLER,
LICENSE #E-64962
EXPIRES 12-31-2025

THIS DWG :
POWER PLAN -
EXISTING
SERVICE SHOP

COMM 21161-B
DATE 02-01-2024

DWG
E-2.2



PARTIAL MAIN FLOOR POWER PLAN
EXISTING SERVICE SHOP
SCALE: 1/8" = 1'-0"



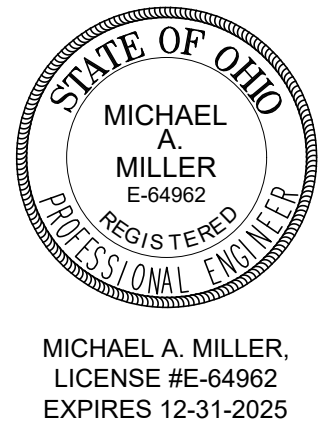
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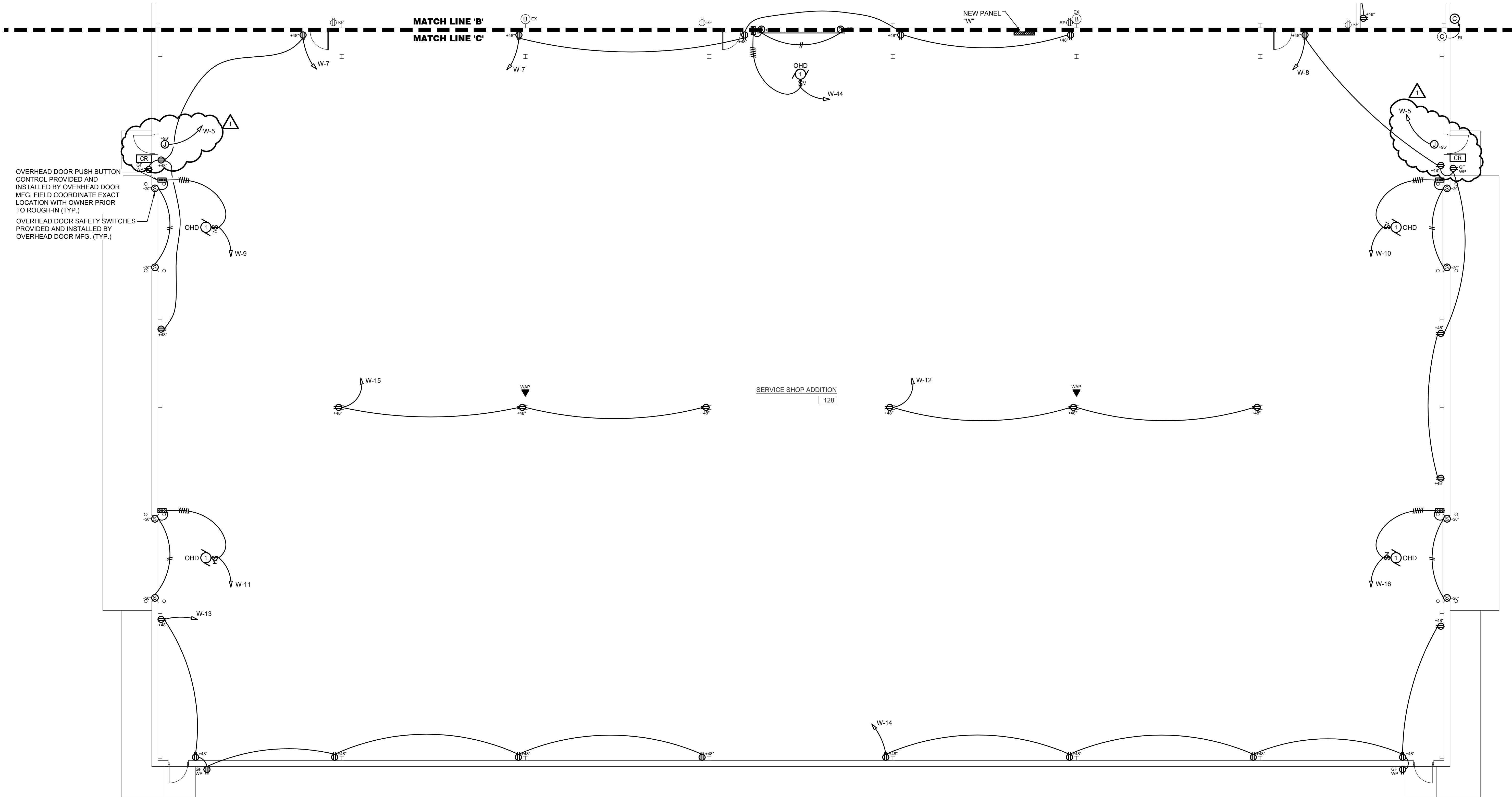
GARAGE ADDITION
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CANTON, OHIO



THIS DWG :
POWER PLAN -
NEW ADDITION

COMM 21161-B
DATE 02-01-2024

DWG
E-2.3



PARTIAL MAIN FLOOR POWER PLAN
NEW ADDITION
SCALE: 1/8" = 1'-0"



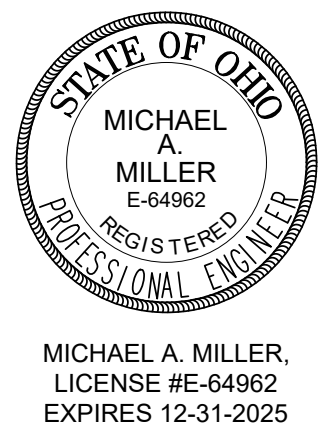
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GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO



THIS DWG :
MECH. ELECT.
PLAN - EXISTING
ADMINISTRATION

COMM 21161-B
DATE 02-01-2024

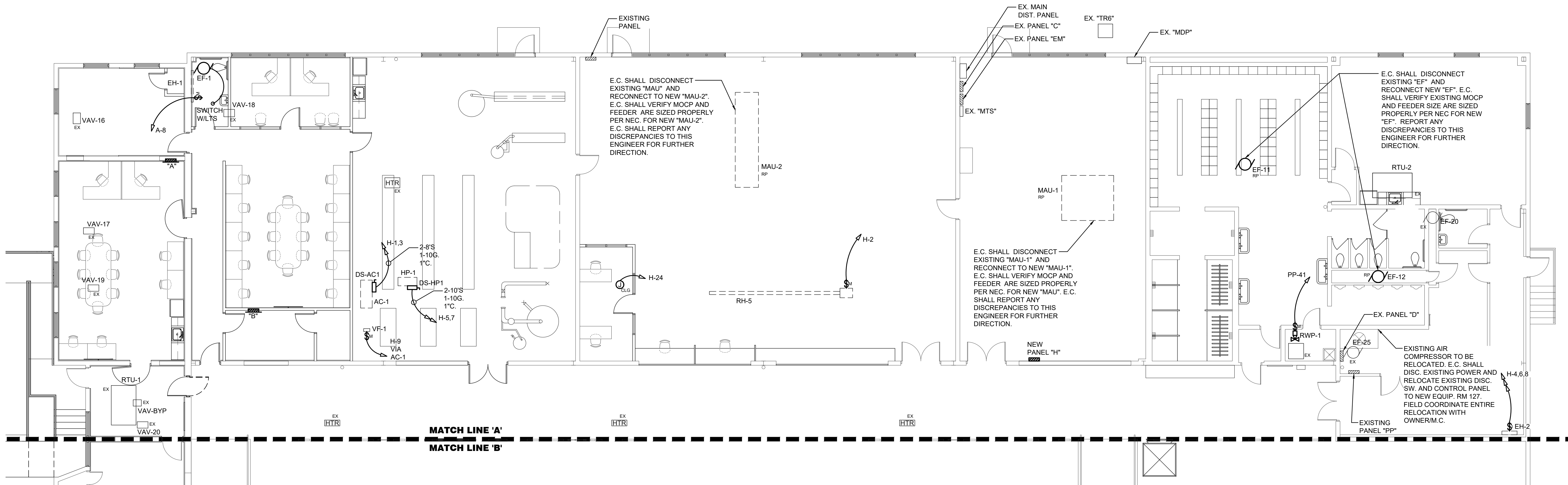
DWG
E-3.1

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DISCONNECT SCHEDULE

DESIGNATION	AMPERAGE RATING (AMPS)	BUSSMAN FUSE	VOLTAGE RATING	PHASE	NEMA RATING	REMARKS
DS-L	30	LPS-RK-20SP	208	3	1	ALTERNATE #1
DS-AC1	60	LPN-RK-35SP	208	1	3R	-
DS-HP1	30	LPN-RK-30SP	208	1	3R	-

SS = STAINLESS STEEL
NF = NON FUSED



PARTIAL MAIN FLOOR MECHANICAL ELECTRICAL PLAN
EXISTING ADMINISTRATION

SCALE: 1/8" = 1'-0"



REVISIONS:

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTHER & MEADOWS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
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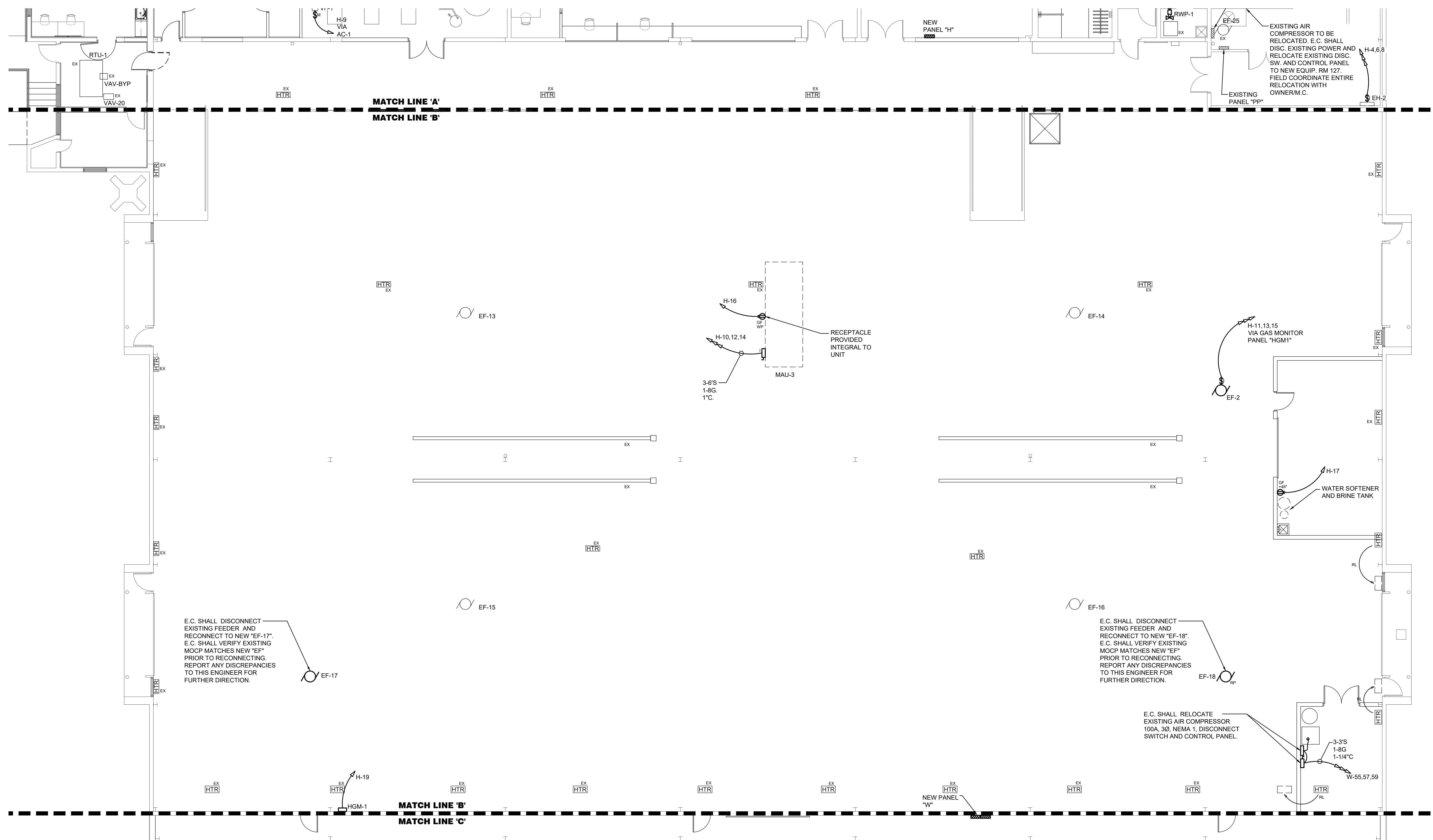


MICHAEL A. MILLER
LICENSE #E-64962
EXPIRES 12-31-2025

**THIS DWG :
MECH. ELECT.
PLAN - EXISTIN
SERVICE SHOP**

COMM 21161-E
DATE 02-01-2024

DWG
E-3.2



PARTIAL MAIN FLOOR MECHANICAL ELECTRICAL PLAN
EXISTING SERVICE SHOP
SCALE: 1/8" = 1'-0"

Plotted 1/31/2024 10:13 PM
623 Canton City Water dwg



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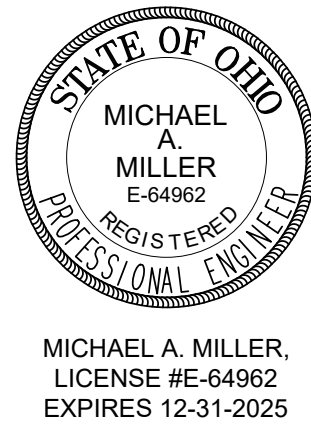
44702

CANTON OHIO

600 MARKET AVENUE NORTH

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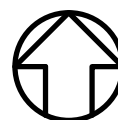
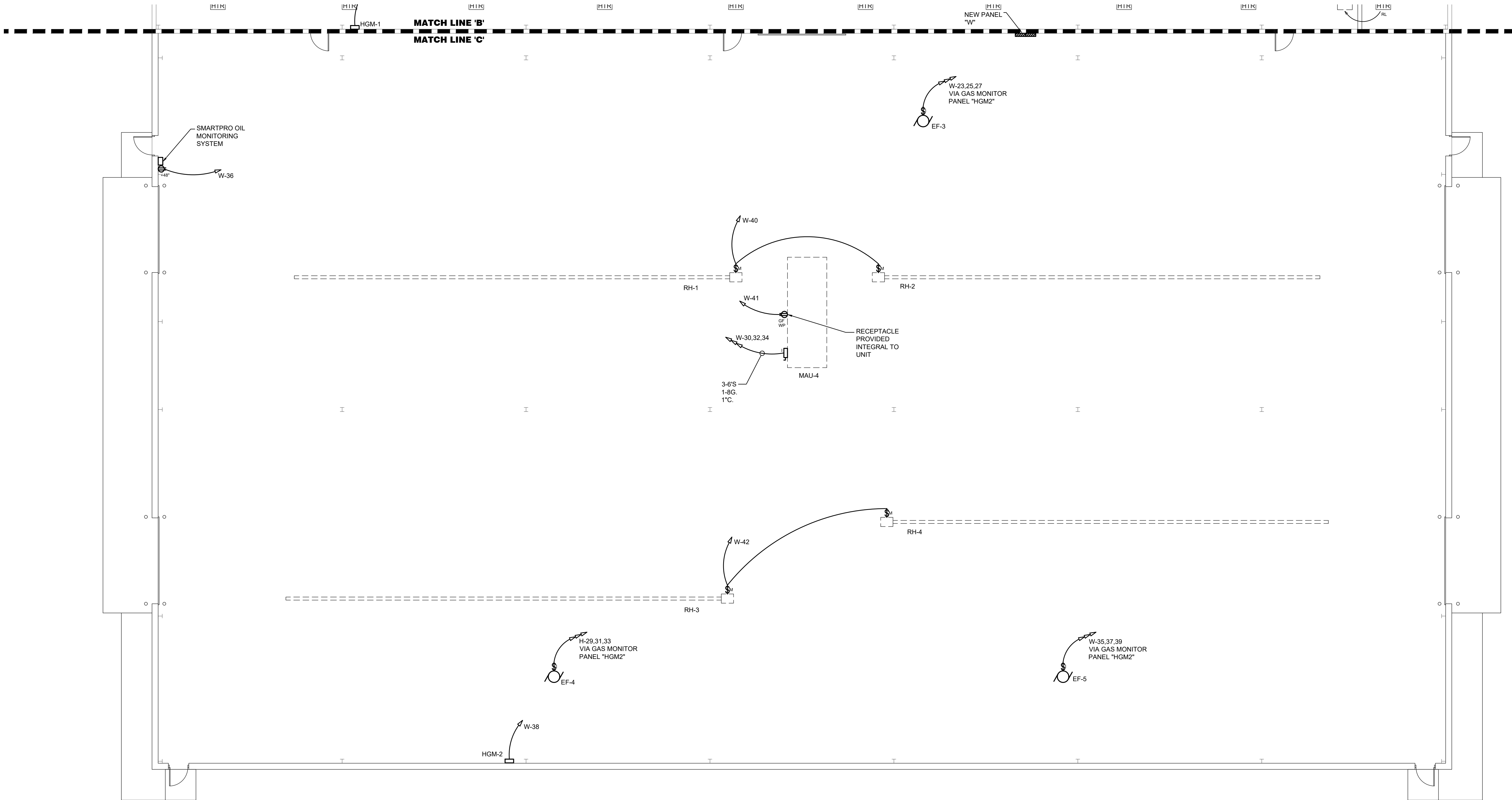


THIS DWG :
MECH. ELECT.
PLAN - NEW
ADDITION

COMM 21161-B
DATE 02-01-2024

DWG
E-3.3

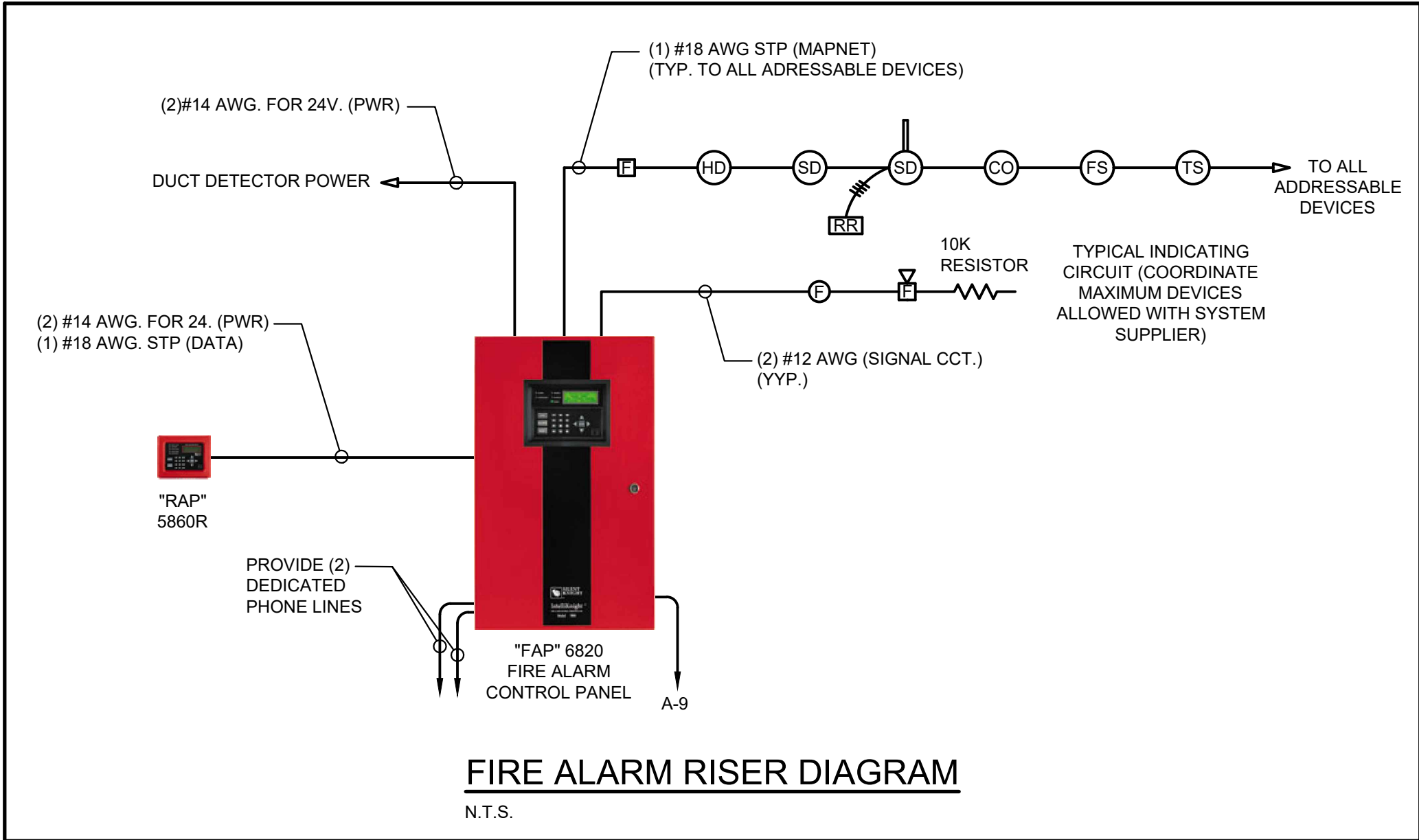
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PARTIAL MAIN FLOOR MECHANICAL ELECTRICAL PLAN
NEW ADDITON
SCALE: 1/8" = 1'-0"

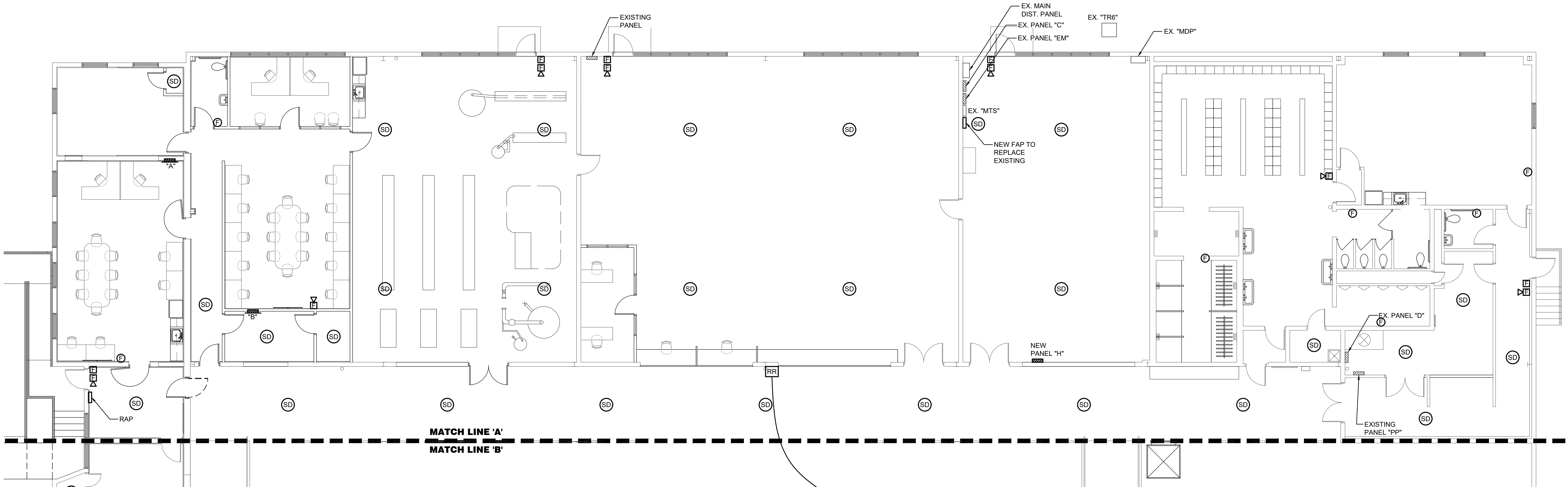
FIRE ALARM SYSTEM INSTALLATION NOTES

- THE FIRE ALARM SYSTEM SHALL BE INSTALLED AS TO BE IN FULL COMPLIANCE WITH THE GUIDELINE FOR THE INSTALLATION OF FIRE ALARM SYSTEMS BY NFPA 72, ALL CODES, ORDNANCES, RULES, ORDERS AND OTHER LEGAL REQUIREMENTS OF THE CITY OF AND PUBLIC AUTHORITIES WHICH BEAR ON THE PERFORMANCE OF THIS WORK.
- THE ELECTRICAL CONTRACTOR SHALL INSTALL THE FIRE ALARM SYSTEM COMPLETE AND OPERABLE AS SHOWN ON THE DRAWINGS. ANY ITEM OR SERVICE REQUIRED TO INSTALL, CONSTRUCT, STARTUP OR OPERATE THIS SYSTEM SHALL BE CONSIDERED TO BE INCLUDED IN THIS SCOPE OF WORK EVEN IF IT IS NOT SPECIFICALLY MENTIONED IN THE SPECIFICATIONS OF DRAWINGS.
- FURNISH AND INSTALL AN ADDRESSABLE FIRE ALARM SYSTEM, CONTROL PANEL WITH STYLE "A" INITIATING DEVICE CIRCUITRY AND STYLE "Y" INITIATING APPLIANCE CIRCUITRY. BATTERY BACKUP OPERATION SHALL BE FOR A MINIMUM OF 48 HOURS WITH A FIVE MINUTE RINGDOWN AT THE END OF THE 48 HOUR PERIOD. PROVIDE A NAMEPLATE READING "FIRE ALARM CONTROL PANEL" ON THE FRONT. INSTALL FIRE DEPARTMENT LOCK AS REQUIRED.
- INSTALL 1/2" MINIMUM SIZE EMT CONDUIT WITH COUPLINGS AND EXPANSION JOINTS; FIRE RATED CABLE WITHOUT CONDUIT IS PERMITTED WHERE PERMITTED BY CODE.
- FIRE ALARM CABLE SHALL BE SOLID CONDUCTORS, STRANDED CONDUCTORS ARE NOT ACCEPTABLE.
- FURNISH AND INSTALL END-OF-LINE RESISTORS AND CLEARLY MARK THE LOCATION OF THIS DEVICE.
- ALL SMOKE DETECTORS SHALL BE LOCATED A MINIMUM OF 3'-0" FROM SUPPLY OR RETURN AIR GRILLS.
- BAG ALL SMOKE DETECTORS UNTIL THE FINAL FIRE DEPARTMENT INSPECTION.
- FURNISH AND INSTALL NAMEPLATES IN ACCORDANCE WITH THE FIRE DEPARTMENT GUIDELINES.
- CONNECT DUCT SMOKE DETECTORS IN THE HVAC SYSTEM (FURNISHED BY ELECTRICAL CONTRACTOR AND INSTALLED BY MECHANICAL CONTRACTOR) TO ACTIVATE THE FIRE ALARM SYSTEM AND SHUTDOWN THE HVAC SYSTEM IN THE EVENT OF SMOKE IN THE DUCTS.
- ALL FIRE ALARM SYSTEM COMPONENTS SHALL BE UL LISTED
- FURNISH AND INSTALL KNOX BOX (OR EQUAL), SIZE AND LOCATION AS DIRECTED BY THE FIRE DEPT.
- LOCATE THE DUCT SMOKE DETECTOR TEST STATIONS IN A ACCESSIBLE LOCATION AS INDICATED ON PLANS OR AS DIRECTED BY THE FIRE DEPARTMENT.
- FURNISH & INSTALL FIRE ALARM MASTER BOX OR AUTOMATIC DIALER AND UL LISTED CENTRAL MONITORING STATION ACCORDING TO THE REQUIREMENTS OF THE TOWN FIRE DEPARTMENT, WHEN USING CENTRAL MONITORING STATION INCLUDE ALL ASSOCIATED STARTUP FEES.
- E.C. SHALL PAINT THE CIRCUIT BREAKER FEEDING THE "FAP" RED AND CLEARLY LABEL IT AS "FIRE ALARM PANEL ON THE PANEL DIRECTORY AND ADJACENT TO THE BREAKER. E.C. SHALL PROVIDE A LABEL INSIDE THE "FAP" STATING THE PANEL AND CIRCUIT NUMBER FEEDING THE "FAP". CIRCUIT BREAKER SHALL ALSO BE HANDLE LOCKED ON.
- E.C. SHALL FURNISH AND INSTALL ALL DEVICES REQUIRED BY ALL APPLICABLE CODES OR "AHJ" WHETHER OR NOT SPECIFICALLY SHOWN ON PLAN OR DIAGRAMS.
- FIRE ALARM SYSTEM SHALL BE TESTED AND CERTIFIED BY THE SYSTEMS MANUFACTURING REPRESENTIVE BEFORE FINAL ACCEPTANCE.
- THE FIRE ALARM SYSTEM SUPPLIER IS RESPONSIBLE FOR PROVIDING STAMPED FIRE ALARM SYSTEM DRAWINGS SHOWING CONDUIT LAYOUTS, WIRE FILLS AND SIZES, CIRCUITING, BATTERY CALCULATIONS AND VOLTAGE DROP CALCULATIONS AS REQUIRED FOR PLAN REVIEW AND THIS ENGINEER'S REVIEW.



FIRE ALARM DEVICE SCHEDULE

DESCRIPTION	MANUFACTURER	SYMBOL
FIRE ALARM PANEL "FAP" - 127 Point Addressable panel with battery-backup, digital alarm communicator, and all necessary accessories, hardware, software, programming.	SILENT KNIGHT	"FAP"
REMOTE ANNUNCIATOR PANEL "RAP" - 5860R - Liquid crystal display	SILENT KNIGHT	"RAP"
MANUAL PULL STATION - PSDA single action pull handle, M.H. 48" AFF.	SILENT KNIGHT	□
ANALOG ADDRESSABLE PHOTOELECTRIC SMOKE DETECTOR- SD505-APS	SILENT KNIGHT	⊙
ANALOG ADDRESSABLE HEAT DETECTOR- SD505-AHS	SILENT KNIGHT	⊙
DUCT SMOKE DETECTOR - SD505-ARM addressable base with 4-wire with 2 sets of form "C" contacts, mounted in return air duct and wired to shut down air handler and alarm "FAP" upon detection of smoke. Provide relay interface to "FAP" if required.	SILENT KNIGHT	⊙
REMOTE RESET/TEST SWITCH -SD505-DTS	SILENT KNIGHT	⊙
INDIVIDUAL ADDRESSABLE MODULE (IAM) - SD500-M IM & SD500-AIM	SILENT KNIGHT	□
HORN/STROBE - GES3-24 remote audible visual device. Flush mounted in wall, red. M.H. 80" above highest floor or 6" below ceiling, whichever lower, with AVS44 synchronization control module.	GENTEX	⊙
STROBE- GES3-24WR selectable strobe, flush visual signal, flush mounted in wall, red. Mounting height 80" above highest floor or 6" below ceiling, whichever is lower, with AVS44 synchronization control module.	GENTEX	⊙
ANALOG ADDRESSABLE CARBON MONOXIDE DETECTOR - SK-FIRE-CO	SILENT KNIGHT	⊙
SPRINKLER FLOW AND TAMPER SWITCHES - FURNISHED BY SPRINKLER CONTRACTOR, WIRED BY E.C. TO FIRE ALARM SYSTEM AS REQUIRED. (QUANTITIES AND LOCATIONS SHALL BE DETERMINED BY SPRINKLER CONTRACTOR) E.C. SHALL PROVIDE "ZAM" RELAY MODULES AS REQUIRED.	BY OTHERS	⊙



PARTIAL MAIN FLOOR SYSTEMS PLAN
EXISTING ADMINISTRATION
SCALE: 1/8" = 1'-0"

MJK

Electrical Engineering, LLC
3844 FRY'S VALLEY RD.
PORT WASHINGTON, OHIO 43837
PHONE: 330-432-0781
EMAIL: MIKE@MJKPE.COM

REVISIONS:

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO



THIS DWG :
SYSTEMS PLAN -
EXISTING
ADMINISTRATION

COMM 21161-B
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2664 HARRISBURG RD. NE
CANTON, OHIO



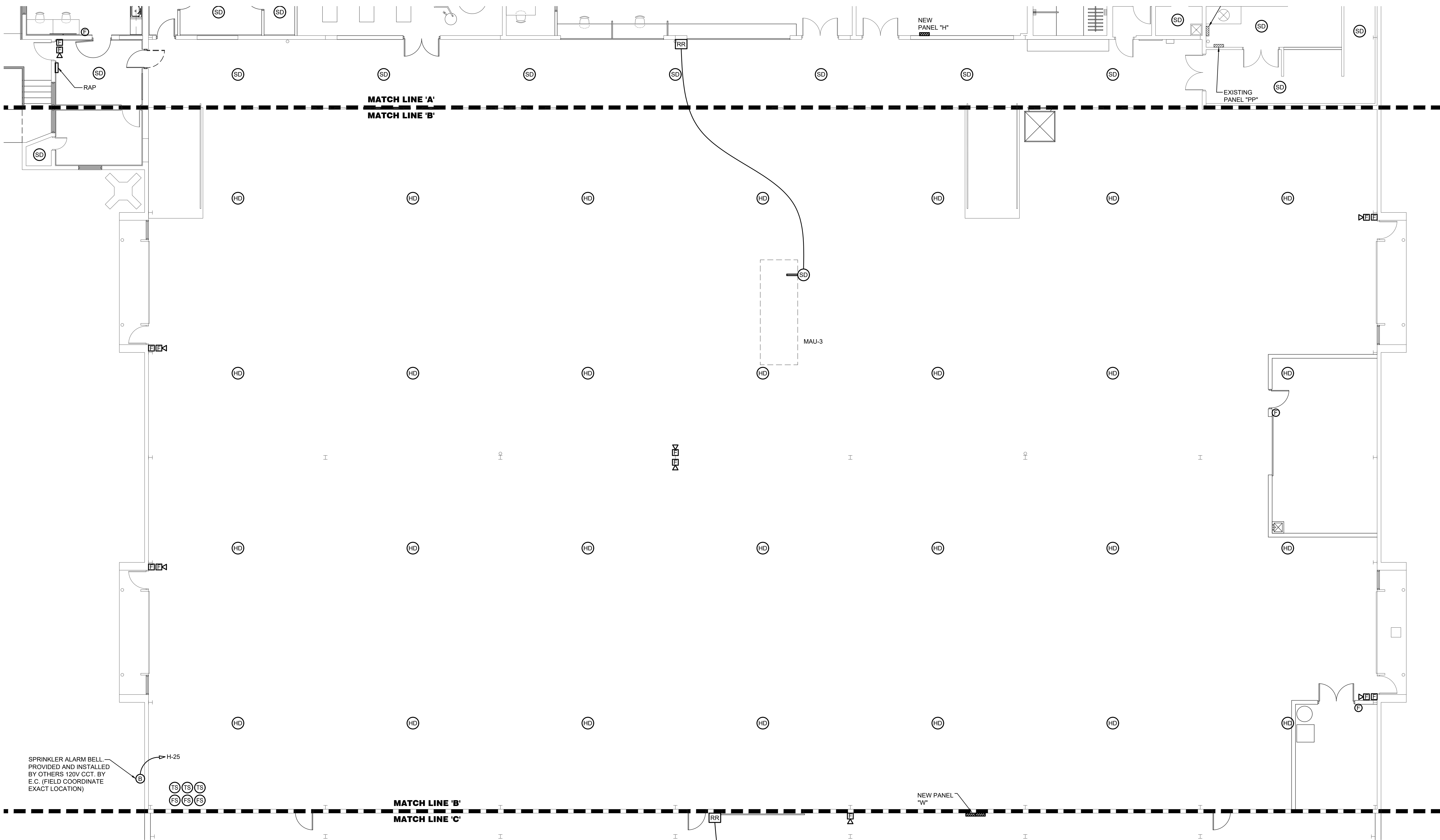
MICHAEL A. MILLER,
LICENSE #E-64962
EXPIRES 12-31-2025

THIS DWG :
SYSTEMS PLAN -
EXISTING
SERVICE SHOP

COMM 21161-B
DATE 02-01-2024

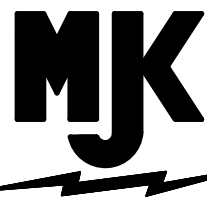
DWG
E-4.2

Plotted 1/17/2024 10:13 PM 623 Canton City Water.dwg



PARTIAL MAIN FLOOR SYSTEMS PLAN
EXISTING SERVICE SHOP

SCALE: 1/8" = 1'-0"



Electrical Engineering, LLC
3844 FRY'S VALLEY RD.
PORT WASHINGTON, OHIO 43837
PHONE: 330-432-0781
EMAIL: MIKE@MKPE.COM

REVISIONS:

600 MARKET AVENUE NORTH CANTON OHIO 44702

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO



MICHAEL A. MILLER,
LICENSE #E-64962
EXPIRES 12-31-2025

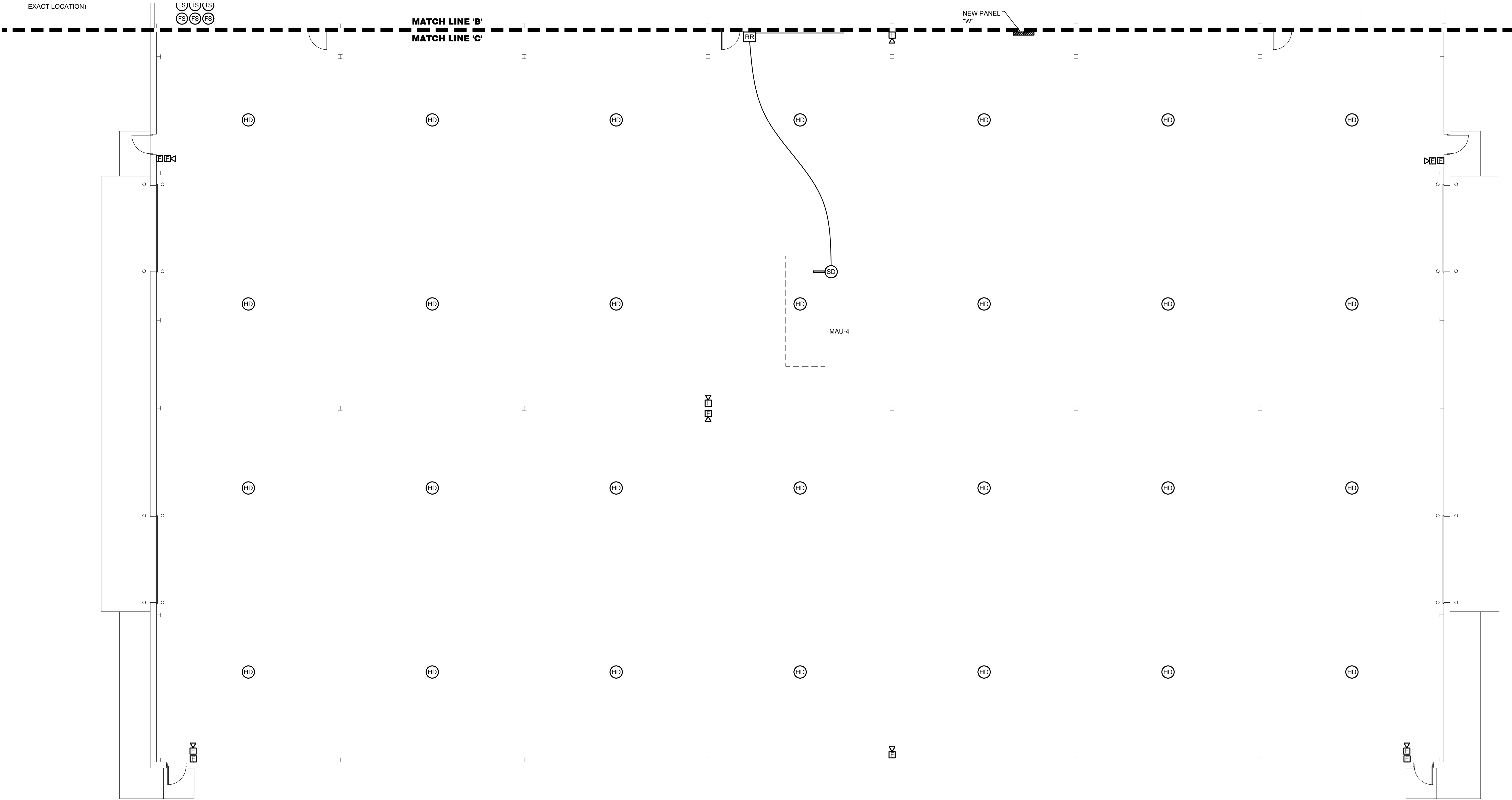
THIS DWG :
SYSTEMS PLAN -
NEW ADDITION

COMM 21161-B
DATE 02-01-2024

DWG
E-4.3



PARTIAL MAIN FLOOR SYSTEMS PLAN
NEW ADDITON
SCALE: 1/8" = 1'-0"





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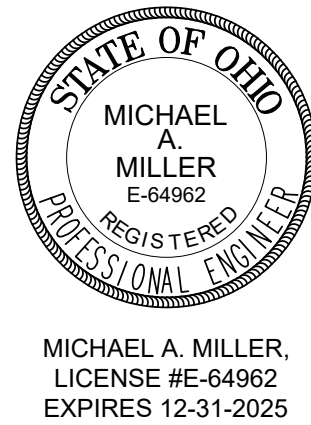
REVISIONS:

CANTON OHIO 44702

600 MARKET AVENUE NORTH

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
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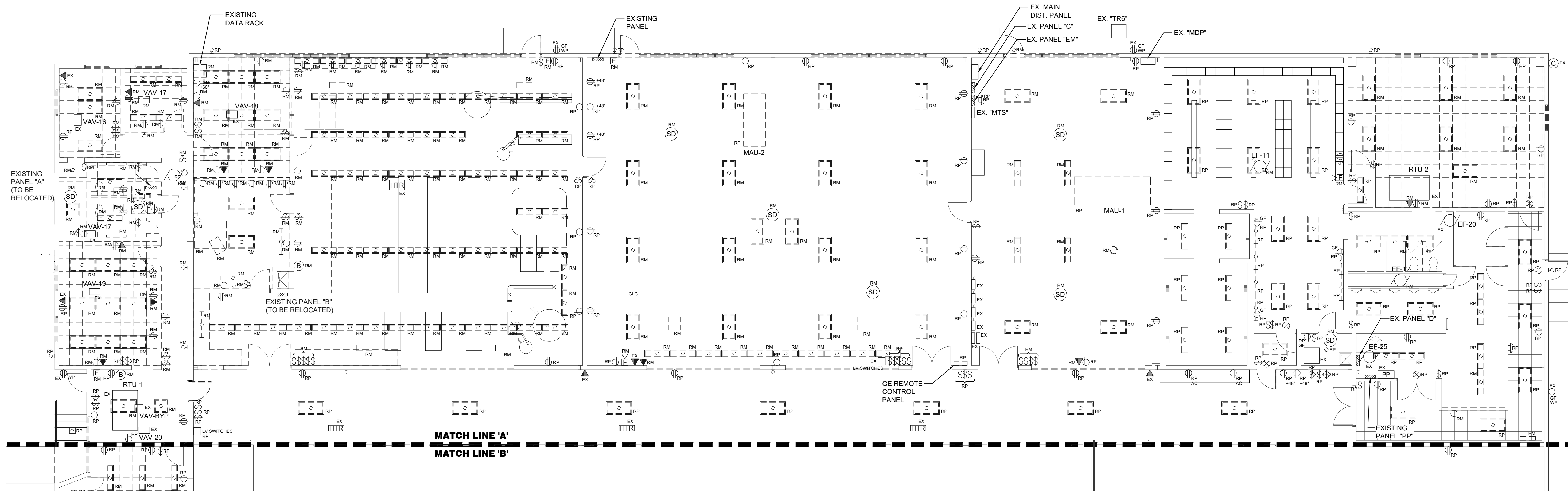
THIS DWG :
DEMO PLAN -
EXISTING
ADMINISTRATION

COMM 21161-B
DATE 02-01-2024

DWG
E-5.1

DEMOLITION NOTES:

1. E.C. SHALL REMOVE ALL ELECTRICAL WIRE, CONDUIT, MOUNTING STRAPS, AND DEVICES FOR EQUIPMENT SHOWN ON DEMOLITION PLAN BACK TO SOURCE OF SUPPLY.
2. DEMOLITION PLAN SHOWS EQUIPMENT TO BE REMOVED IN ITS ENTIRETY ONLY. ALL DEVICES, EQUIPMENT OR FIXTURES TO BE REPLACED ARE INDICATED ON THE RESPECTIVE LIGHTING AND POWER PLANS.
3. E.C. SHALL BE RESPONSIBLE FOR PROPER DISPOSAL, OFF SITE, OF ALL ELECTRICAL EQUIPMENT TO BE REMOVED UNLESS SPECIFICALLY DIRECTED OTHERWISE BY OWNER OR ARCHITECT. OWNER RESERVES THE RIGHT TO KEEP EXISTING DEVICES, FIXTURES OR EQUIPMENT FOR FUTURE USE OR FOR RECYCLING PURPOSES. E.C. SHALL COORDINATE WITH OWNER DURING CONSTRUCTION.
4. WHERE REMOVAL OF ANY ELECTRICAL DEVICE, FIXTURE, OR EQUIPMENT CAUSES INTERRUPTION OF POWER TO A DEVICE, FIXTURE OR EQUIPMENT TO REMAIN, E.C. SHALL EXTEND CIRCUITRY AS NECESSARY FOR PROPER OPERATION.
5. DEMOLITION PLANS ARE SHOWN ON THESE DRAWINGS TO ASSIST THE E.C. WITH PROVIDING A BID ONLY. THE E.C. SHALL VISIT THE SITE, REVIEW THE ARCHITECTURAL DEMOLITION PLANS, AND INCLUDE ALL REQUIRED DEMOLITION IN HIS BID FOR A COMPLETE AND OPERABLE SYSTEM AS DESIGNED HEREIN.
6. WHERE NEW FINISHES ARE NOT BEING PROVIDED BY G.C., E.C. SHALL PATCH ALL HOLES THROUGH WALLS, CEILINGS, OR FLOORS RESULTING FROM THE DEMOLITION/REMOVAL OF ANY GIVEN FIXTURE, DEVICE, OR CONDUIT. PAINT PATCHED AREA TO MATCH EXISTING.
7. ALL EXISTING, UNUSED WIRING SHALL BE REMOVED IN ITS ENTIRETY UNLESS SPECIFICALLY DESIGNATED AND TAGGED FOR FUTURE USE.



PARTIAL MAIN FLOOR DEMO PLAN
EXISTING ADMINISTRATION
SCALE: 1/8" = 1'-0"



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3844 FRY'S VALLEY RD.
PORT WASHINGTON, OHIO 43837
PHONE: 330-432-0781
EMAIL: MIKE@MKPE.COM

REVISIONS:

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600 MARKET AVENUE NORTH

MOTTER & MEADOWS
ARCHITECTS

GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
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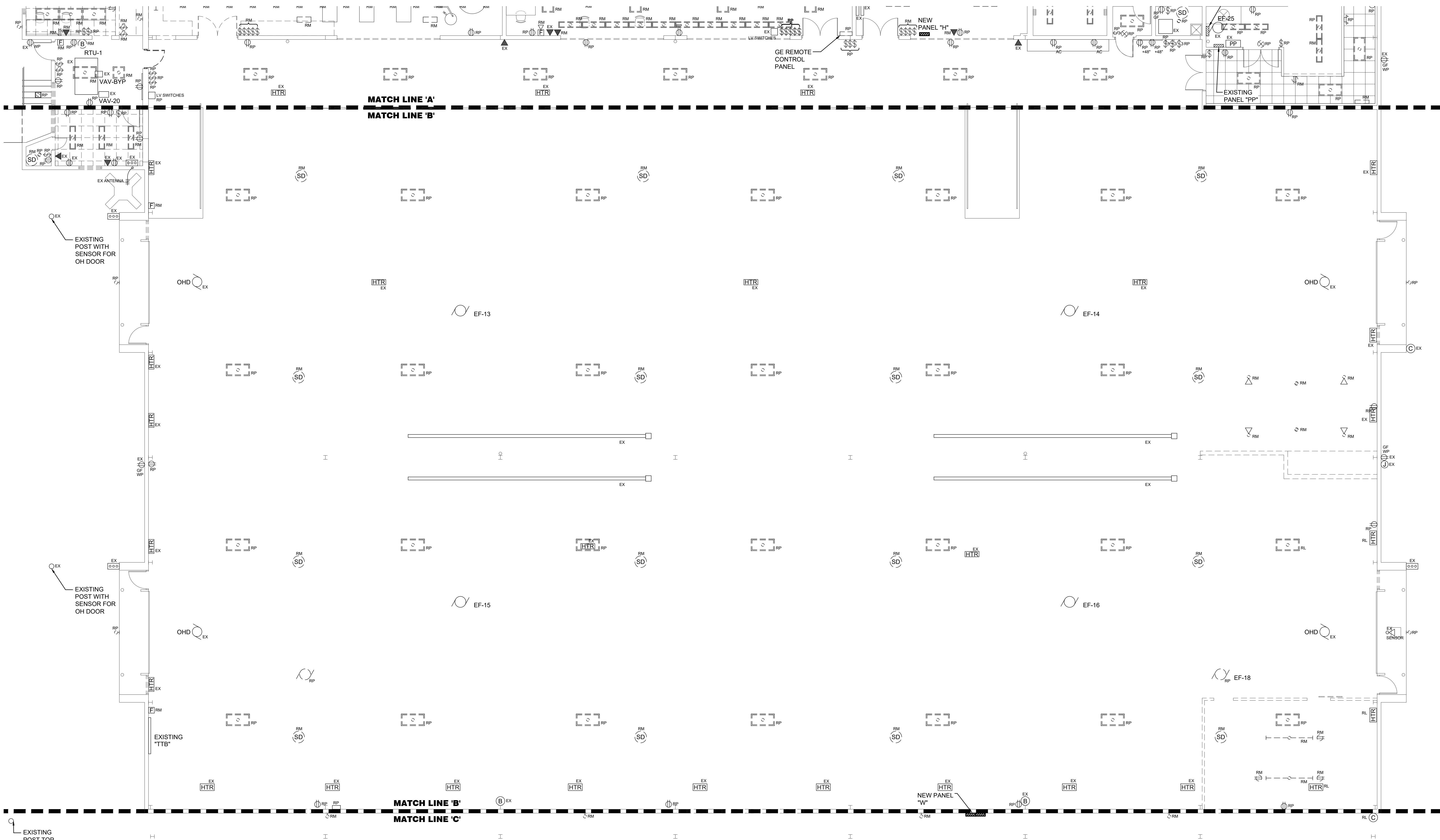


THIS DWG :
DEMO PLAN -
EXISTING
SERVICE SHOP

COMM 21161-B
DATE 02-01-2024

DWG
E-5.2

Plotted: 1/17/2024 10:13 PM 623 Canton City Water.dwg



PARTIAL MAIN FLOOR DEMO PLAN
EXISTING SERVICE SHOP
SCALE: 1/8" = 1'-0"



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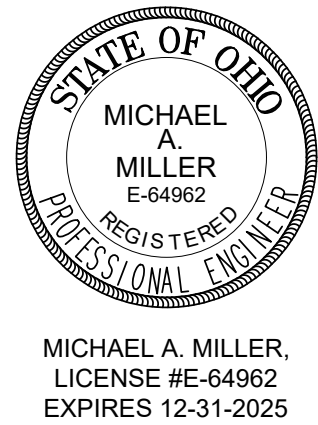
REVISIONS:

CANTON OHIO 44702

600 MARKET AVENUE NORTH

MOTTER & MEADOWS
ARCHITECTS

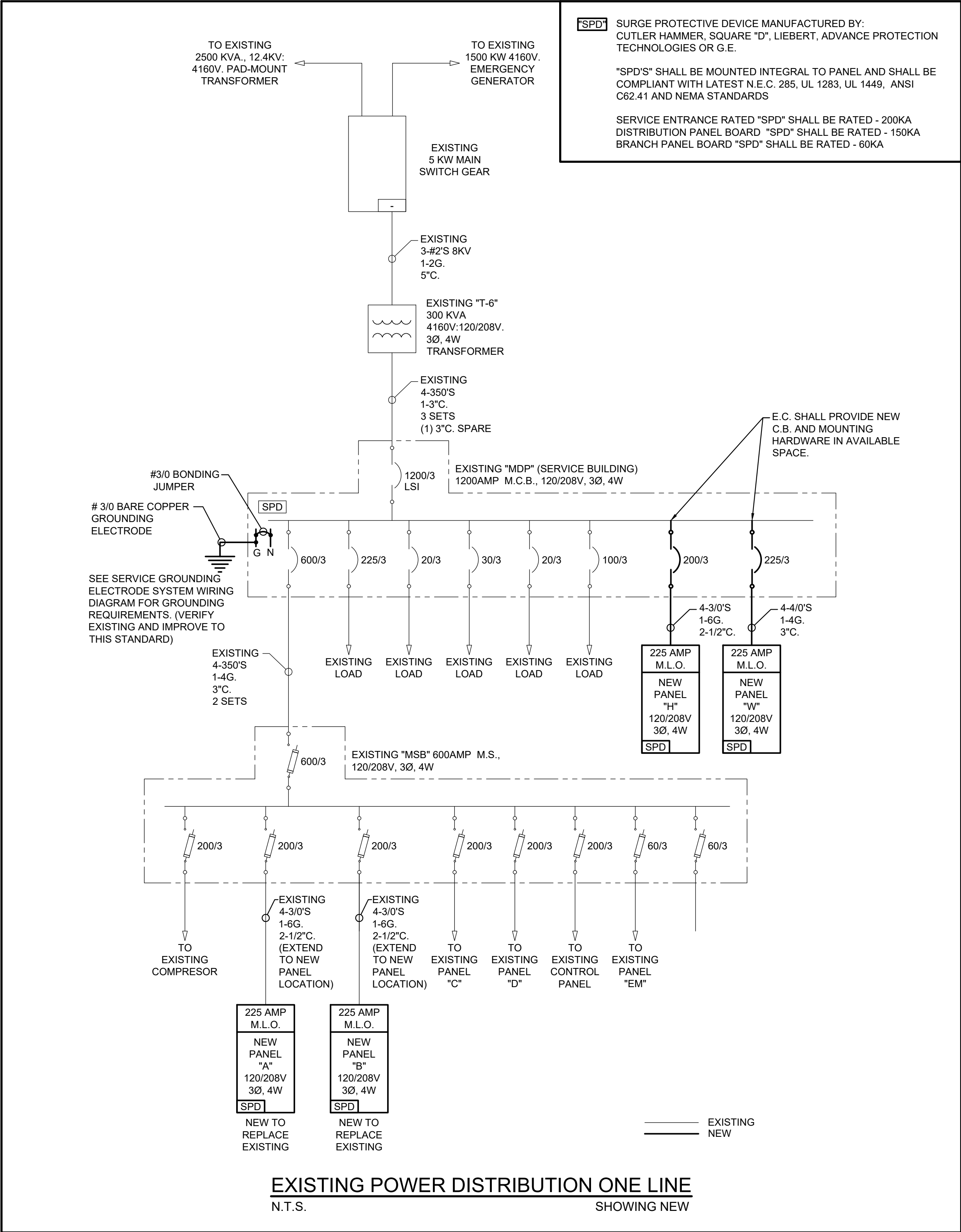
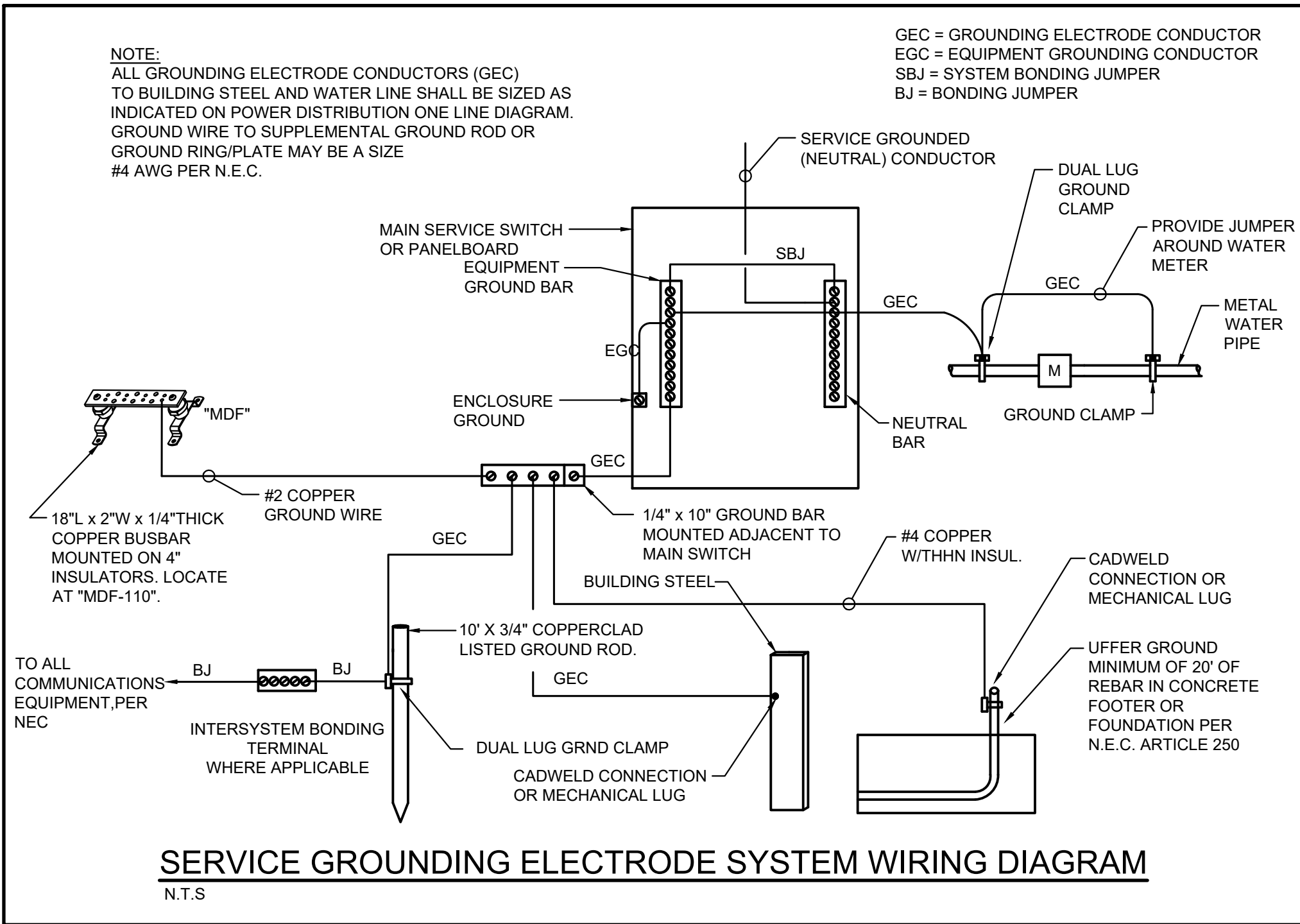
GARAGE ADDITION
WATER DEPARTMENT SERVICE CENTER
2664 HARRISBURG RD. NE
CANTON, OHIO



THIS DWG :
EX. POWER DIST.
1 LINE

COMM 21161-B
DATE 02-01-2024

DWG
E-6.1





Electrical Engineering, LLC
3844 FRYS VALLEY RD.
PORT WASHINGTON, OHIO 43837
PHONE: 330-432-0781
EMAIL: MIKE@MKPE.COM

REVISIONS:
02-24-2024 REVISION #1

PANEL A (NEW PANEL TO REPLACE EXISTING)			PANEL TYPE <u>SQ D QO</u> FLUSH MOUNTED MAINS RATING <u>225A</u> M.L.O. A.I.C. RATING <u>10,000</u> AMPS			LOCATION <u>SERVICE ADMIN 104</u> <u>120/208</u> VOLT <u>3</u> PHASE <u>4</u> WIRE NEMA <u>1</u>						
[SPD]												
GROUP	WIRE AWG	TRIP	ASSIGNMENT	CONDUIT	LOAD (VA)	PHASE	LOAD (VA)	CONDUIT	ASSIGNMENT	TRIP	WIRE AWG	CIRCUIT
1	12	20/1	RECEPTACLE	3/4	720	A	360	3/4	RECEPTACLE	20/1	12	2
3	12	20/1	RECEPTACLE	3/4	360	B	540	3/4	RECEPTACLE	20/1	12	4
5	12	20/1	RECEPTACLE	3/4	360	C	360	3/4	RECEPTACLE	20/1	12	6
7	12	20/1	REFRIGERATOR "GF"	3/4	1000	A	600	3/4	EH-1	20/1	12	8
9	12	20/1	FAP "HLOI"	3/4	500	B	360	3/4	RECEPTACLE	20/1	12	10
11	20/1		SPARE		-	C	-		SPARE	20/1		12
13	20/1		SPARE		-	A	-		SPARE	20/1		14
15	20/1		SPARE		-	B	-		SPARE	20/1		16
17	20/1		SPARE		-	C	-		SPARE	20/1		18
19	20/1		SPARE		-	A	-		SPARE	20/1		20
21	20/1		SPARE		-	B	-		SPARE	20/1		22
23	20/1		SPARE		-	C	-		SPARE	20/1		24
25	20/1		SPARE		-	A	-		SPARE	20/1		26
27	30/2	●	** EXISTING LOAD	3/4	1750	B	1750		EXISTING LOAD **	●	30/2	28
29					1750	C	1750					30
31	30/2	●	** EXISTING LOAD	3/4	1750	A	1750		EXISTING LOAD **	●	30/2	32
33					1750	B	1750					34
35	30/2	●	** EXISTING LOAD	3/4	1750	C	1750		EXISTING LOAD **	●	30/2	36
37					1750	A	1750					38
39	20/2	●	** EXISTING LOAD	3/4	1200	B	1750		EXISTING LOAD **	●	30/2	40
41					1200	C	1750					42
CONNECTED LOAD PER PHASE					A	B	C	A	B	C	TOTAL CONNECTED LOAD	
					5220	5580	5060	6210	6150	5610	33,810	WATTS
REMARKS: 1) "GF" = GROUND FAULT CIRCUIT BREAKER. 2) "HLOI" = HANDLE LOCK ON. 3) "ST" = SHUNT TRIP CIRCUIT BREAKER. 4) ** = EXISTING LOAD RECONNECTED TO NEW PANEL "A", EXTEND EXISTING FEEDER TO NEW PANEL LOCATION.												

PANEL B (NEW PANEL TO REPLACE EXISTING)				PANEL TYPE <u>SQ D QO</u> FLUSH MOUNTED MAINS RATING <u>225A</u> M.L.O. A.I.C. RATING <u>10,000</u> AMPS				LOCATION <u>WORKROOM 109</u> <u>120/208</u> VOLT <u>3</u> PHASE <u>4</u> WIRE NEMA <u>1</u>				
[SPD]												
CIRCUIT	WIRE AWG	TRIP	ASSIGNMENT	CONDUIT	LOAD (VA)	PHASE	LOAD (VA)	CONDUIT	ASSIGNMENT	TRIP	WIRE AWG	CIRCUIT
1	12	20/1	RECEPTACLE	3/4	900	A	360	3/4	RECEPTACLE	20/1	12	2
3	12	20/1	RECEPTACLE	3/4	900	B	360	3/4	RECEPTACLE	20/1	12	4
5	12	20/1	RECEPTACLE	3/4	900	C	360	3/4	RECEPTACLE	20/1	12	6
7	12	20/1	RECEPTACLE	3/4	540	A	540	3/4	RECEPTACLE	20/1	12	8
9	12	20/1	REFRIGERATOR "GF"	3/4	1000	B	900	3/4	RECEPTACLE	20/1	12	10
11	12	20/1	RECEPTACLE	3/4	360	C	720	3/4	RECEPTACLE	20/1	12	12
13	12	20/1	RECEPTACLE	3/4	360	A	500	1	SIGN	20/1	10	14
15	12	20/1	RECEPTACLE MDF-110	3/4	-	B	-		SPARE	20/1	16	16
17	12	20/1	CARD READER	3/4	500	C	-		SPARE	20/1	18	18
19	20/1		SPARE		-	A	-		SPARE	20/1	20	20
21	20/1		SPARE		-	B	-		SPARE	20/1	22	22
23	20/1		SPARE		-	C	-		SPARE	20/1	24	24
25	20/1		SPARE		-	A	-		SPARE	20/1	26	26
27	20/1		SPARE		-	B	-		SPARE	20/1	28	28
29	20/1		SPARE		-	C	-		SPARE	20/1	30	30
31	20/1		SPARE		-	A	-		SPARE	20/1	32	32
33	10	30/2	MDF-110 UPS RECEPT.	3/4	1664	B	-		SPARE	20/1	34	34
35					1664	C	-		SPARE	20/1	36	36
37					1923	A	-		SPARE	20/1	38	38
39					1923	B	-		SPARE	20/1	40	40
41	30/3		** EXISTING RTU		1922	C	-		SPARE	20/1	42	42
CONNECTED LOAD PER PHASE					A	B	C	A	B	C	TOTAL CONNECTED LOAD	
					3723	5487	5346	1400	1260	1080	18,296 WATTS	
REMARKS: 1) "GF" = GROUND FAULT CIRCUIT BREAKER. 2) "HLOI" = HANDLE LOCK ON. 3) "ST" = SHUNT TRIP CIRCUIT BREAKER. 4) ** = EXISTING LOAD RECONNECTED TO NEW PANEL "A", EXTEND EXISTING FEEDER TO NEW PANEL LOCATION.												

PANEL EM (EXISTING PANEL)				PANEL TYPE <u>WESTINGHOUSE NOB</u> SURFACE MOUNTED MAINS RATING <u>100A</u> M.L.O. A.I.C. RATING <u>10,000</u> _____AMPS				LOCATION <u>STORAGE 114</u> <u>120/208</u> VOLT <u>3</u> PHASE <u>4</u> WIRE NEMA <u>1</u>				
CIRCUIT	WIRE AWG	TRIP	ASSIGNMENT	CONDUIT		PHASE		CONDUIT	ASSIGNMENT	TRIP	WIRE AWG	CIRCUIT
1		20/1	EXISTING LIGHTING		✓	A	✓		EXISTING LIGHTING	20/1		2
3		20/1	EXISTING RECP		✓	B	✓		EXISTING LIGHTING	20/1		4
5		20/1	EXISTING RECP		✓	C	✓		EXISTING LIGHTING	20/1		6
7		20/1	EXISTING RECP		✓	A	✓		EXISTING RECP	20/1		8
9	●				✓	B	✓					10
11	●	20/3	EX. N.E. DOOR OPENER		✓	C	✓		EX. N.W. DOOR OPENER	● 20/3		12
13					✓	A	✓					14
15					✓	B	✓					16
17	●	20/3	EX. S.E. DOOR OPENER		✓	C	✓		EX. S.W. DOOR OPENER	● 20/3		18
19					✓	A	✓					20
21					✓	B	✓					22
23					✓	C	✓					24
REMARKS: 1) "GF" = GROUND FAULT CIRCUIT BREAKER. 2) "HLOI" = HANDLE LOCK ON. 3) "ST" = SHUNT TRIP CIRCUIT BREAKER. 4) * = NEW LOAD AND CIRCUIT BREAKER IN AVAILABLE SPACE. 5) ** = NEW LOAD ON EXISTING SPARE CIRCUIT BREAKER.												

PANEL C			PANEL TYPE		WESTINGHOUSE NOB		LOCATION		STORAGE 114			
(EXISTING PANEL)			SURFACE MOUNTED				120/208		VOLT 3 PHASE 4 WIRE			
			MAINS RATING		225A M.L.O.		NEMA		1			
			A.I.C. RATING		10,000		AMPS					
CIRCUIT	WIRE AWG	TRIP	ASSIGNMENT	CONDUIT		PHASE		CONDUIT	ASSIGNMENT	TRIP	WIRE AWG	CIRCUIT
1		20/1	EXISTING LIGHTING		✓	A	✓		EXISTING LIGHTING	20/1		2
3		20/1	EXISTING LIGHTING		✓	B	✓		EXISTING LIGHTING	20/1		4
5		20/1	EXISTING LIGHTING		✓	C	✓		EXISTING LIGHTING	20/1		6
7		20/1	EXISTING LIGHTING		✓	A	✓	3/4	LVP1 **	20/1	12	8
9		20/1	EXISTING LIGHTING		✓	B	✓		EXISTING LIGHTING	20/1		10
11		20/1	EXISTING LIGHTING		✓	C	✓		EXISTING LIGHTING	20/1		12
13		20/1	EXISTING LIGHTING		✓	A	✓		EXISTING LIGHTING	20/1		14
15		20/1	EXISTING LIGHTING		✓	B	✓		EXISTING LIGHTING	20/1		16
17		20/1	EXISTING LIGHTING		✓	C	✓		EXISTING LIGHTING	20/1		18
19		20/1	EXISTING LIGHTING		✓	A	✓		EXISTING LIGHTING	20/1		20
21		20/1	EXISTING LIGHTING		✓	B	✓		EXISTING RECPs	20/1		22
23		20/1	EXISTING LIGHTING		✓	C	✓		EXISTING LIGHTING	20/1		24
25		20/1	EXISTING HEATERS		✓	A	✓		EXISTING LIGHTING	20/1		26
27	20/2	●	EXISTING LIGHTING		✓	B	✓		EXISTING RELAY	20/1		28
29		●			✓	C	✓		EXISTING LOAD	20/2	●	30
31	20/2	●	EXISTING LOAD		✓	A	✓		EXISTING LOAD	20/2	●	32
33		●			✓	B	✓		EXISTING LOAD	20/2	●	34
35	20/1		EXISTING LOAD		✓	C	✓					36
37		●			✓	A	✓		EXISTING LOAD	20/1		38
39	70/3	●	EXISTING LOAD		✓	B	✓		EXISTING LOAD	20/1		40
41		●			✓	C	✓					42

REMARKS: 1) "GF" = GROUND FAULT CIRCUIT BREAKER. 2) "HLOI" = HANDLE LOCK ON. 3) "ST" = SHUNT TRIP CIRCUIT BREAKER.
4) * = NEW LOAD AND CIRCUIT BREAKER IN AVAILABLE SPACE. 5) ** = NEW LOAD ON EXISTING SPARE CIRCUIT BREAKER.

PANEL D (EXISTING PANEL)			PANEL TYPE WESTINGHOUSE NOB		LOCATION STORAGE 123					
			SURFACE MOUNTED		120/208 VOLT 3 PHASE 4 WIRE					
			MAINS RATING 225A M.L.O.		NEMA 1					
			A.I.C. RATING 10,000 AMPS							
CIRCUIT	WIRE AWG	TRIP	ASSIGNMENT	CONDUIT	PHASE	CONDUIT	ASSIGNMENT	TRIP	WIRE AWG	CIRCUIT
1		20/1	EXISTING LIGHTING	✓	A	✓	EXISTING LIGHTING	20/1		2
3		20/1	EXISTING LIGHTING	✓	B	✓	EXISTING LIGHTING	20/1		4
5		20/1	EXISTING HEATER	✓	C	✓	EXISTING LIGHTING	20/1		6
7		20/1	EXISTING FAN	✓	A	✓	EXISTING LIGHTING	20/1		8
9		20/1	EXISTING LIGHTING	✓	B	✓	EXISTING HEATER	20/1		10
11		20/1	EXISTING HEATERS	✓	C	✓	EXISTING TUBE HEATERS	20/1		12
13		20/1	EXISTING DOCK HEAT	✓	A	✓	EXISTING HEATER	20/1		14
15		20/1	EXISTING HEAT	✓	B	✓	EXISTING TUBE HEATERS	20/1		16
17		20/1	EXISTING FAN	✓	C	✓	EXISTING RECPs	20/1		18
19		20/1	EXISTING RECPs	✓	A	✓	EXISTING PLUG STRIP	20/1		20
21		20/1	EXISTING STOP CLOCK	✓	B	✓	EXISTING PLUG STRIP	20/1		22
23		20/1	EXISTING RECPs	✓	C	✓	EXISTING PLUG STRIP	20/1		24
25		20/1	EXISTING RECPs	✓	A	✓	SPARE	20/1		26
27		20/1	EXISTING RECPs	✓	B	✓	EXISTING LIGHTING	20/1		28
29		20/1	EXISTING LOAD	✓	C	✓	EXISTING LIGHTING	20/1		30
31		30/2	EXISTING LOAD	✓	A	✓	EXISTING WATER SOFTNR	30/2		32
33				✓	B	✓				34
35	12	20/1	* RECEPTACLE	3/4	✓	C	EXISTING LOAD	15/3		36
37	12	20/1	* REFRIGERATOR "GF"	3/4	✓	A				38
39	12	20/1	* RECEPTACLE	3/4	✓	B				40
41	12	20/1	* RECEPTACLE	3/4	✓	C				42

REMARKS: 1) "GF" = GROUND FAULT CIRCUIT BREAKER. 2) "HLOI" = HANDLE LOCK ON. 3) "ST" = SHUNT TRIP CIRCUIT BREAKER.
4) * = NEW LOAD AND CIRCUIT BREAKER IN AVAILABLE SPACE. 5) ** = NEW LOAD ON EXISTING SPARE CIRCUIT BREAKER.

PANEL W (NEW PANEL)		PANEL
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Code of Federal Regulations

Title 45 - Public Welfare

Volume: 4

Date: 2010-10-01

Original Date: 2010-10-01

Title: Section 2543.87 - Byrd anti-lobbying amendment.

Context: Title 45 - Public Welfare. Subtitle B - Regulations Relating to Public Welfare (Continued).

CHAPTER XXV - CORPORATION FOR NATIONAL AND COMMUNITY SERVICE. PART 2543 - GRANTS AND AGREEMENTS WITH INSTITUTIONS OF HIGHER EDUCATION, HOSPITALS, AND OTHER NON-PROFIT ORGANIZATIONS. Subpart E - Statutory Compliance.

§ 2543.87

Byrd anti-lobbying amendment.

Contractors who apply or bid for an award of \$100,000 or more shall file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient.

ODOT Office of Local Programs Notice to the Industry

In December 2014, a compliance review of ODOT's Disadvantaged Business Enterprise (DBE) Program was conducted by the Federal Highway Administration's (FHWA's) Office of Civil Rights. A subsequent review was conducted in June 2015. The purpose of the reviews was to determine ODOT's compliance with the DBE program regulations found in 49 CFR Part 26.

In the end, it was determined that the ODOT DBE Program was noncompliant with Federal regulations. A total of 32 areas were identified in which the Department was deficient in implementing the Federal requirements; 7 of these were directly related to the Local Let program.

As a result of those findings, ODOT and FHWA entered into a Conciliation Agreement in September 2015 to address those areas of noncompliance in ODOT's DBE program. Since the inception of this agreement, the Office of Local Programs has played an integral part in addressing specific deficiencies related to the Local Let program and has worked to develop solutions to ensure compliance.

Following, are the programmatic and process changes that have been or will be implemented by ODOT's Office of Local Programs to address these seven areas.

PN007

This Note is a Local-let specific version of the ODOT-let PN 007 that was drafted in December of 2019. Requirements to monitor DBE Trucking have been updated to a monthly process that will be completed as part of the Trucking Affidavit Section on the new Prompt Payment Spreadsheet (*see PN31 Prompt Payment guidance below*). The Prime Contractor will be required to monitor trucking firms being used on the project and make appropriate selections on the Affidavit section of the Prompt Payment Spreadsheet.

Training and Guidance for this process can be located at:

<https://www.transportation.ohio.gov/wps/portal/gov/odot/programs/local-programs/resources/prompt-pay>

PN13

A Local-let specific version of PN 13 was finalized and added to the Bid Doc Template in March of 2019. This proposal note outlines the requirements for identifying DBEs pre-award who will be utilized to meet the established project goals through the Utilization and Affirmation processes. This Proposal Note also provides defining criteria for Good Faith Efforts, termination, and the replacement of DBE firms.

Good Faith Efforts, termination, and replacement guidance may be located at:

<https://www.transportation.ohio.gov/wps/portal/gov/odot/programs/business-economic-opportunity/dbe/dbe-resources>

For reference purposes, the Local-let Bid Doc Template may be found in the Forms/Bid Preparation Section at the following web page address:

<https://www.transportation.ohio.gov/wps/portal/gov/odot/working/publications/local-let-manual>

PN31

This Proposal Note was developed to outline the new comprehensive Prompt Payment and Commercially Useful Function (CUF) Procedures via the GoFormz platform. A template for this form may be found and submitted via the GoFormz website located at www.goformz.com (see *detailed directions for creating an account below*).

The Code of Federal Regulations (CFR), 49 CFR Part 26. Within 49 CFR Part 26, 49 CFR 26.29 define the prompt payment requirements that apply to ODOT (the Department), its subrecipients (LPA's), and, by extension, both Prime Contractors and Subcontractors (including non-DBEs). The Prime Contractor must comply with this Proposal Note and the Department's prompt payment requirements as published in Section 107.21 of the Construction and Materials Specifications (C&MS).

Additionally, ODOT will monitor payments made by Prime Contractors and Subcontractors for compliance with this Proposal Note, C&MS 107.21 and, where applicable, 49 CFR 26.29. To facilitate this monitoring, the Department requires prime contractors to report their payments to all subcontractors with the submission of each invoice. The payment data reported must include any retainage withheld and any previously withheld retainage released. All such reporting will take place through a web-based submission on a customized version of ODOT's GoForms, which will be directly routed to a project specific folder on a SharePoint site created by each district.

Invoices will not be approved and processed for payment unless this reporting form has been submitted and received by the Department.

To obtain a GoFormz account, you must first register and obtain a MyODOT account. To do this, please click [Link](#) and follow directions outlined on the website. Two process flowcharts linked below have also been provided to assist in better understanding this process.

<https://www.transportation.ohio.gov/static/Working/data-tools/PromptPay/Visio-LPA-LocalPublicAgency-access-GoFormz-SharePoint.pdf>

<https://www.transportation.ohio.gov/static/Working/data-tools/PromptPay/Visio-LPA-PrimeContractoraccess-GoFormz.pdf>

Once a MyODOT account has been set up, the account holder will need to email: GoFormz.Help@dot.ohio.gov

- In the Subject Line type Create GoFormz Account;
- After, a Login for Goformz will be emailed back to the sender, then
- Click www.goformz.com to access GoFormz and set up your account

You may access online training for Prompt Payment and CUF on the Local Programs LTAP page at the following web address:

http://www.dot.state.oh.us/Divisions/Planning/LocalPrograms/LTAP/Pages/Ohio_LTAP_eLearning.aspx

Additionally, a very beneficial GoFormz training/ YouTube webinar recording can be found at:

https://youtu.be/hes_7zi2n2U

PN32

To ensure compliance with State and Federal laws which require all contractors and subcontractors to be documented in writing and in conformity with all applicable laws and regulations, the Department will require that a C92 form be completed for each subcontractor and material supplier working on the project prior to their starting work via electronic C92 GoFormz (*process to access GoFormz described above*) which will automatically be uploaded to the respective District SharePoint site. This requirement will go into effect immediately for all Local-let projects advertising after 1/31/2021.

Additionally, this requirement allows the Department to accurately and fully track DBE participation, both race-neutral and race-conscious. This is necessary for semi-annual reporting to FHWA.

District LPA staff will grant SharePoint access to the appropriate LPA personnel enabling them to view and monitor project documentation. The Project Engineer or LPA Designee will be required to verify that a C92 GoFormz has been submitted for each subcontractor working on the project, and this requirement will also be routinely monitored by the District Construction Monitor to ensure compliance.

PN126

This Proposal Note must be used on all Local-let Design Build projects using the 2019 C&MS. The note revises Section 100 – General Provisions of the ODOT 2019 C&MS to be specific for LPAs. PN126 closely resembles the same note used on ODOT-let Design Build projects. The major update is the Prime Contractor's contractual obligation to make payment to each consultant, subcontractor, and supplier within 10 Calendar Days after receipt of payment from either the Department or LPA. Also, the Prime Contractor shall ensure this contractual obligation is placed in all consultants, subconsultants, subcontractor and supplier contracts that it enters into and further require that all consultants, subconsultants subcontractor and suppliers place the same payment obligation in each of their lower tier contracts.

For reference purposes, the Local-let Design Build Bid Doc Template may be found in the Forms/Bid Preparation Section at the following web page address:

<https://www.transportation.ohio.gov/wps/portal/gov/odot/working/publications/local-let-manual>

Commercially Useful Function (CUF) Training

Training for CUF and Prompt Payment is located at the following web address:

http://www.dot.state.oh.us/Divisions/Planning/LocalPrograms/LTAP/Pages/Ohio_LTAP_eLearning.aspx

Additional Updates to the LTP Manual of Procedures – Construction Chapter

Clarification on Retainage Requirements

In accordance with Article XVIII, Section 3 of the Ohio Constitution, and Ohio's home rule law, the Department allows LPA program recipients the full flexibility to withhold retainage from the prime in strict accordance with sections 153.12 and 153.14 of the Revised Code, and pursuant to 49 CFR 26.29(b)(3).

Should an LPA exercise its option to retain funds, it must be done so in strict accordance with the rules outlined above. Additionally, LPAs who choose to do so, shall monitor the return of retainage and may withhold retainage by selecting one of three specified methods outlined in 49 CFR 26.29(b)(3):

(1) LPA may decline to hold retainage from prime contractors and prohibit prime contractors from holding retainage from sub-contractors.

(2) LPA may decline to hold retainage from prime contractors and require a contract clause obligating prime contractors to make prompt and full payment of any retainage kept by prime contractor to the subcontractor within 30 days after the subcontractor's work is satisfactorily completed.

(3) LPA may hold retainage from prime contractors and provide for prompt and regular incremental acceptances of portions of the prime contract, pay retainage to prime contractors based on these acceptances, and require a contract clause obligating the prime contractor to pay all retainage owed to the subcontractor for satisfactory completion of the accepted work within 30 days after your payment to the prime contractor.

FHWA Form 1273

A process has been outlined in the Construction Chapter of the LPA Manual of Procedures to ensure that the FHWA Form 1273 is physically incorporated into all Local-let construction contract and subcontract agreements (excluding purchase orders, rental agreements and other agreements for supplies or services). The LPA will be required to collect all contracts, subcontracts, and lower-tier contracts on the project from the Prime Contractor to verify Form FHWA-1273 has been physically incorporated. The LPA must then affirm the physical incorporation of Form FHWA-1273 by completing Appendix M – Form FHWA-1273 Subcontract Agreement Check.

The Construction Chapter of the LPA Manual of Procedures may be found at the following web page address: <https://www.transportation.ohio.gov/wps/portal/gov/odot/working/publications/local-let-manual>

Ensuring Continued Compliance

Moving forward, ODOT has committed to meet required corrective actions outlined in the Conciliation Agreement and ensuring that the Local-let Program is compliant with the DBE program requirements and regulations.

If there are any additional questions or comments, please do not hesitate to contact any of the individuals listed below.

Contact Information:

Any questions regarding the update outlined above should be directed to the following:

Office of Local Programs:

Jeff Peyton: 614-466-2032

Jeff Shaner: 614-644-6394

All questions regarding the **GoFormz** application can be directed to the following email address GoFormz.Help@dot.ohio.gov or the Admin Owners below.

GoFormz Admin Owners:

Janet Treadway: 614-466-7514

Tia Williams-Hayes: 614-644-6463

Code of Federal Regulations

Title 2 - Grants and Agreements

Volume: 1

Date: 2015-01-01

Original Date: 2015-01-01

Title: Section Â§ 200.322 - Procurement of recovered materials.

Context: Title 2 - Grants and Agreements. Subtitle A - Office of Management and Budget Guidance for Grants and Agreements. CHAPTER II - OFFICE OF MANAGEMENT AND BUDGET GUIDANCE. - Reserved. PART 200 - UNIFORM ADMINISTRATIVE REQUIREMENTS, COST PRINCIPLES, AND AUDIT REQUIREMENTS FOR FEDERAL AWARDS. Subpart D - Post Federal Award Requirements. - Procurement Standards.

§ 200.322

Procurement of recovered materials.

A non-Federal entity that is a state agency or agency of a political subdivision of a state and its contractors must comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds \$10,000 or the value of the quantity acquired during the preceding fiscal year exceeded \$10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.

[78 FR 78608, Dec. 26, 2013, as amended at 79 FR 75885, Dec. 19, 2014]

Prohibition on Covered Telecommunications and Video Surveillance Services or Equipment

Grants and Loans

This document is designed to address common questions regarding the Office of Management and Budget’s (OMB) implementation of section 889(b) of the National Defense Authorization Act (NDAA) of Fiscal Year 2019, Pub. L. No. 115—232, for grants and loans through the updates to section 200.216 of Title 2 of the Code of Federal Regulations (2 CFR).

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Q-1. What are “covered telecommunications equipment or services”?

Section 889 of the NDAA of 2019 defines “covered telecommunications equipment or services” to mean telecommunications and video surveillance equipment or services produced by Huawei Technologies Company, ZTE Corporation, Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).

“Covered telecommunications equipment or services” also includes telecommunications or video surveillance equipment or services provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity that is owned or controlled by the government of a covered foreign country. Additional entities identified as covered entities will be identified as described in Q-2.

Q-2. How do you know if an entity has been added to the list of covered entities?

Entities added to this list will be incorporated into the excluded parties list in the System for Award Management (SAM) (www.sam.gov). When a user conducts a search of the excluded parties list, a record will appear describing the nature of the exclusion for any entity identified as covered by this prohibition.

Q-3. What is the covered foreign country?

The People’s Republic of China.

Q-4. Can this prohibition be waived for grants and loans?

Unlike Federal procurement, the prohibition cannot be waived for Federal assistance such as grants and loans.

Q-5. Is it mandatory to include a specific provision in Federal awards and notices of funding opportunity issued on or after August 13, 2020?

The Federal awarding agency must take positive steps to ensure that recipients are aware of the requirements associated with this provision as of August 13, 2020. While referencing 2 CFR Part 200 may likely suffice, including a specific provision may be a best practice in order to ensure clarity, especially because this is a new requirement.

Q-6. Does the Section 889 prohibition apply to existing Federal awards as of August 13, 2020?

Yes. The section 889 prohibition on covered telecommunications and video surveillance services or equipment is effective on all expenditures charged to Federal awards as of August 13, 2020.

Q-7. Will this prohibition impact fixed amount awards where payment is based upon the achievement of milestones and not based on actual costs?

Yes, the prohibition on covered telecommunications and video surveillance services or equipment applies and the recipient’s budget must not include the cost of covered telecommunications and video surveillance services or equipment in their fixed amount award.

Q-8. Can a Federal award be provided to a recipient when they use covered telecommunications equipment or services?

Yes, as long as the Federal award does not pay for the covered telecommunications and video surveillance services or equipment that the recipient uses. If the Federal agency suspects that the goods and services being procured under the award may in fact be prohibited, it must take appropriate action, consistent with its policies and procedures, and in accordance with the guidance in 2 CFR Part 200.

Q-9. Do existing Federal awards need to be amended to include the provision after August 13, 2020?

This prohibition applies to existing Federal awards. Federal awarding agencies must ensure that recipients are aware of this prohibition and determine if an amendment is needed on a case by case basis.

Q-10. If a Federal award issued prior to August 13, 2020 is amended for non-financial purposes (i.e., no cost extension or scope), does the amendment need to include this prohibition?

This prohibition applies to existing Federal awards. Federal awarding agencies must ensure that recipients are aware of this prohibition and determine if an amendment is needed on a case by case basis.

Q-11. If a Federal award issued prior to August 13, 2020 is amended for the purposes of adding supplemental funds, does the amendment need to include this prohibition?

This prohibition applies to existing Federal awards. Federal awarding agencies must ensure that recipients are aware of this prohibition and determine if an amendment is needed on a case by case basis.

Q-12. Can a Federal award be used to procure goods or services, unrelated to prohibited services or equipment, from an entity that uses such equipment and services?

Yes.

Q-13. Do recipients need to certify that goods or services procured under a Federal award are not for covered telecommunications equipment or services?

Yes, when the recipient signs an award agreement they are certifying that they will comply with all applicable laws, rules, and regulations, including the prohibition on covered telecommunications equipment and services. If the Federal agency suspects that the goods and services being procured under the award may in fact be prohibited, it must follow its own policies and procedures to take appropriate action that aligns with the guidance in 2 CFR Part 200. OMB is separately evaluating the certifications and representations statement in SAM and will make any necessary updates.

Q-14. Can recipients use the costs associated with covered telecommunications equipment or services or equipment to meet their cost sharing or match requirements?

No, such costs are unallowable costs.

Q-15. Can recipients use program income generated by a Federal award to cover the costs associated with covered telecommunications equipment or equipment?

No. Program income must be used for allowable costs in accordance with 2 CFR §200.307.

Q-16. Will this prohibition impact awards that use the de minimis indirect cost rate, as the 10% is based on modified total direct costs (MTDC) and not specific indirect costs elements?

No, the prohibition on covered telecommunications and video surveillance services or equipment does not affect a non-Federal entity's use of the de minimis indirect cost rate; however, the non-Federal entity must review its costs used to determine its de minimis indirect cost rate to ensure that unallowable costs are not included in the calculation. The MTDC cannot include unallowable costs in its calculation of the de minimis indirect cost rate.

Q-17. When a recipient normally charges prohibited services or equipment through their indirect cost pool, can a Federal award cover the same recipient's indirect costs?

No, like other unallowable costs, covered telecommunications and video surveillance services or equipment costs must not be charged either directly or indirectly to Federal awards. The recipient must separately negotiate an indirect cost rate for their Federal awards that excludes these costs from the indirect cost pool and base amount chargeable to its Federal award(s).

Q-18. How will covered telecommunications equipment or services as a new unallowable expense be implemented for indirect cost rates?

Federally approved indirect cost rate agreements generally do not need to be reopened or amended, but may need to be adjusted in accordance with 2 CFR § 200.411. The non-Federal entity must review its current indirect cost rate proposal or previously negotiated rate to ensure that it does not include expenses associated with covered telecommunications equipment or services because the non-Federal entity must certify that the costs included in its proposal are allowable.¹

- If a non-Federal entity has not included the covered telecommunications equipment or services, then it should include a statement with each indirect cost proposal affirming that it has not included any costs described in 2 CFR §200.216.
- If a non-Federal entity finds that it has included the covered telecommunications equipment or services in an indirect cost proposal currently under review or a previously negotiated rate, then it should immediately contact the cognizant agency for indirect costs to revise the indirect cost proposal or negotiated rate.

Q-19. How will Federal agencies identify covered telecommunications and video surveillance services or equipment as unallowable costs in the negotiation and random audit selection of indirect costs?

Federal agencies must adapt their policies and procedures to review the costs associated with the prohibited telecommunications and video surveillance services or equipment. 2 CFR Part 200 requires the recipient to certify that all costs within the negotiated indirect cost rate are allowable in accordance with 2 CFR Part 200, Subpart E (Cost Principles). The covered telecommunications and video surveillance services or equipment mentioned in Sec. 889 of the NDAA of 2019 are considered unallowable under 2 CFR Part 200, Subpart E (Cost Principles).

¹ 2 C.F.R. Part 200, Appendix III (F), Certification; Appendix IV (D), Certification of Indirect (F&A) Costs; Appendix VII (D.3), Required Certification.

Q-20. What are the Federal awarding agencies' responsibilities to monitor adherence to this provision?

Federal awarding agencies are responsible for the implementation of this provision, as they are for the other compliance requirements in 2 CFR Part 200, and must incorporate oversight of this provision into their existing the monitoring and compliance oversight of Federal awards. Adherence to these new requirements will also be reviewed for costs incurred on or after August 13, 2020 in future Single Audits and other audits of recipient spending.

Q-21. How should a Federal awarding agency handle a recipient that procured covered telecommunications equipment or services or equipment under a Federal award?

If a recipient procures covered technology under a Federal award, the Federal awarding agency must follow its policies and procedures associated with monitoring Federal awards and, when appropriate, pursue remedies for noncompliance, which must align with the guidance provided in 2 CFR Part 200.

Exclusion Search Results 17 Total Results

Filtered by:

Keyword	Status
Hangzhou Hytera Huawei Zhejiang ZTE dahua	Active
	Inactive

Dr. Zhiwei Wang ● Active

DUNS Unique Entity ID:	Excluding Agency:	Activation Date:
SAM Unique Entity ID:	HEALTH AND HUMAN SERVICES, DEPARTMENT OF	Jul 21, 2020
	Classification:	Termination Date:
	Individual	Jul 20, 2030

HANGZHOU HONGYAN TRADING CO., LTD ● Active

DUNS Unique Entity ID:	Excluding Agency:	Activation Date:
SAM Unique Entity ID:	OFFICE OF FOREIGN ASSETS CONTROL	
	Classification:	Termination Date:
	Special Entity Designation	Indefinite

ZTE Corporation ● Active

DUNS Unique Entity ID: 654608660	Excluding Agency:	Activation Date:
SAM Unique Entity ID: HWEKRJ3F3N29	GENERAL SERVICES ADMINISTRATION	Dec 13, 2019
	Classification:	Termination Date:
	Firm	Indefinite

Huawei Investment & Holding Co., Ltd. ● Active

DUNS Unique Entity ID: 544957314	Excluding Agency:	Activation Date:
SAM Unique Entity ID: Y3NYMV2P5446	GENERAL SERVICES ADMINISTRATION	Dec 13, 2019
	Classification:	Termination Date:
	Firm	Indefinite

Hangzhou Hikvision Digital Technology Co., Ltd. ● Active

DUNS Unique Entity ID: 545259848	Excluding Agency:	Activation Date:
SAM Unique Entity ID: L78SCHFL4JN8	GENERAL SERVICES ADMINISTRATION	Dec 13, 2019
	Classification:	Termination Date:
	Firm	Indefinite

Hytera Communications Corporation Limited ● Active

DUNS Unique Entity ID: 654702463	Excluding Agency:	Activation Date:
SAM Unique Entity ID: DUKCMD4EJJG8	GENERAL SERVICES ADMINISTRATION	Dec 13, 2019
	Classification:	Termination Date:
	Firm	Indefinite

Zhejiang Dahua Technology Co., Ltd. ● Active

DUNS Unique Entity ID: 545242687	Excluding Agency:	Activation Date:
SAM Unique Entity ID: ED47N4Z1K8S9	GENERAL SERVICES ADMINISTRATION	Dec 13, 2019
	Classification:	Termination Date:



Indefinite

HONGYUAN MARINE CO LTD ● Active

DUNS

Unique Entity ID:

Excluding Agency:

OFFICE OF FOREIGN ASSETS CONTROL

Activation Date:

Jan 10, 2020

SAM

Unique Entity ID:

Classification:

🔒 Special Entity Designation

Termination Date:

Indefinite

Zhongli DING ● Active

DUNS

Unique Entity ID:

Excluding Agency:

OFFICE OF FOREIGN ASSETS CONTROL

Activation Date:

Dec 07, 2020

SAM

Unique Entity ID:

Classification:

👤 Individual

Termination Date:

Indefinite

SHANGHAI GANG QUAN TRADE CO. ● Active

DUNS

Unique Entity ID:

Excluding Agency:

OFFICE OF FOREIGN ASSETS CONTROL

Activation Date:

May 17, 2017

SAM

Unique Entity ID:

Classification:

🔒 Special Entity Designation

Termination Date:

Indefinite

SHANGHAI NORTH TRANSWAY INTERNATIONAL TRADING CO. ● Active

DUNS

Unique Entity ID:

Excluding Agency:

OFFICE OF FOREIGN ASSETS CONTROL

Activation Date:

May 17, 2017

SAM

Unique Entity ID:

Classification:

🔒 Special Entity Designation

Termination Date:

Indefinite

Yueyue SHEN ● Active

DUNS

Unique Entity ID:

Excluding Agency:

OFFICE OF FOREIGN ASSETS CONTROL

Activation Date:

Dec 07, 2020

SAM

Unique Entity ID:

Classification:

👤 Individual

Termination Date:

Indefinite

Huawei Technologies Co., Ltd. ● Active

DUNS

Unique Entity ID: 654292358

Excluding Agency:

DEPT OF THE AIR FORCE

Activation Date:

Feb 21, 2019

SAM

Unique Entity ID: DCAMUHE5N6W1

Classification:

🏢 Firm

Termination Date:

Indefinite

Huawei Device Co., Ltd. ● Active

DUNS

Unique Entity ID: 421306185

Excluding Agency:

DEPT OF THE AIR FORCE

Activation Date:

Feb 21, 2019

SAM

Unique Entity ID: JKTPF89M9P73

Classification:

🏢 Firm

Termination Date:

Indefinite

HUAWEI DEVICE USA INC. ● Active

DUNS

Unique Entity ID: 078284967

Excluding Agency:

DEPT OF THE AIR FORCE

Activation Date:

Feb 21, 2019

SAM

Unique Entity ID: LCF7TMLFD2J2

Classification:

🏢 Firm

Termination Date:

Indefinite

Zuoyou LIN ● Active

DUNS Unique Entity ID:

SAM Unique Entity ID:

Excluding Agency:

OFFICE OF FOREIGN ASSETS CONTROL

Classification:

👤 Individual

Activation Date:

Sep 03, 2020

Termination Date:

Indefinite

Daniel Y. HE ● Active

DUNS Unique Entity ID:

SAM Unique Entity ID:

Excluding Agency:

OFFICE OF FOREIGN ASSETS CONTROL

Classification:

👤 Individual

Activation Date:

Oct 19, 2020

Termination Date:

Indefinite

Appendix E

Title VI Requirements

The City of Canton, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat.252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity, for which the Recipient receives Federal financial assistance from DOT, including the City of Canton.

Please also review Appendix A, Appendix C, Appendix D and Appendix E of the Standard Assurances which are included in the following pages.

APPENDIX A

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, *The City of Canton*, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21. *{Include City of Canton specific program requirements.}*
3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin. *{Include City of Canton specific program requirements.}*
4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or *The City of Canton* to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or *The City of Canton*, as appropriate, and will set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance:** In the event of a contractor's noncompliance with the Non• discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or *The City of Canton* may determine to be appropriate, including, but not limited to:
 - a. withholding payments to the contractor under the contract until the contractor complies; and/or
 - b. cancelling, terminating, or suspending a contract, in whole or in part.
6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the Recipient or *The City of Canton* may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

APPENDIX C

CLAUSES FOR TRANSFER OF REAL PROPERTY ACQUIRED OR IMPROVED UNDER THE ACTIVITY, FACILITY, OR PROGRAM

The following clauses will be included in deeds, licenses, leases, permits, or similar instruments entered into by the (Title of Recipient) pursuant to the provisions of Assurance 7(a):

- A. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:
 - 1. In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.
- B. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Non-discrimination covenants, (Title of Recipient) will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued.*
- C. With respect to a deed, in the event of breach of any of the above Non-discrimination covenants, the (Title of Recipient) will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the (Title of Recipient) and its assigns.*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

APPENDIX D

CLAUSES FOR CONSTRUCTION/USE/ACCESS TO REAL PROPERTY ACQUIRED UNDER THE ACTIVITY, FACILITY OR PROGRAM

The following clauses will be included in deeds, licenses, permits, or similar instruments/agreements entered into by (Title of Recipient) pursuant to the provisions of Assurance 7(b):

- A. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.
- B. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Non- discrimination covenants, (Title of Recipient) will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued.*
- C. With respect to deeds, in the event of breach of any of the above Non-discrimination covenants, (Title of Recipient) will there upon revert to and vest in and become the absolute property of (Title of Recipient) and its assigns.*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

APPENDIX E

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

Pertinent Non-Discrimination Authorities:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq.*), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 - 12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 *et seq.*).

CANTON TITLE VI COMPLAINT PROCEDURE

I. FILING A COMPLAINT

Complaint Procedure - Any person who believes that he or she as a member of a protected class, has been discriminated against based on race, color, national origin, gender, age, disability, religion, low income status, or Limited English Proficiency (LEP) in violation of Title VI of the Civil Rights Act of 1964, as amended and its related statutes, regulations and directives, Section 504 of the Vocational Rehabilitation Act of 1973, Americans with Disabilities Act of 1990, as amended, the Civil Rights Restoration Act of 1987, as amended, and any other Federal nondiscrimination statute may submit a complaint. A complaint may also be submitted by a representative on behalf of such a person.

It is the policy of the City to conduct a prompt and impartial investigation of all allegations of discrimination and to take prompt effective corrective action when a claim of discrimination is substantiated.

No one may intimidate, threaten, coerce or engage in other discriminatory conduct against anyone because they have taken action or participated in an action to secure rights protected by the civil rights laws. Any individual alleging such harassment or intimidation may submit a complaint by following the procedure printed below.

Any individual who feels that he or she has been discriminated against may submit a written or verbal complaint to the designated Title VI Coordinator. A complaint must include the name, address and telephone number of the individual making the complaint (complainant) and a brief description of the alleged discriminatory conduct including the date of harm. An individual submitting a complaint alleging discrimination may include any relevant evidence, including the names of witnesses and supporting documentation.

Complaints should be directed to the Title VI Coordinator:

Fonda Williams
Deputy Mayor
218 Cleveland Ave S.W., 8th floor
Canton, Ohio 44702
Phone - 330-438-4302
Email – fonda.williams@cantonohio.gov

Within 60 days of the receipt of the complaint the City will conduct an investigation of the allegation based on the information provided and issue a written report of its findings to the complainant. The City will try to obtain an informal voluntary resolution to all complaints at the lowest level possible.

A complainant's identity shall be kept confidential except to the extent necessary to conduct an investigation. All complaints shall be kept confidential.

These procedures do not deny the right of any individual to file a formal complaint with any government agency or affect an individual's right to seek private counsel for any complaint alleging discrimination.

Complaints may also be filed with the following government agencies:

Ohio Department of Transportation
Office of Equal Opportunity
1980 West Broad Street
MS: 3270
Columbus, OH 43223

The U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Ohio Civil Rights Commission
Central Office
Rhodes State Office Tower
30 East Broad Street, 5th floor
Columbus, OH 43215
614-466-2785

Ohio Civil Rights Commission
Akron Regional Office
Bradley S. S. Dunn, Regional Director
Akron Government Bldg.
161 S. High Street, Suite 205
Akron, OH 44308
(330) 643-3100

Link to filing a complaint online with the Ohio Civil Rights Commission:

<https://crc.ohio.gov/FilingaCharge/ChargeFilingProcedure.aspx>

II COMPLAINT PROCESSING

The Title VI Coordinator will review the complaint upon receipt to ensure that all required information is provided, the complaint meets the filing deadline date which is 180 days from the date the alleged discriminatory act occurred, and falls within the jurisdiction of the City.

The Title VI Coordinator will then investigate the complaint. If the complaint is against the City then the Mayor's office or their designee will investigate the complaint. Additionally, a copy of the complaint will be forwarded to the City Law Director.

If the complaint warrants a full investigation, the Complainant will be notified in writing by certified mail. This notice will name the investigator and/or investigating agency.

The party alleged to have acted in a discriminatory manner will also be notified by certified mail as of the complaint. This letter will also include the investigator's name and will request that this party be available for an interview.

Any comments or recommendations from legal counsel will be reviewed by the Title VI Coordinator, Director of Public Service and Mayor's office.

Once the City has investigated the report findings, the City will adopt a final resolution. All parties associated with the complaint will be properly notified of the outcome of the City's investigative report.

If the complainant is not satisfied with the results of the investigation of the alleged discriminatory practice(s), she/he shall be advised of their right to appeal the City's decision.

Appeals must be filed within 180 days after the City's final resolution. Unless new facts not previously considered come to light, reconsideration of the City's determination will not be available.

The foregoing complaint resolution procedure will be implemented in accordance with the Department of Justice guidance manual entitled "Investigation Procedures Manual for the Investigation and Resolution of Complaints Alleging Violations of Title VI and Other Nondiscrimination Statutes," available online at:

<http://www.justice.gov/crt/about/cor/Pubs/manuals/complain.pdf>

Title VI Complaint Filing

Complaints filed with the City of Canton, Ohio based on violations of Title VI of the Civil Rights Act of 1964, must include the following information:

- Name of Complainant
- Date of Complaint
- Address of Complainant
- Telephone Number of Complainant
- Name of Agency / Department
Accused of Discriminatory Practices
- Name of Individual Accused of
Discriminatory Practices
- Address of Agency
- Date of Alleged Discrimination
- Description of Alleged Discrimination
(see below)

11. Alleged Discrimination - If your complaint is in regard to discrimination in the delivery of services or discrimination that involved the treatment of you by others by the agency or department indicated above, please indicate below the basis on which you believe these discriminatory actions were taken.

- Race / Color / Religion
- National Origin
- Age · Sex, Gender
- Disability · Income Status
- Explanation of Alleged Discrimination - Please explain as clearly as possible what happened.

Provide the name(s) of witness(s) and others involved in the alleged discrimination. (Attach additional sheets if necessary and provide a copy of written material pertaining to your case.)

- Signature of Complainant · Date of Complaint

III. ENVIRONMENTAL JUSTICE

In accordance with Title VI of the Civil Rights Act of 1964, each Federal agency shall ensure that all programs or activities receiving Federal financial assistance that affect human health or the environment do not directly, or through other arrangements, use criteria, methods, or practices that discriminate on the basis of race, color, or national origin. Part of Title VI reads, “No person in the United States shall, on the ground of race, color, or national origin be excluded

from participation in, be denied the benefits of, or be subject to discrimination under any program or activity receiving Federal financial assistance.”

The three fundamental environmental justice (EJ) principles are:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations;
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process; and
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority populations and low-income populations.

The City of Canton is committed to these three environmental justice principles in all work that the City performs.

IV. ADMINISTRATION – WORK PLAN

Pursuant to 23 CFR 200, the City of Canton has designated a Title VI Coordinator who is responsible for initiating, monitoring, and ensuring the City’s compliance with Title VI requirements for the following work plan:

- Administer, coordinate and Implement the Title VI Program plan and distribute internally and externally via website and update annually as required.
- Ensure that Assurances are being used in contracts for federal projects.
- Attend Title VI training.
- Collect public involvement data.
- Review written Title VI complaints and ensure every effort is made to resolve complaints informally at the local or regional level and review and update the City’s Title VI plan and procedures as required.
- Implement a plan that provides training to City Staff on the basic requirements of the Title VI implementation plan.

Title VI Coordinator:

Fonda Williams
Deputy Mayor
218 Cleveland Avenue, S.W., 8th floor
Canton, Ohio 44702
Phone – 330-438-4302
Email - fonda.williams@cantonohio.gov

V. LIMITED ENGLISH PROFICIENCY (LEP) POLICY

On August 11, 2000, the President signed an executive order, *Executive Order 13166: Improving Access to Service for Persons with Limited English Proficiency (LEP)*, to clarify Title VI of the Civil Rights Act of 1964. It has as its purpose, to ensure meaningful access to programs and services to otherwise eligible persons who are not proficient in the English language. In addition, The US Department of Transportation published *Policy Guidance Concerning Recipients' responsibilities to Limited English Proficient Person* in the December 14, 2005 Federal Register.

This guidance outlines the following four factors that the City uses to access the LEP populations in Canton.

1. The number and proportion of LEP persons eligible to be served or likely to be encountered by the City.
2. The frequency with which LEP individuals come into contact with the program, activity or service.
3. The nature and importance of the program, activity, or service provided by the program.
4. The resources available to the City and costs.

Summary of the four factor analysis

Factor 1- The number and proportion of LEP persons eligible to be served or likely to be encountered by the City can only be estimated until the actual number of persons who can speak English less than “very well” are documented as needing assistance by City Staff . With this Title VI Plan being in early development stages and considered a document that may need regular updates, US Census Bureau information is being used at this time. The total population is provided below to shown general distribution of race and ethnicity in the community. The estimated number of persons that may not speak English “very well” is following in the US Census Bureau 2006-2010 American Community Survey.

The U.S. Census Bureau provides statistics from 2010 for the City of Canton as follows:

Total population = 74,451

Population by Ethnicity:

Hispanic or Latino = 1,805 Non Hispanic or Latino = 72,646

Population by Race:

White = 53,150 African American = 16,854, Asian = 193, American Indian or Alaska Native = 372,

Native Hawaiian and Pacific Islander = 0, Other = 431, Identified by two or more = 3,451.

The US Census Bureau 2006-2010 American Community Survey 5-Year Estimates under SELECTED SOCIAL CHARACTERISTICS estimates the number of people in Canton who speak a language other than English to be 2,945 with those speaking English less than “very well” estimated at 1.0% or approximately 983 individuals who may be considered limited in English proficiency.

Factor 1(continued)-

According to the census numbers above there may be up to 983 individuals who live in the City of Canton that *may* be considered as LEP. Based on actual contact between City Staff and the community there have been very few requests from anyone in the service area asking the City to provide language translation services. Therefore, the LEP population is probably even less than the estimate shown above.

Factor 2- The frequency with which LEP individuals come into contact with the program, activity or service:

Due to the infrequent requests for translation services, there appears to be a minimal need for translation services from the City. This may be attributed to the high percentage of younger people (87.6% for ages up to 17) who are available as family members for translation services.

Factor 3. The nature and importance of the program, activity, or service provided by the program:

If at any time a LEP individual requests translation services that are considered important such that denial or delay of access or services or information could have serious or even life-threatening implications, the City will provide, upon request, services to assist the LEP population including translation of vital City documents and interpretation services.

Factor 4. The resources available to the City and costs:

The City of Canton currently has several staff members who are bilingual in English and Spanish and are available to translate requests from the Hispanic population on a day to day basis. The City also provides many of their outreach services in the predominate languages of the community, English and Spanish. In addition, certified translation services are available through LanguageLine Solutions, a telephone translation service that is accessible for phone line translations services 24 hours a day. These are services the City provides upon request as discussed in factor 3 above. Page | 12

Summary of LEP Accommodation Plan

- The City of Canton strives to serve its population to the best of its ability and will provide upon request, services to assist the LEP population including translation of vital documents and interpretation services deemed necessary to provide meaningful access to City services.
- A U.S. Census Bureau ISpeak card is available as part of this document and on the City's webpage and is also available at City Hall located at 414 Main Street. This card allows LEP individuals to communicate their preferred language to City Staff whereas City Staff may then access a translation service called LanguageLine, phone number 1-800-752-6096 is available to City Staff or other translation services may be used as determined by the City.
- For language translation requests from the Hispanic or Latino community the City has several staff member who are bilingual and are available to provide translation services on a day to day basis.
- The City of Canton utilizes a voluntary public involvement survey to collect information regarding persons affected by proposed projects. The survey permits respondents to remain

anonymous, while voluntarily answering questions regarding their gender, ethnicity, race, age, sex, disability status, and household income. This voluntary public involvement survey is available at all public hearings and meetings. Once the survey data has been collected, it will be reviewed and then the survey will be placed in a file for future reference. In the case enough surveys are collected over time to show a significant increase in LEP populations, the City may consider changes to their LEP policy. Completed surveys shall be retained for a period of three years from the date of the meeting and/or completion of the related project, if applicable. See Appendix G for a sample of this Survey.

- The City reviews written Title VI complaints and ensures every effort is made to resolve complaints informally at the local or regional level and review and update the City's Title VI plan and procedures as required.
- Staff for the City will be provided training on the requirements for providing meaningful access to services for LEP persons. Considering the relatively small size of the City of Canton and limited financial resources, current training may be limited to web access to this document and its attachments by all City Staff, a log showing the names of all Staff that have been made aware of this document (sign off that they have read the document) and require that all new employees receive the same training.



The City of Canton

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

MODIFIED STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

[Where Third Party Engineer Performs Construction Administration Duties]

Prepared by



Issued and Published Jointly by





These General Conditions have been prepared for use with the Agreement Between Owner and Contractor for Construction Contract (EJCDC® C-520, Stipulated Sum, or C-525, Cost-Plus, 2013 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other.

To prepare supplementary conditions that are coordinated with the General Conditions, use EJCDC's Guide to the Preparation of Supplementary Conditions (EJCDC® C-800, 2013 Edition). The full EJCDC Construction series of documents is discussed in the Commentary on the 2013 EJCDC Construction Documents (EJCDC® C-001, 2013 Edition).

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National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314-2794
(703) 684-2882
www.nspe.org

American Council of Engineering Companies
1015 15th Street N.W., Washington, DC 20005
(202) 347-7474
www.acec.org

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400
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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters or with all capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement or Owner-Contractor Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 5. *Bidder*—An individual or entity that submits a Bid to Owner.
 6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
 7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
 8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
 9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Owner concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
 10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with any procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times, or both; contesting Owner's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Owner has declined to address. A demand for money or services by a third party is not a Claim.
 11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and



The City of Canton

- Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.
 13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract. Only printed or hard copies of the items in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
 14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 13.03 in the case of Unit Price Work).
 15. *Contract Times*—The number of days or the dates stated in the Agreement by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work so that it is ready for final payment.
 16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work and has entered into the Agreement.
 17. *Cost of the Work*—See Paragraph 13.01 for definition.
 18. *Design Professional*—architects; civil, structural, mechanical, electrical, plumbing, and heating, ventilating, air conditioning, and other engineers; interior designers; landscape architects; and others whose services have traditionally been considered "professional" activities, require licensing or registration by the state, or otherwise require the knowledge and application of design principles appropriate to the project at hand.
 19. *Drawings*—The part of the Contract Documents prepared or approved by the Engineer that graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
 20. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed by the Owner.
 21. *Engineer*—The individual or entity named identified in the Agreement.
 22. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
 23. *General Requirements*—Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.
 24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.



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25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, *statutes*, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens*—Charges, security interests, or *encumbrances* upon Contract-related funds, real property, or personal property.
27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an *intermediate* completion date or by a time prior to Substantial Completion of all the Work.
28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
29. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor may start to perform the Work. *Owner*—The individual or entity with which *Contractor* has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract. The Owner is the City of Canton.
30. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times. The Progress Schedule is sometimes called the Construction Schedule.
31. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
32. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.
33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.
34. *Samples*—Physical examples of materials, equipment, or workmanship that are *representative* of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.
36. *Schedule of Values*—For non unit price items, a schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or *information* that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
38. *Site*—Lands or areas indicated in the *Contract Documents* as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.
39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and



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workmanship as applied to the *Work*, and certain administrative requirements and procedural matters applicable to the *Work*.

40. *Subcontractor*—An individual or entity having a *direct* contract with Contractor or with any other Subcontractor for the performance of a part of the *Work*.
41. *Substantial Completion*—The time at which the *Work* (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the *Work* (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the *Work* (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the *Work* refer to Substantial Completion thereof. Substantial Completion is further defined as (i) that degree of completion of the Project’s operating facilities or systems sufficient to provide Owner the full time, uninterrupted, and continuous beneficial operation of the *Work*; ii) all required functional, performance, and acceptance or startup testing has been successfully demonstrated for all components, devices, equipment, and instrumentation and control; and (iii) all traffic control and safety devices are in place and operational to the satisfaction of Engineer in accordance with the requirements of the Specifications.
42. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.
43. *Supplementary Conditions*—The part of the Contract Documents that amends or supplements these General Conditions.
44. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the *Work* by Contractor or a Subcontractor.
45. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.
46. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
47. *Unit Price Work*—Work to be paid for on the basis of unit prices.
48. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. *Work* includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.



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49. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to respond to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the

provisions of Article 10 or any other provision of the Contract Documents.

C. *Day:*

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. *Furnish, Install, Perform, Provide:*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use



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any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured identified in the Modified General Conditions Owner-approved copies of certificates of insurance, copies of endorsements, and other evidence of insurance which either of them or any additional insured may reasonably request, which Contractor is required to purchase and maintain in accordance with Article 6.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor one fully executed Agreement in electronic format.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
2. a preliminary Schedule of Submittals; and
3. for Work items not covered by unit prices, a preliminary Schedule of Values which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices shall be broken down into labor & materials. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work. The total of the Schedule of Values prepared for the Work items not covered by unit prices, as required by these Modified General Conditions, shall not exceed the Bid submitted for said Work, unless such amount is adjusted as provided in the Contract Documents.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.



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2.05 *Initial Acceptance of Schedules*

- A. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer and Owner.
- 1. The Construction/Progress Schedule shall be prepared as provided in the Contract Documents.
- 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
- 3. For non-unit price Work, Contractor's Schedule of Values will be acceptable to Owner and Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work. Such prices shall be broken down into labor & materials. Once approved by the Owner and Engineer, the Contractor will not change the allocation of the Contract Price to the component parts of the Work without the Owner and Engineer's written approval. The Owner and/or Engineer thereafter may from time to time require the Contractor to adjust such schedule if the Owner and/or Engineer determines it to be in any way unreasonable or inaccurate. The Contractor then shall adjust the schedule of values as required by the Owner and/or Engineer within ten (10) days.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.
- B. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer

hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

- A. Standards Specifications, Codes, Laws and Regulations
 - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code,



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or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of Owner's officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the Contract Documents.

3.03 Reporting and Resolving Discrepancies

A. Reporting Discrepancies:

1. *Contractor's Verification of Figures and Field Measurements:* In addition to its obligations under the Instructions to Bidders, before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Owner, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.
2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract

Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof or Contractor failed to perform its obligations under the Instructions to Bidders.
4. In addition to its obligations under the Instructions to Bidders, if Contractor proceeds with work that Contractor had actual knowledge or should have known that a conflict, error, ambiguity, or discrepancy existed as indicated above, correction or work constructed without notification to Engineer shall be at Contractor's expense, (except in an emergency as authorized by Paragraph 7.15).

B. Resolving Discrepancies:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the



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provisions of the Contract Documents would result in violation of such Law or Regulation).

2. Within the Contract Documents, requirements of the Agreement shall take precedence over the Modified General Conditions, which shall take precedence over the Specifications, which shall take precedence over the Drawings.
3. Within a particular Contract Document, figure dimensions on Drawings shall take precedence over general Drawings. Specific instructions or specifications shall take precedence over the general instructions or specifications.

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.
- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by filing a Claim.
- C. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its

consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run in accordance with Section 3 of the Agreement.

4.02 *Starting the Work*

- A. Contractor may start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.

4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in the Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes



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in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by Professional Surveyor (P.S.) registered in the state of Ohio. Contractor is referred to the General Requirements for additional requirements for laying out the Work.

4.04 *Progress Schedule*

A. Contractor shall adhere to the Construction Schedule established in accordance with the Contract Documents.

1. **The Date for Substantial Completion shall be changed or modified only by Change Order, other Modification, or a Claim that is Finally Resolved, regardless of the date in the Construction Schedule.**

2. The float in the Construction Schedule and any updates to it shall belong to the Owner. Float shall mean the amount of time by which activities may be delayed without affecting the Contract Date for Substantial Completion.

3. The Contractor's obligation to furnish scheduling information is a material term of its Contract. If the Contractor fails to furnish requested scheduling information in writing within five (5) days of a request for such information from the Engineer or Owner, the Contractor shall pay and the Owner may withhold from the Contractor Liquidated Damages at the rate of Fifty Dollars (\$50.00) a day for each calendar day thereafter that the Contractor fails to furnish the requested information.

B. **THE PERIODS OF TIME IN THE PROJECT CONSTRUCTION SCHEDULE ARE OF THE ESSENCE TO THIS CONTRACT. THE CONTRACTOR SHALL PROSECUTE ITS WORK IN ACCORDANCE WITH THE CURRENT PROJECT CONSTRUCTION SCHEDULE.**

1. **Notice of Delays.** As a condition precedent to any increase in the Contract Price and/or Contract Times, the Contractor shall give the Owner and the Engineer verbal notice of any delay affecting its Work within two (2) business

days of the commencement of the delay. In addition and also as a condition precedent to any increase in the Contract Price and/or Contract Times, the Contractor shall give the Owner and Engineer written notice of the delay within ten (10) business days of the commencement of the delay with specific recommendations about how to minimize the effect of the delay. The written notice of the delay shall conspicuously state that it is a **"NOTICE OF DELAY."** A notice of delay shall not constitute the submission of a Claim. Contract Times shall only be changed as provided in the Agreement. The Contractor acknowledges and agrees that these notice provisions are material terms of the Contract Documents and give the Owner the opportunity to take action to minimize the cost and/or effect of delays.

4.05 *Delays in Contractor's Progress*

A. Excusable, Compensable Delays. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Non-Excusable Delays. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. Excusable, Non-Compensable Delays. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the



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Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph; it being understood and agreed that the Contractor has included in the Contract Price a contingency for the risk of such delays. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 2. weather conditions as provided in Paragraph 4.05.H;
 3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
 4. acts of war or terrorism.
- D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.
- E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.
- F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.
- G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or

Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

- H. Weather Delays. When the Contractor is prevented from completing any part of the Work on the critical path within the Contract Time due to weather conditions, if a Claim is made as provided for in these Modified General Conditions, the Contract Time will be extended by one (1) day for each work day lost due to weather that delays Work on the critical path in excess of those in the following table:

<u>Month</u>	<u>Number of Workdays Lost Due To Weather</u>
<u>January</u>	<u>8</u>
<u>February</u>	<u>8</u>
<u>March</u>	<u>7</u>
<u>April</u>	<u>6</u>
<u>May</u>	<u>5</u>
<u>June</u>	<u>4</u>
<u>July</u>	<u>4</u>
<u>August</u>	<u>4</u>
<u>September</u>	<u>5</u>
<u>October</u>	<u>6</u>
<u>November</u>	<u>6</u>
<u>December</u>	<u>6</u>

- I. A work day will be lost due to weather only when weather conditions reduce production by more than 50 percent on Work on the critical path. Production shall be measured by hours worked. The Contractor shall have the burden of establishing that weather conditions reduced the production by more than 50 percent on Work on the critical path.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 Availability of Lands

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.
- B. Upon reasonable written request, Owner shall furnish Contractor with a Notice of



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Commencement prepared for the Project, conforming to the provisions of Ohio Revised Code Section 1311.252.

- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 Use of Site and Other Areas

A. Limitation on Use of Site and Other Areas:

- 1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

- 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, alleged to have been caused by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and



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machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

- D. *Loading of Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Agreement identifies:

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
3. Technical Data contained in such reports and drawings.
4. It is possible that there may be other reports, and/or tests of subsurface conditions at or contiguous to the Site not prepared by or on behalf of Owner. The Owner makes no representation about such reports and/or tests, assuming they exist.

- B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data contained in such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information. For example, interpolations and extrapolations of Technical Data performed by Contractor to estimate locations or quantities of subsurface strata are independent factual assumptions which Owner does not warrant.

5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
2. is of such a nature as to require a change in the Drawings or Specifications; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor, as a condition precedent to any increase in the Contract Price and/or an extension of the Contract Times shall, within 48 hours after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15),



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notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding determine conditions for the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition and indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Possible Price and Times Adjustments:*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and
 - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew or should have known of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
 - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 5.04.A.
 3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
 4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written



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statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, or by others. Unless it is otherwise expressly provided elsewhere in these Modified General Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. protecting all Underground Facilities in a manner at least as cautious and protective of safety and of underground facilities as those methods identified in Ohio Revised Code Sections 3781.25 and 3781.30;
 - b. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 - c. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

C. *Engineer's Review:* Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; and determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Possible Price and Times Adjustments:*

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or



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actual location of the Underground Facility in question;

- b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
- c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and
- d. Contractor gave the notice required in Paragraph 5.05.B.

- 2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
- 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings:* The Agreement identifies:

- 1. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
- 2. Technical Data contained in such reports and drawings.

- #### B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Contract Documents with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report

prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

- 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work



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in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.
- H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have

such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

- I. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a Contract Bond in the amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. Such bond shall be in the form that meets the requirements of the Ohio Revised Code. If the Contractor submitted a combined Bid Guaranty and Contract Bond with its bid for the Work, that form of Bond shall satisfy the Contractor's requirement to provide a Contract Bond. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on



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Federal Bonds and as Acceptable Reinsuring Companies” as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury and meet the other requirements of the Contract Documents. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual’s authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

- C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.
- D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.
- E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner’s termination rights under Article 16.
- F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.
- G. *Material Default or Termination.* If the Owner notifies the Contractor’s surety that the Contractor is in material default, the surety will complete its investigation of the claimed material default within 21 days. The surety is advised to start looking for a replacement contractor upon notice of material default. As part of its investigation, the surety shall promptly visit the offices of the Contractor, Engineer, and Owner to

inspect and copy the available Project records. The Owner, Engineer, and Contractor, upon written request by the surety, shall make such records available during regular business hours for such inspection and copying. The Owner and Engineer’s making such records available as provided herein shall satisfy the Owner’s obligation to the surety to furnish documents for the investigation. The surety will provide the Owner with the results of its investigation, including any written reports or documents.

If the Owner terminates the Contract and the surety proposes to take over the Work, the surety shall do so no later than the expiration of the 21-day investigation period or 10 days after the date the Owner terminates the Contract, whichever is later. If the Owner terminates the Contract, and the surety proposes to provide a replacement contractor, the replacement contractor shall not be the Contractor or a contractor comprised of mostly Contractor’s employees, unless the Owner agrees in writing. In the event the Surety takes over the Project, the surety’s obligation shall not be limited to the penal sum of the Bond.

If the surety does not propose an acceptable contractor as required by this Paragraph 6.01.G, the Owner may complete the Work by such means as it deems appropriate. In the event the Owner agrees to accept a replacement contractor, the replacement contractor shall furnish its own bond for the replacement contractor’s scope of work, and neither the Contractor nor the surety shall be relieved of their obligations under the Contract Documents.

This Paragraph 6.01.G is in addition to any other rights of the Owner under the Contract Documents and is not intended to create any rights of the surety, including but not limited to the right to take over the Contractor’s obligations.

In the event of the Contractor’s termination and if the surety does not takeover the Work



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as provided in this Paragraph 6.01.G, the Owner may take possession of and use all materials, facilities, and equipment at the Project Site or stored off-site for which Owner has paid in whole or in part.

6.02 Insurance—General Provisions

- A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Contract Documents.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Modified General Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Modified General Conditions, or elsewhere in the Contract Documents), 3 certificates of insurance, copies of endorsements, or when specifically requested by the Owner, 3 certified copies of the insurance policies and a receipt evidencing full payment on the premiums, and other evidence of insurance requested by Owner establishing that Contractor has obtained and is maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Modified General Conditions, or elsewhere in the Contract Documents), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- E. Failure of Owner to demand such certificates or other evidence of full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to obtain and maintain such insurance.
- F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.
- H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.
- I. By requiring such insurance and insurance limits herein, Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.



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- J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract Documents.

6.03 Contractor's Insurance

- A. *Workers' Compensation:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.
2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).
3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).
4. Foreign voluntary worker compensation (if applicable).

- B. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
2. claims for damages insured by reasonably available personal injury liability coverage.
3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

- C. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:

- a. Such insurance shall be maintained for three years after final payment.
- b. Contractor shall furnish Owner and each other additional insured (as identified in these Modified General Conditions or elsewhere in the Contract Documents) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
3. Broad form property damage coverage.
4. Severability of interest.
5. Underground, explosion, and collapse coverage.
6. Personal injury coverage.
7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

- D. *Automobile liability:* Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

- E. *Umbrella or excess liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow



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form as to each and every one of the underlying policies.

- F. *Contractor's pollution liability insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.
- G. *Additional insureds:* The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Modified General Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.
- H. *Contractor's professional liability insurance:* If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. *General provisions:* The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.
2. be written for not less than the limits of liability provided in this Article and in the Modified General Conditions, or required by Laws or Regulations, whichever is greater:
 - a. Commercial General Liability ("CGL"): Bodily injury (including death and emotional distress) and property damage with limits of \$1,000,000 each occurrence and \$2,000,000 aggregate. CGL shall include: (i) Premises-Operation, (ii) Explosion and Collapse Hazard, (iii) Underground Hazard, (iv) Independent Contractors' Protective, (v) Broad Form Property Damage, including Completed Operations, (vi) Contractual Liability, (vii) Products and Completed Operations, (viii) Personal/Advertising Injury, (ix) Stopgap liability with Ohio Intentional Tort endorsement for \$1,000,000 limit, and (x) per project aggregate endorsement.
 - b. Automobile Liability, covering all owned, non-owned, and hired vehicles used in connection with the Work: Bodily injury (including death and emotional distress) and property damage with a combined single limit of \$1,000,000 per person and \$1,000,000 each accident.
 - c. Such policies shall be supplemented by an umbrella policy, also written on an occurrence basis, to provide additional protection to provide coverage in the total amount of \$1,000,000 for each occurrence and \$1,000,000 aggregate for contracts with Contract Price of \$250,000 or less; \$2,000,000 each occurrence and \$2,000,000 aggregate for contracts with a Contract Price greater than \$250,000 but less than or equal to \$500,000; \$3,000,000 each occurrence and \$3,000,000 aggregate for contracts with a Contract Price greater than \$500,000 but less than or equal to



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\$1,000,000; and \$5,000,000 each occurrence and \$5,000,000 aggregate for contracts with a Contract Price greater than \$1,000,000.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 30 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.
5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.
6. include products and completed operations insurance.
7. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 5.02 and 7.18.
8. with respect to products and completed operations insurance remain in effect for at least two years after final payment.
 - a. Contractor shall furnish Owner and each other additional insured identified in these Modified General Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of

such insurance at final payment and one year thereafter.

- J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.
- K. The following provisions shall also apply to the insurance provided by the Contractor:
 1. Contractor's insurance shall be primary and non-contributory.
 2. Insurance policies shall be written on an occurrence basis only.
 3. The Contractor shall require all Subcontractors to provide Workers' Compensation, CGL, and Automobile Liability Insurance with the same minimum limits specified herein, unless the Owner agrees to a lesser amount.
 4. Owner shall be named as a certificate holder on the policies of insurance maintained by Contractor. The Contractor shall provide each additional insured with a certificate of insurance.
 5. The additional insured endorsement shall be ISO 20 10 10 01 and CG 20 37 10 01 or their equivalents so that Completed Operations liability extends to the additional insured after the completion of the Project.

6.04 Property Insurance

- A. *Builder's Risk*: Unless otherwise provided in the Contract Documents, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Contract Documents or required by Laws and Regulations). This insurance shall:
 1. include the Owner, Engineer, and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Contract Documents to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and



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any corresponding sections in the Contract Documents, the parties required to be insured shall collectively be referred to as “insureds.”

2. be written on a builder’s risk “all risk” policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Contract Documents. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder’s risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.
3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form

work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).
 5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
 6. extend to cover damage or loss to insured property while in transit.
 7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder’s risk insurance.
 8. allow for the waiver of the insurer’s subrogation rights, as set forth below.
 9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
 10. not include a co-insurance clause.
 11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
 12. include performance/hot testing and start-up.
 13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.
- B. *Notice of Cancellation or Change:* All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the



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purchasing policyholder shall provide a copy of the notice to each other insured.

- C. *Deductibles:* The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.
- D. *Partial Occupancy or Use by Owner:* If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- E. *Additional Insurance:* If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.
- F. *Insurance of Other Property:* If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.05 Waiver of Rights

- A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or

subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Modified General Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:
 - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss



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referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

- D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Modified General Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in

interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

- C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

7.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, Shut Down Dates as defined in the Agreement, or any City-recognized holiday.



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Contractor may perform Work outside regular working hours or on Saturdays, Sundays, Shut Down Dates as defined in the Agreement, or legal holidays only with Owner's written consent, which will not be unreasonably withheld. Contractor (and Subcontractor) regular working hours consist of 8 up to 10 working hours within an 11-hour period between 7:00 a.m. and 6:00 p.m., on a regularly scheduled basis, excluding Saturday, Sunday, and holidays. Overtime work is work in excess of 40 hours per week. Contractor must receive advanced written approval from the Owner prior to performing work on weekends or City Holidays. Approval of such weekend and/or holiday work is in the Owner's sole discretion.

7.03 Services, Materials, and Equipment

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment. Contractor warrants that all materials and equipment are suitable and fit for the intended use of such materials and equipment and are free from defects in material, workmanship, or design. The foregoing applies whether the materials or equipment are specified in the Contract Documents.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with

instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 "Or Equals"

- A. Substitutions prior to the receipt of bids shall be governed by the Instructions to Bidders. Substitutions after the entry into the Agreement shall be governed by these Modified General Conditions. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) it has a proven record of performance and availability of responsive service; and
 - 4) it is not objectionable to Owner.



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b. Contractor certifies that, if approved and incorporated into the Work:

- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
- 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense:* Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination:* Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request:* If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 Substitutes

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or

equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

a. shall certify that the proposed substitute item will:

- 1) perform adequately the functions and achieve the results called for by the general design,
- 2) be similar in substance to that specified, and
- 3) be suited to the same use as that specified.

b. will state:

- 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,
- 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and



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- 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from that specified, and
 - 2) available engineering, sales, maintenance, repair, and replacement services.
 - d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- E. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination:* If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.
- 7.06 *Concerning Subcontractors, Suppliers, and Others*
- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.
 - B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract Documents to do so.
 - C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.
 - D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be



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deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

- E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.
- F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, Contractor shall not be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement.
- G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work

just as Contractor is responsible for Contractor's own acts and omissions.

- J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.
- K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.
- N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.
- O. Nothing in the Contract Documents:
 - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
 - 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.



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7.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 *Permits*

- A. Responsibility for permits will be established by the Instructions to Bidders.
- B. A copy of each permit obtained by Owner is available at Owner's office. Contractor shall examine the permits and conform to the requirements contained therein, and such requirements are hereby made part of these Contract Documents as though the same were set forth herein. Failure to examine the permit(s) will not relieve Contractor from compliance with the requirements stated therein.

7.09 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.
- B. Materials purchased for use or consumption in connection with the proposed Work will be exempt from the State of Ohio Sales Tax, as provided in Section 5739.02 of the Ohio Revised Code, and also from the State of Ohio Use Tax, as provided in Section 5741.01 of the Ohio Revised Code. A Construction Tax Exempt Certificate is included with the Bid Documents.
- C. Purchases by the Contractor of expendable items, such as form lumber, tools, oil, greases, fuel, or equipment rentals, are subject to the application of Ohio Sales or Use Taxes.
- D. Contractor shall withhold any income taxes due to the Owner for wages, salaries, and commissions paid to its employees for work done under this Agreement and further agrees that any of its subcontractors shall, by the terms of its subcontract, be required to withhold any such income taxes due for work performed under this Agreement.

7.10 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of



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engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

- C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal.
- D. Prevailing Wage Rates. If indicated in the Agreement or Instructions to Bidders, each laborer, worker, or mechanic employed by Contractor, Subcontractor, or other persons performing Work on the Project shall be paid not less than the applicable prevailing rate of wages pursuant to Ohio Revised Code Chapter 4115.

7.11 Record Documents

- A. Contractor shall maintain in a safe place at the Site two printed record copies of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. The Contractor shall deliver these record documents, samples, and shop drawings to the Engineer, no later than the date for Substantial

Completion, for the Engineer's review and transmittal to the Owner.

7.12 Safety and Protection

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Contract Documents identify any Owner's safety programs that are applicable to the Work.



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- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
- G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 Safety Representative

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.
- B. Contractor shall keep at the Site at all times during the progress of the Work as required by law a

competent person to comply with OSHA trenching and excavation requirements. The competent person shall be one who is capable of identifying existing and predictable hazards in the surrounding, or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

7.14 Hazard Communication Programs

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 Emergencies

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.16 Shop Drawings, Samples, and Other Submittals

- A. *Shop Drawing and Sample Submittal Requirements:*
 - 1. Before submitting a Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria,



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installation requirements, materials, catalog numbers, and similar information with respect thereto;

- c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
- d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.
3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

- a. Contractor shall submit the number of copies required in the Specifications.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to

show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples:*

- a. Contractor shall submit the number of Samples required in the Specifications.
- b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Other Submittals:* Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.



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3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.
 5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.
 6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
 7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.
 8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.
- E. Resubmittal Procedures:**
1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.
 2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than the number of submittal reviews specified in Paragraph 15.01.E.4 of these Modified General Conditions. Engineer will record Engineer's time for reviewing a subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time in accordance with Paragraph 15.01.E.4. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
 3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.
- 7.17 Contractor's General Warranty and Guarantee**
- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.
 - B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 2. normal wear and tear under normal usage.
 - C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation



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to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;
 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 4. use or occupancy of the Work or any part thereof by Owner;
 5. any review and approval of a Shop Drawing or Sample submittal;
 6. the issuance of a notice of acceptability by Engineer;
 7. any inspection, test, or approval by others; or
 8. any correction of defective Work by Owner.
- D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.
- E. Upon final payment, the Contractor must assign and transfer to Owner all guarantees, warranties, and agreements from and with all contractors, subcontractors, vendors, suppliers, and manufacturers regarding their performance, quality of workmanship, or quality of materials supplied in connection with the work. Contractor represents and warrants that all such guarantees, warranties, and agreements will be in place and enforceable by the Owner in accordance with their terms. The Owner, however, will not assume through any assignment or transfer required under this subparagraph any of the Contractor's payment obligations to any entities.

7.18 Indemnification

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold

harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims (whether alleged or proven), demands, costs, losses, and damages, including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs, arising out of or relating to the performance of the Work or any breach of Contractor's obligations under the Contract Documents, including but not limited to the breach of any warranty provided in the Contract Documents.

- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.19 Delegation of Professional Design Services

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.
- B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required



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of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.
- D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the Owner will provide for the



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coordination of the work at the Site in the Contract Documents.

8.03 *Legal Relationships*

- A. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.
- B. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.
- C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify Owner and Engineer as required under Paragraph 7.18.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

- A. Except as otherwise provided in these Modified General Conditions, Owner shall issue all communications to Contractor through Engineer or the Resident Project Representative.

9.02 *Replacement of Engineer*

- A. Owner may at its discretion appoint an engineer to replace Engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

9.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.



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9.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
- B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S CONSTRUCTION

STATUS

DURING

10.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The Engineer's duties and responsibilities during the construction period are in addition to the duties and responsibilities of the Owner's Representative, as referenced in the Agreement. The duties and responsibilities and the limitations of authority of Engineer as a representative of the Owner during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of



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construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

- A. Owner may furnish a Resident Project Representative to assist Engineer at the Site, assist Engineer in providing more extensive observation of the progress and quality of the Work, and assist in carrying out the Engineer's other responsibilities under the Contract Documents and its agreement with the Owner
- B. The duties and responsibilities of the Resident Project Representative may include, but not be limited to, the following:
 1. Review schedules and amendment thereto.
 2. Attend conferences and meetings with Contractor.
 3. Serve as liaison between Owner, Engineer, and Contractor.
 4. Conduct on-site observation of the work.
 5. Observe tests, equipment, and system startups.
 6. Report to Engineer and Owner when clarifications and interpretations of the Contract Documents are needed. Consider, evaluate, and report to Engineer and Owner, Contractor's requests for modification.
 7. Maintain orderly records, keep a daily log (when on a part-time basis, keep log for days visiting site).
 8. Before project completion, prepare final list of items to be completed or corrected and make recommendations to Owner concerning acceptance of the Work.
 9. Review Payment Applications from Contractor.
- C. The Resident Project Representative shall not:
 1. Authorize any deviation from the Contract Documents or substitutions of materials or equipment, unless authorized by Owner.

2. Undertake any of the responsibilities of Contractor, Subcontractor, or Contractor's superintendent.
3. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences, or procedures of construction.
4. Advise on, issue directions regarding, or assume control over safety precautions and programs in connection with the Work.
5. Accept shop drawing or sample submittals from anyone other than Contractor.
6. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
7. Authorize Owner to occupy the Project in whole or in part.
8. Participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by Engineer.

10.04 *Rejecting Defective Work*

- A. Owner has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

- A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.
- B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.
- C. Engineer's authority as to Change Orders is set forth in Article 11.
- D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.



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- B. Unit Price Work for which a typical cross section or other detail from the Contract Documents applies shall be paid only up to the quantity determined by using the dimensions provided in the typical cross section or other detail. By way of example, this provision means that if a typical trench width detail in the Drawings shows a maximum width of 30 inches, all pay quantities associated with the actual work of constructing the detail shall be calculated using a trench width not greater than 30 inches. This means that the actual pay quantity could also be less than that based upon a 30 inch wide trench, if the actual trench width is smaller and otherwise in conformance with the Contract Documents, but the Contractor would not be paid more if the actual trench width exceeds 30 inches. Contractor is responsible for determining what actual trench width may be required due to field conditions and applicable laws and regulations existing at the time of its bid.

10.07 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor,

any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.



ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders:*

- a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

2. *Work Change Directives:* A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive.

3. *Field Orders:* Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the

Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations. The agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including but not limited to, all direct, indirect, and cumulative costs associated with such change and any and all adjustments to the Contract Sum and the Date for Substantial Completion.
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of Work Change Directive, a Claim may be made therefor as provided in Article 12.



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11.03 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:
1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or]
 2. where the parties do reach a mutual agreement to a lump sum, then by that mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or
 3. where the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).
- C. *Contractor's Fee:* When applicable, the Contractor's fee for overhead and profit shall be determined as follows, and is the maximum total allowable amount:
1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

- a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;
- b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;
- c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;
- d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
- e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
- f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.



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11.05 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.
- B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

- A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

- 1. *Procedures:* Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.
- 2. *Engineer's Action:* Engineer will review each Change Proposal and, within 30 days after

receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

- 3. *Binding Decision:* Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

- B. *Resolution of Certain Change Proposals:* If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
 - 1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
 - 2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 - 3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under



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Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 Notification to Surety

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change. Failure to provide notice to the surety of any such change shall not exonerate the surety from its obligations under the bond.

ARTICLE 12 – CLAIMS

12.01 Claims

- A. *Claims Process:* The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Contractor of Engineer's decisions regarding Change Proposals;
2. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

- B. *Submittal of Claim:* As a condition precedent to a change in the Contract Price or the Contract Terms, for each Claim the Contractor shall deliver

a fully completed Statement of Claim Form, a copy of which form is a Contract Document, to the Engineer and the Owner, within 21 days of the start of the underlying cause of the Claim. The Contractor shall be responsible for substantiating its Claim. The Contractor's failure to deliver a fully completed Statement of Claim form shall be an irrevocable waiver of Contractor's right to any form of additional compensation, be it in time or money, arising out of the Claim or the circumstances underlying the Claim. Further, Contractor's obligation to deliver a fully completed Statement of Claim form within such 21 day period is a material term of the Contract Documents and provides the Owner with the opportunity to mitigate its damages.

- C. *Review and Resolution:* Engineer will review each Claim and, within 45 days after receipt of the Statement of Claim Form, take one of the following actions in writing:

1. deny the Claim in whole or in part;
2. approve the Claim, or
3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial. In the event the Engineer does not take action on a Claim within said 45 days, the Claim shall be denied.

- D. *Final and Binding Results:* Engineer's written action under Paragraph 12.01.C or denial pursuant to Paragraphs 12.01.C.3 or 12.01.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invokes the dispute resolution procedures set forth in Article 17.

- E. *False or Fraudulent Claim.* The Contractor shall not knowingly present or cause to be presented to the Owner a false or fraudulent Claim. Knowingly shall have the same meaning as in Section 3729(b) USC of the Federal False Claims Act. If the Contractor knowingly presents or causes to be presented a false or fraudulent Claim, then the Contractor shall be liable to the Owner for the same civil penalty and damages as the United States Government



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would be entitled to recover under such Section 3729(a) USC and shall also indemnify and hold the Owner harmless from all costs and expenses, including Owner's attorneys' and consultants' fees and expenses incurred in investigating and defending against such Claim and in pursuing the collection of such penalty, damages, and fees and expenses.

- F. *Claim Documentation.* Within ten (10) days of written request from the Owner, Contractor shall make available to Owner or its representative any books, records, or other documents in its possession or to which it has access, including but not limited to Contractor's daily logs/reports, original estimates of Work and applicable agreements, correspondence with subcontractors and suppliers, internal correspondence (including e-mail), accounting records, and other information from which the Contractor's records, and other information from which the Contractor's costs may be derived. To the extent permitted by law, the Owner shall keep the Project accounting records and estimate for the Project confidential. As requested by the Owner, the Contractor shall provide such documents and information in paper copies and/or computer format (including the format of the Contractor's accounting software and/or ASCII format). The Contractor's provision of the requested documents and information shall be a condition precedent to any further proceeding under the Contract Documents or to payment of an Application for Payment.
- G. Failure to provide the requested documents shall be a material breach of the Contract, and Contractor shall indemnify Owner for all of Owner's costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to Contractor's failure to comply with this provision. If the Contractor fails to provide the requested documents, the Contractor shall be precluded from presenting such documents in any subsequent dispute resolution proceedings, if the

data was reasonably available at the time of the request.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES

13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work:* The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
 2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included:* Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes,



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workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

- b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

- c. Construction Equipment and Machinery

- 1) Rentals of all construction equipment and machinery, and the parts thereof in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
- 2) Costs for equipment and machinery owned by Contractor and used on the Work will be paid at a rate shown for such equipment in the latest edition of the Associated Equipment Distributors' rental rate manual. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs. Costs will include the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, shall cease to accrue when the use thereof is no longer necessary for the changed Work. Equipment or machinery with a value of less than \$1,000 will be considered small tools. Costs for equipment and machinery owned by Contractor for



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which Contractor is seeking monetary compensation due to the equipment and machinery being idled through no cause of Contractor will be paid at half of the Associated Equipment Distributors' rate.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Fees for permits and licenses.
- f. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- g. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- h. The cost of utilities, fuel, and sanitary facilities at the Site.
- i. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

- j. The portion of the costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain, that can be attributed to this Contract.

C. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
- 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee:* When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered



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by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

- E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances*: Contractor agrees that:
1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. .
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.
- E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:
1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
 2. there is no corresponding adjustment with respect to any other item of Work; and
 3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract



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Price, and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 Access to Work

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

14.02 Tests, Inspections, and Approvals

- A. All Work is subject to testing to indicate compliance with Contract Document requirements. Duplicate copies of test results required shall be submitted to Engineer. Testing laboratories used by Contractor are subject to the approval of Owner. Tests and inspection of work may be conducted by Owner or an independent laboratory employed by Owner. Tests may also be performed in the field by Engineer as a basis for acceptance of the Work. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests. Samples required for testing shall be furnished by Contractor at no cost to Owner. In the event that completed Work does not conform to specification requirements during the initial test, the Work shall be corrected and retested for conformance. The entire cost of retesting completed Work shall be borne by Contractor. This shall include the extra cost for inspection to Owner which will be deducted from the final amount due Contractor.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the

Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
 - 1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 - 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 - 3. by manufacturers of equipment furnished under the Contract Documents;
 - 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 - 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer. Tests required by the Contract Documents to be performed by Contractor that require test certificates to be submitted to Owner and Engineer for acceptance shall be made by an independent testing laboratory or agency licensed or certified in accordance with Laws and Regulations and applicable state and local statutes. In the event state license or



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certification is not required, testing laboratories or agencies shall meet the following applicable requirements:

- a. "Recommended Requirements for Independent Laboratory Qualification," published by the American Council of Independent Laboratories.
- b. Basic requirements of ASTM E329, "Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials used in Construction" as applicable.
- c. Calibrate testing equipment at reasonable intervals by devices of accuracy traceable to either the National Institute of Standards and Technology or accepted values of natural physical constants.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Owner or Engineer, Contractor shall, if requested by Owner or Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Owner and Engineer timely notice of Contractor's intention to cover the same and Owner and Engineer had not acted with reasonable promptness in response to such notice.

14.03 Defective Work

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work and so as not to delay the Project, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Owner or Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 Acceptance of Defective Work

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this



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sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

- A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
 - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly

attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, fails to comply with any requirements of the Contract Documents, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

- A. If Contractor fails within two (2) business days of a written notice from Owner or Engineer, or such longer time as may be stated in such notice, to correct, or take reasonable steps to commence to correct, defective Work, or to remove and replace, or take reasonable steps to remove and replace, rejected Work in accordance with Paragraph 14.03.D or as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may correct or remedy any such deficiency. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor all the costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under



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this Paragraph 14.07. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

- B. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 Progress Payments

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. The Engineer-approved version of the Application for Payment form, which includes information on completed Schedule of Values items, is to be used by the Contractor when making an Application for Progress Payment. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. Applications for Payments:

1. At least by the 20th day of the month (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application, and any other supporting documentation required by the Contract Documents or by the Engineer. The Application for Payment will be in the form and submitted with the number of copies of it and all related documents as required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
2. Beginning with the second Application for Payment, each Application shall include Contractor's Affidavit with List of Subcontractors and Suppliers with Amounts Withheld; including a certification that Contractor has paid all of its subcontractors and suppliers who were due to be paid with the proceeds of the prior Application for Payment, all using the form provided by Owner and included in the Project Manual.
3. *Retainage.* Partial payments to Contractor for labor performed shall be made at the rate of 92 percent of the amount invoiced through the Application for Payment that shows the total Contract Completion at 50 percent or greater, pursuant to Ohio Revised Code Section 153.14. After the Contract is 50 percent complete as evidenced by payments in the amount of at least 50 percent of the Contract Price to



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Contractor, no additional funds shall be retained from payments for labor.

4. Contractor shall submit one original (unless a different quantity is otherwise agreed upon) on 8-1/2 by 11 paper of each lien waiver submitted.
5. Contractor shall submit six copies (unless a different quantity is otherwise agreed upon) of each pay request for approval.
6. No advanced payment for shop drawing preparation will be made. Shop drawing costs will be paid when equipment and materials are delivered and suitably stored on the site.
7. All stored equipment and materials for which payment is requested shall have five copies (unless a different quantity is otherwise agreed upon) of invoices included with the pay request. Equipment shall be identified thoroughly on the invoices, including serial numbers.
8. Payment for the stored equipment and material which are on the site shall not exceed the invoiced amount for each item, less the Contract retainage. The overhead and profit for the stored items shall not be invoiced until the item is installed.
9. Payment for off-site storage is normally reserved for sensitive or very large pieces of equipment that in Engineer's opinion would not be practical to have stored on the site. Payment for off-site stored items shall be limited to 75% of the invoiced value of the item, less Contract retainage. Contractor shall reimburse Owner the Cost of inspecting off-site stored items. When off-site storage is approved, Contractor shall provide Insurance Certificates and Document of Ownership to Owner.

C. *Review of Applications:*

1. Engineer will, within 10 working days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may

make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner



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or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

- a. to supervise, direct, or control the Work, or
- b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
- c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
- d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or
- e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

- a. the Work is defective, requiring correction or replacement;
- b. the Contract Price has been reduced by Change Orders;
- c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
- d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

- e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents; or

- f. the Contractor is in default of any other Agreement it has with the Owner.

D. Payment Becomes Due:

1. Thirty days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be submitted to the appropriate funding sources for processing (up to 90 days) and payment to contractor.

E. Reductions in Payment by Owner:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
 - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal



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reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

- f. the Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. the Contract Price has been reduced by Change Orders;
 - i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
 - j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - l. there are other items entitling Owner to a set off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the

amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

4. Items entitling Owner to retain set-offs from the amount recommended include, but are not limited, to the following:
 - a. Owner compensation to Engineer at an average rate of \$200 per each extra personnel hour for labor plus expenses, if applicable, because of the following Contractor-caused events:
 - 1) Return visits to manufacturing facilities to witness factory testing or retesting;
 - 2) Submittal review in excess of two reviews by Engineer for substantially the same Submittal, in accordance with Paragraph 7.16.E of these Modified General Conditions;
 - 3) Evaluation of proposed substitutes and in making changes to Contract Documents occasioned thereby, in accordance with Paragraph 7.05 of these Modified General Conditions; and
 - 4) Overtime worked by Contractor necessitating Engineer or anyone else to work overtime in accordance with Paragraph 7.02 of these Modified General Conditions.
 - b. Liability for liquidated damages incurred by Owner as set forth in the Contract Documents.

15.02 Contractor's Warranty of Title

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.



15.03 Substantial Completion

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.
- G. *Time for Completion of Items on Tentative List and Remedies.* The time fixed by the Engineer for the completion of all items on the list accompanying the tentative certificate of Substantial Completion shall not be greater than thirty (30) days. The Contractor shall complete all items on the list within such 30-day period. If the Contractor fails to do so, the Owner in its discretion may perform the Work by itself or others and the cost thereof shall be charged to the Contractor. The Contractor irrevocably designates the Owner as the Contractor's attorney-in-fact to execute a Change Order deducting such cost from the balance of the Contract Price and also any additional costs or expenses incurred by the Owner arising out of or related to the failure of the Contractor to complete such items, including but not limited to attorneys', consultants', and Engineer's fees. The Contractor's warranties under the Contract Documents shall remain in full force and effect



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and cover any remedial Work, even if performed by others. If more than one inspection by the Engineer for purposes of evaluating corrected Work is required, it will be performed at the Contractor's expense.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.
2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. Owner may at any time request Contractor in writing to permit Owner to take over operation of any part of the Work although it is not substantially complete. A copy of such request will be sent to Engineer, and within a reasonable time thereafter, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected thereon before final payment. If Contractor does not object in writing to Owner and Engineer that such part of the Work is not ready for separate operation by Owner, Engineer will finalize the list of items to be completed or corrected and will deliver such lists to Owner and Contractor together with a written recommendation as to the division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, maintenance, utilities, insurance, warranties, and guarantees for that part of the Work which will become binding upon Owner and Contractor at the time when Owner takes over such operation (unless they shall have otherwise agreed in writing and so informed Engineer). During such operation and prior to Substantial Completion of such part of the Work, Owner shall allow Contractor reasonable access to complete or correct items on said list and to complete other related Work.
5. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.



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15.06 Final Payment

A. Application for Payment:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
 - d. a list of all disputes that Contractor believes are unsettled; and
 - e. a Contractor's Waiver and Release Agreement for itself as of the date of Final Application for Payment and Subcontractors-Suppliers Waiver and Release Agreements for each of its Subcontractors and Suppliers as of the date of the Final Application for Payment.
3. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

4. If Contractor is required to pay prevailing wages, prior to final payment and in accordance with ORC 4115.05, Contractor and its Subcontractors shall each file with Owner an affidavit certifying their compliance with ORC 4115.03 to ORC 4115.16 regarding wages.

B. Engineer's Review of Application and Acceptance:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

- C. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

- D. *Payment Becomes Due:* Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-



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offs allowed under the provisions above with respect to progress payments) will become due and will be submitted to appropriate funding sources for processing (up to 90 days) and paid to Contractor.

15.07 *Waiver of Claims*

- A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.
- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such other adjacent areas;
 - 2. correct such defective Work;
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or limitation upon, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by



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written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 Owner May Terminate for Cause

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
4. Contractor's disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) three business days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
2. enforce the rights available to Owner under any applicable performance bond.

Such termination shall be effective as of the date stated in the termination notice provided to Contractor.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within three business days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.



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16.03 Owner May Terminate For Convenience

- A. Upon three business days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. Such termination shall be effective as of the date stated in the written notice. In such case, Contractor shall be paid for (without duplication of any items):
1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including compensation as set forth in the schedule of values or Bid Form in the case of unit prices;
 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.
- C. Contractor shall require similar provisions contained in Paragraph 16.03 in each of its subcontracts to protect Contractor from claims by Subcontractors arising from the Owner's termination for convenience, or to minimize claims by such subcontractors. The remedy provided to Contractor under this Paragraph 16.03 shall be the Contractor's sole remedy in the event of termination for convenience by Owner.

16.04 Contractor May Stop Work or Terminate

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 90 days to pay

Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 90 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 Methods and Procedures

- A. *Litigation, Settlement, Methods, and Procedures.*
1. Any dispute, claim, or other matter not settled by negotiation or mediation, shall be determined by the Court of Common Pleas for Stark County, Ohio, which shall be exclusive venue and jurisdiction over such matters and claims, to the exclusion of any other court, including any U.S. District Court.
 2. In addition to Owner's entitlement to attorneys' fees set forth elsewhere in the Contract Documents, in the event that Contractor files a Claim or files an action against Owner, Owner shall be entitled to make an offer of settlement of the Claim to Contractor at any time up to the date of trial. Such offer of settlement shall not be admissible into evidence at the litigation except on the issue of entitlement to recovery of attorneys' fees, costs, and expenses. If at any stage of the litigation, including any appeals, Contractor's claim is dismissed or found to be



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without merit, or if the damages awarded to Contractor on its claim do not exceed Owner's offer of settlement, Contractor shall be liable to Owner and shall reimburse Owner for all attorneys' fees, costs, and expenses incurred by Owner from the date of the offer of settlement until the date of the final adjudication and resolution of Contractor's claim.

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 - 1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
 - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

- A. This Contract is to be governed by the law of the State of Ohio.

18.08 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

18.09 *Equal Employment Opportunity and Non-Discrimination.*

- A. The Contractor shall comply with, and shall require all Subcontractors of any tier to comply with, the applicable equal employment opportunity and non-discrimination statute and regulations of the State of Ohio.



The City of Canton

Date:

SAMPLE ONLY

SENT BY REGULAR U.S. MAIL

Re: Notice to Proceed
City of Canton – Project

Dear M . :

You are notified to proceed with your Work on the **PROJECT** (the Project). This letter shall serve as [Name of Contractor]'s Notice to Proceed on the Project and shall be effective as of . The Contractor shall have its Work for the «Project_Name» scope of work, referred to herein as the "Interim Milestone Scope," substantially complete by «Date_of_Substantial_Completion». Substantial Completion is the time at which the Work has progressed to the point where the Work is sufficiently complete, in accordance with the Contract Documents, so that the Work can be utilized for the purposes for which it is intended.

Thank you.

Approved By:

John Highman, Director of Public Service, City of Canton

(SAMPLE COPY)
Waste Disposal Agreement for Projects in the City of Canton

Items 1, 3 - 9 are optional and discretionary to the undersigned

THIS WASTE AGREEMENT, made this _____ day of _____ 20____, by and between

(called "Contractor"), and _____ of

(called "Land Owner"), concerning a certain construction contract
between the Contractor and _____ in the City of Canton, OH for the

(project), as follows:

1. **MANNER OF WASTING:** Land Owner grants to Contractor the exclusive right to place dirt, earth, rock, topsoil, subsurface, unsuitable and/or other excess material (called "waste material") upon the area described in the following paragraph without requirement, limit, or restriction as to depth, amount, manner, or time.
2. **WASTE AREA:** The property upon which Contractor is permitted to place material is commonly known as _____ (address).
3. **TITLE TO WASTE AREA:** The Land Owner warrants that it has title to and the right to contract for placement of waste material in said area and agrees to defend and indemnify Contractor against any claim, suit, or damage arising out of such title or right to contract.
4. **ACCESS AND USE:** Land Owner hereby grants Contractor the right of ingress and egress to the waste area in locations to be selected by Contractor for all purposes necessary to the complete fulfillment of this agreement, and the right of quiet enjoyment in the intended use of such area.
5. **PAYMENT:** Contractor agrees to pay and Land Owner agrees to accept as full and final compensation for all rights granted and covenants contained herein and all claims of every nature the sum of _____ payable _____.
6. **BASIS OF MEASUREMENTS:** It is mutually agreed that measurement of the amount of materials wasted, where required, shall be made on the following basis: _____ and said measurement shall be binding upon the parties hereto for all purposes.
7. **DAMAGES:** Land Owner hereby waives any and all claims for damage to the waste area and to the area of ingress and egress except as specifically noted herein.
8. **RELEASE:** Upon receipt of final payment hereunder, and provided all terms of this agreement have been fulfilled, Land Owner hereby releases Contractor from further liability of any kind or nature hereunder.

WITNESSES:

CONTRACTOR:

Authorized Signature & Title

LANDOWNER:

Signature

9. **ENTIRE AGREEMENT:** It is agreed that the terms and conditions of this agreement are fully covered in the foregoing, and that any oral or written statements made by either party, or agents claiming to represent either party, not set forth herein, are not binding on the parties and are not considered as part of this Agreement.
10. **DISCLAIMER:** The City of Canton is not a party to the here above agreement. The Contractor and Landowner shall indemnify and save harmless the City of Canton from any claim that may arise from the here above agreement. The waste material is the property of the Contractor, not the City of Canton.

Signature Page

Water Department Service Shop Addition and Renovation

To the Director of Public Service of the City of Canton:

The undersigned, having carefully examined the complete invitation to bid, herewith proposes to furnish all of the goods and/or services contained within the bid for **Water Department Service Shop Addition and Renovation** in accordance with all specifications on file to the satisfaction of the Director of Public Service of said City.

The bidder hereby agrees that the Director of Public Service has the right to reject any and all bids and to accept the bid(s) deemed most beneficial to the City of Canton.

The bidder herewith encloses a _____ **(Bid Bond, Certified/Cashier's Check)** in the sum of \$ _____ dollars made payable to the CITY OF CANTON as a guaranty that if awarded the contract _____ will enter into contract therefore, within the prescribed time of ten (10) days from the date of service of notice of award, otherwise such bond or checks shall become the property of said City.

The bidder acknowledges receipt of Addenda Numbers: _____

SIGNATURE OF BIDDER: _____

NOTE: If bidder is a corporation, set forth the legal name of the corporation, together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. If bidder is a partnership, set forth the name of the firm, together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership.

Please have this page Notarized.

Proposal Page

We (I), the above signed hereby propose to furnish the following article(s) and/or service(s) at the price(s) and terms stated subject to all instructions, conditions, specifications, and all attachments hereto. We (I) have read all attachments including the specifications and fully understand what is required.

BID ITEM	SPEC ITEM	DESCRIPTION	QTY	UNIT	PRICE LABOR	PRICE MATERIAL	TOTAL
CITY OF CANTON WATER DEPARTMENT SERVICE SHOP ADDITION AND RENOVATIONS							
Base Bid	ALL	Perform all General Contract work as outlined in Project Manual and as shown on Drawings	1	Lump			
Allowance 1		General Contractor to include General Purpose Construction Allowance.	1	Lump			\$80,000
Alternate 1		Additional time for Owner to execute Owner-Contractor Agreement	30	Days			
		PROJECT TOTAL					

Bid Price in Figures _____

FROM: _____

Bid Price in Words _____

**Base Bid Prices are for Informational Purposes Only.
Total Unit Prices will govern.**