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purchasinginfo@kcdc.org
www.kcdc.org

Invitation for Sealed Bids

Solicitation Name and Number	Alterations at Guy B. Love Towers C20013
Responses Must Arrive No Later Than (As KCDC's clocks indicate)	2:00 p.m. on December 3, 2019
Deliver Responses to:	Knoxville's Community Development Corporation Procurement Division 901 N. Broadway Knoxville, TN 37917 Procurement is behind the main office building.
Electronic Copies	Electronic copies are available on KCDC's webpage or by email at purchasinginfo@kcdc.org**.**
Responses may be Emailed to KCDC	☐ Yes ☒ No
Printed Responses Required	☒ Yes ☐ No
Solicitation Meeting	☒ Yes ☐ No
Solicitation Meeting is Mandatory	☐ Yes ☒ No ☐ Not Applicable
Solicitation Meeting Date and Time	November 14, 2019 at 3:00 p.m.
Solicitation Meeting Location	KCDC's Board Room at 901 N. Broadway in Knoxville. Come to the lobby and go up the stairs or ask the receptionist for access to the elevator.
Solicitation Meeting Connection	KCDC will host an on-line meeting. Email **purchasinginfo@kcdc.org** for the web link.
Site Visit Schedule	Following the solicitation meeting
Questions About This Solicitation	Submit questions to purchasinginfo@kcdc.org **KCDC will not accept questions via telephone.**
Award Results	KCDC posts the award decision to its web page at: http://www.kcdc.org/procurement/
Open Records/Public Access to Documents	All document provided to KCDC are subject to the Tennessee Open Meetings Act (TCA 8-44-101) and open records requirements.
Plans/Blueprints	Blueprints/plans are available from Knoxville Blueprint
Check KCDC's webpage for addenda and changes before submitting your response	

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General Information

1. **Background and Intent**

a. Knoxville's Community Development Corporation (KCDC) is the public housing and redevelopment agency for the City of Knoxville and for Knox County in Tennessee. KCDC's affordable housing property portfolio includes 20 sites with approximately 3,525 dwelling units.

b. KCDC wishes to hire a supplier to perform alteration work for its Guy B. Love Towers (Love Towers) property as detailed in this solicitation package.

2. **Bonds**

Bid, payment and performance bonds are required if the bid exceeds $100,000 in value. The supplier will include all bonding costs in the base bid. Bonding requirements include:

a. A bid **bond** from each supplier equivalent to five percent (5%) of the bid price. Such bid bond must accompany the bid. Bid bonds will not be returned until a contract is signed.

b. Performance and payment **bonds** for 100% of the contract price.

c. All bonding companies must be listed in the Federal Register, Department of the Treasury Fiscal Service, Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies; Notice. Companies licensed to do business in the State of Tennessee must issue all required bonds.

3. **Changes after Award**

It is possible that after award KCDC will need to revise the service needs or requirements specified in this document. KCDC reserves the right to make such changes after consultation with the supplier. Should additional costs arise, the supplier must document increased costs. KCDC reserves the right to accept or reject and negotiate these charges.

4. **Codes and Ordinances**
   All work covered is to be done in full accord with national, state and local codes and ordinances and orders that are in effect at the time the work is performed.

5. **Contact Policy**
   Only contact KCDC's Procurement Division about this solicitation from the issuance of this RFP until award. Information obtained from an unauthorized officer, agent, or employee will not affect the risks or obligations assumed by the proposer or relieve the proposer from fulfilling any of the conditions of the resulting award for the purpose of this project. Such contact can disqualify the proposer from the solicitation process.

6. **Contract Approval**
   The resulting contract is subject to KCDC's Board approval.

7. **Contract Documents**
   KCDC has posted a prototype of the standard contract and rider that will be used to its webpage. Please review these documents before submitting a bid.

8. **Damage**
   The supplier is responsible for all damage to buildings, equipment, grounds, premises and all other types of potential damage resulting from the provision of the services requested herein.

9. **Employees**
   Supplier will:

a. Allow only personnel thoroughly trained and skilled to work on the job. Employees are not to be accompanied in their work area by acquaintances, family members, assistants or any person unless said person is an authorized employee of the supplier.

b. Have sufficient personnel to complete the work in a timely manner.

c. Provide adequate supervision and adequate discipline among his/her employees.

d. Provide at least one employee on every job assignment with the ability to speak, read, write and understand English so owner's staff can communicate effectively with them.

e. Employ the quantity and quality of supervision necessary for both effective and efficient management at all times.

f. Ensure that employees have proper identification displayed while on the job site. Employees must wear a company uniform or have photo identification badges at all times.

g. Employees parking vehicles (whether corporately or privately owned) must ensure that company identification is on the vehicles. This may be by placards on the vehicle's side, laminated paper with the company name placed on the dashboard or other means.

10. **Entrance to Sites**
    Supplier employees are not to be on KCDC' premises unless they are working on the project. Acquaintances, family members, assistants, or any person not working on owner's behalf will not accompany employees on KCDC' sites.

11. **Equipment**
    Supplier shall provide all necessary equipment, materials, supplies, et cetera needed for the work. Include the cost for such equipment, materials and supplies in the price quoted.

12. **Evaluation**
    KCDC will evaluate this as a formal sealed bid and the award is to the "lowest and best." KCDC alone determines (using NIGP's definition and other relevant sources as appropriate) the supplier's "responsive" and "responsible" status prior to award. Responsible means a business with the financial and technical capacity to perform the requirements of the solicitation and subsequent contract. A responsive bid is one that fully conforms in all material respects to the solicitation document and all of its requirements, including all form and substance. KCDC reserves the right to request additional information to assist in the evaluation process; this includes references and business capacity information.

13. **General Instructions to Suppliers**
    KCDC's General Instructions to Suppliers are at www.kcdc.org. Click on "Procurement" and the link to the instructions. The supplier's submittal means acceptance of the terms and conditions set forth in KCDC's "General Instructions to Suppliers."

14. **Insurance**
    See Appendix 1. These insurances and levels are required and not optional. If you or your insurance agent have concerns or believe that some coverages are not necessary, email purchasinginfo@kcdc.org detailing any requested changes before this solicitation's due date. The supplier will include all insurance costs in the base bid.

15. **Invoicing**

a. KCDC will process pay applications once per month.

b. Suppliers are required to submit invoices within 90 days following the delivery of the goods or services. KCDC may deny invoices submitted after the 90-day threshold.

c. KCDC normally pays by electronic transfer (ACH) only. KCDC does not issue checks. Suppliers will need to set up their access to KCDC's Supplier Portal to track actual payments made.

d. KCDC's purchases of goods are exempt from Tennessee sales and use tax pursuant to Tennessee Code Annotated 67-6-329(a) (4) and KCDC is generally exempt from the Federal Excise tax.

Suppliers are subject to Tennessee sales and use tax on all materials and supplies used in the performance of a contract, whether such materials and supplies are purchased by the supplier, produced by the supplier, or provided to the supplier by KCDC, pursuant to Tennessee Code Annotated 67-6-209. The supplier will pay all taxes incurred in the performance of an awarded contract.

16. **Licensure**

a. Suppliers must possess and maintain proper licensure from the State of Tennessee and all other authorities having jurisdiction throughout the term of this award.

b. In addition to any City or County licenses that may be required, all suppliers must be licensed as required by the State of Tennessee's "Contractor's Licensing Act of 1994."

c. The Executive Director of the State Contractor Licensing Board says one of these licenses is required:

- BC
- BC-B

d. Any subsequent rulings by the State Licensing Board automatically revise these specifications- irrespective of the timing of the notice from the State and irrespective of the status of this solicitation.

e. Additional information is at **https://www.tn.gov/commerce/regboards/contractors.html**.

17. **Liquidated Damages**
Liquidated damages of $300.00 per calendar day for each day beyond the scheduled completion date apply and are included in the award. This applies to both the infrastructure and the construction work. KCDC will consider explanatory information if it provides a valid reason for delays in schedule.

18. **Measurements and Drawings**
Complete responsibility for the final determination of dimensions lies with the supplier. The supplier shall verify all dimensions with the actual on-site conditions. Where the supplier's work is to join another trade, the supplier's shop drawings shall show actual dimensions and the method of joining the work of those trades.

19. **Permits**
The supplier shall obtain and pay for or cause its subcontractors to obtain and pay for all permits required to complete required work. In addition, supplier shall arrange, schedule and pay for or cause its subcontractors to arrange, schedule and pay for all required final inspections by state, local, or independent certified inspecting authorities necessary for issuance of all required owner utilization permits for the work.

20. **Representations**
By submitting a response, the supplier certifies:

a. That the supplier is financially solvent and that it is experienced in and competent to perform the type of work, and/or to furnish the personnel, plans, materials, supplies, or equipment to be performed or furnished by it; and

b. That the supplier is familiar with all federal, state, municipal and county laws, ordinances and regulations, which may in any way affect the work of those employed therein, including but not limited to any special acts relating to the work or to the project of which it is a part; and

c. That the supplier carefully examined the plans, specifications and the worksite and that from its own investigations, has satisfied itself as to the nature and location of the work, the character, quality, quantity of surface and subsurface materials likely to be encountered, and character of equipment and other facilities needed for the performance of the work, the general and local conditions and all other materials which may in any way affect the work or its performance.

21. **Safety/OSHA Guideline Compliance**

a. The supplier is responsible for providing and placing barricades, tarps, plastic, flag tape and other safety/traffic control equipment to protect the public, surrounding areas, equipment and vehicles.

b. The safety of staff and the public is of prime concern to KCDC and all costs associated are the responsibility of the supplier.

c. The supplier shall ensure that its employees exercise all necessary caution and discretion to avoid injury to persons or damage to property.

d. The supplier will protect all buildings, appurtenances and furnishings from damage. The supplier shall, at his expenses, repair such damages (or replace the items) by approved methods to restore the damaged areas to their original condition.

e. Supplier shall use caution signs as required by OSHA Regulation 1910.144 and 1910.145 at no cost to KCDC. Caution signs shall be on-site at commencement of contract.

f. Supplier shall comply with all other OSHA and TOSHA safety standards that apply.

22. **Section 3 of the HUD Act of 1968**

Section 3 is a provision of the Housing and Urban Development Act of 1968 which requires that programs of direct financial assistance administered by the U.S. Department of Housing and Urban Development (HUD) provide, to the greatest extent feasible, opportunities for job training and employment to lower income residents in connection with projects in their neighborhoods. Further, to the greatest extent feasible, contracts in connection with these projects are to be awarded to local businesses. Section 3 is a tool for fostering local economic development, neighborhood economic improvement and individual self-sufficiency.

a. Recipients and suppliers must make a good faith effort to utilize Section 3 area residents as trainees and employees in connection with the project. Targeted recruitment and the selection of Section 3 area residents for available positions are two examples of good faith efforts to meet this requirement.

b. Recipients and suppliers must make a good faith effort to award contracts to Section 3 business concerns for work in connection with the project. An example of a good faith effort to meet this requirement is the implementation of an affirmative action plan, which includes targets for the number and dollar value for awarding contracts to Section 3 business concerns.

c. Recipients and suppliers must keep records and submit reports to HUD documenting the good faith efforts taken and the results of these actions. Examples of such documentation include letters to community organizations, employment development and business development centers, copies of solicitations for bids or proposals; and copies of affirmative action plans.

d. How can businesses find Section 3 residents to work for them? This can be accomplished by recruiting in the neighborhood and public housing developments to tell about available training and job opportunities.

   Distributing flyers, posting signs, placing ads, and contacting resident organizations and local community development and employment agencies to find potential workers are a few effective ways of getting jobs and people together.

e. All contracts awarded are subject to Section 3 requirements. Supplier shall seek to fill any and all positions that are needed and unfilled with residents of KCDC communities. For additional information, please go to http://www.hud.gov/offices/fheo/section3/Section3.pdf. The successful supplier will supply KCDC with job announcements for any position that must be filled as a result of the award of owner's work.

   Additionally the successful supplier will supply the same job announcement to the Knoxville-Knox County Committee Action Committee's Workforce Connections group. These can be faxed to 544-5269.

f. A Section 3 resident is one who lives within a public housing authority's site. It is also people who live in an area with a HUD assisted program and whose income is below HUD's low income requirements.

g. A Section 3 business is one that:

   1. Is at least 51% owned by a Section 3 resident; or

   2. Employs Section 3 residents for at least 30% of its employee base; or

   1. Makes a commitment to sub contract at least 25% of the project's dollars to a Section 3 business.

h. Upon award, the successful supplier will supply two documents to KCDC:

   1. A Section 3 Business determination (forms supplied by KCDC) provided one is not already on file.

   2. A Section 3 Business plan for this work.

23. **Security**

The successful supplier is responsible for providing any necessary security to equipment, materials, personnel, tools and the site that are required for this job. KCDC is not responsible for damage or losses to equipment, materials, personnel, tools or the site.

24. **Site Examination**

a. Suppliers are required to visit the site and become fully acquainted and familiar with conditions, as they exist and the required operations. The supplier shall make such investigations as necessary so that they may fully understand the scope of the work and related facilities and possible complexities when executing the work.

b. The failure or omission of the supplier to receive or examine the solicitation document or any part of the specifications, or to visit the site(s) and acquaint themselves as to the nature and location of the work, the general and local conditions and all matters which may in any way affect performance shall not relieve the supplier of any obligation to perform as specified herein.

Supplier understands the intent and purpose hereof and its obligations hereunder and that it shall not make any claim for, or have any right to damages resulting from any misunderstanding or misinterpretation of the resulting agreement, or because of any lack of information.

c. By submitting a response to this solicitation, each supplier is certifying that they have inspected the site and have read the solicitation and all appendices and addenda. The failure or omission of any supplier to receive or examine any form, instrument, or document shall in no way relieve the supplier from any obligation in respect to its bid.

25. **Smoking Policy**

KCDC has a Smoke Free policy that applies to you, your employees and all subcontractors. This policy mandates:

- No smoking on KCDC's property
- No e-vape or similar usage on KCDC's property
- The Smoke Free policy applies in personal or corporate vehicles on KCDC's property

HUD definitions include:

✓ "Smoking" means inhaling, exhaling, burning or carrying any lighted or heated cigar, cigarette or pipe, or any other lighted or heated tobacco or plant product intended for inhalation, including hookahs and marijuana, whether natural or synthetic, in any manner or in any form. "Smoking" also includes the use of an electronic smoking device which creates an aerosol or vapor, in any manner or in any form.

✓ "Electronic Smoking Device" means any product containing or delivering nicotine or any other substance intended for human consumption that can be used by a person in any manner for the purpose of inhaling vapor or aerosol from the product.

The term includes any such device, whether manufactured, distributed, marketed or sold as an e-cigarette, e-cigar, e-pipe, e-hookah or vape pen or under any other product name or descriptor.

- ✓ Property means all KCDC owned buildings, parking lots, streets, structures and **land** .

Should supplier staff be observed violating these requirements, KCDC's Procurement Division will notify the corporate level contact about the problem. Should there be recurrences; KCDC may ask the supplier to not send the employee to owner's property. Repeated offenses may result in forfeiture of your awarded "contract."

26. **Storm Water and Street Ordinances**

The City of Knoxville's Storm Water and Street Ordinances apply to this solicitation. The successful supplier will comply with all aspects of the City's ordinances. Compliance includes but is not limited to:

a. Retaining all sediments on the project site using structural drainage controls. Drainage control costs are incidental to the work.

b. Not discharging any construction or demolition related materials, wastes, spills, or residues from the project site to streets, drainage facilities, or adjacent properties by wind or runoff.

c. Containing non-storm water runoff from equipment and vehicle washing and any other activity at the project site.

d. Additional information about NPDES, BMPs and the Land Development Manual at http://www.cityofknoxville.org/engineering/stormwater/npdes.asp**.**

e. The successful supplier is responsible for all work, remediation, repair and monetary penalties or fines arising out of a Notice of Violation of the City of Knoxville's Storm Water and Street Ordinances. The supplier will be charged costs KCDC incurs to install structural drainage controls or remedy a Notice of Violation. KCDC shall also charge a $50 fee per violation for related administrative costs.

f. KCDC will prepare, submit and pay the permitting fees. Upon award, the successful supplier will be required to sign onto the permit and be responsible for implementing and maintaining all erosion control measures as required on the SWPPP.

27. **Subcontractors**

Subcontractors must:

a. Be approved by KCDC prior to beginning work.

b. Carry the insurance coverages as outlined herein.

c. Comply with the federal Davis Bacon requirements and submit certified payrolls.

d. Not be on HUD's nor the State of Tennessee's debarment lists.

e. Not be changed without owner's permission.

28. **Time for Completion**

Supplier will complete the entire project by December 31, 2019. Upon award, the successful supplier will work with KCDC to develop a satisfactory schedule.

29. **Weather**

KCDC provides allowances for excessive inclement weather since this solicitation calls for liquidated damages-provided the supplier exceeds the guaranteed number of days for completion.

a. Extensions of Contract Time

If the basis exists for an extension of time in accordance with this solicitation, then an extension of time based on weather may be granted only for the number of weather delay days in excess of the number of weather days listed as the Standard Baseline for that month.

b. Standard Baseline for Average Climatic Range

The Standard Baseline is the normal and anticipated number of calendar days for each month during which adverse weather will prevent activity. Suspension of activity for the number of days each month as listed in the Standard Baseline is to be included in the work and not eligible for an extension of the contract time. The baseline is:

Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
7.4	7.5	8.1	7.3	7.9	7.1	7.8	6.0	4.8	5.2	7.2	7.9

c. Adverse Weather and Weather Delay Days

1. Adverse weather is the occurrence of one or more of the following conditions which prevents only exterior activity or access to the site within a twenty-four hour period:

    a. Precipitation (rain, snow or ice) in excess of one-tenth inch (0.10") liquid measure.
    b. Temperatures which do not rise above 32 degrees Fahrenheit by 10:00 a.m.
    c. Standing snow in excess of one inch (1.00").

2. Adverse weather may include, if appropriate, "dry-out" or "mud" days when all of the following are met:

    a. For rain above the Standard Baseline.

    b. Only if there is a hindrance to site access or site work, such as excavation, backfill and footings.

    c. At a rate no greater than one make-up day for each day or consecutive days of rain beyond the Standard Baseline that total 1.0 inch or more, liquid measure, unless specifically recommended otherwise by the KCDC.

3. A weather delay day occurs only if adverse weather prevents work on the project for 50 percent or more of the supplier's scheduled workday, including a weekend day or holiday if the supplier has scheduled construction activity that day.

d. Documentation and Submittals

1. Submit Daily Jobsite Work Log showing which and to what extent activities were affected by weather on a monthly basis.

2. Submit actual weather data to support a claim for the time extension obtained from nearest NOAA weather station or other independently verified source approved by the KCDC at the beginning of the project.

3. Maintain a rain gauge, thermometer and clock at the jobsite. Keep daily records of precipitation, temperature and the time of each occurrence throughout the project.

4. Use the Standard Baseline data provided in this section when documenting actual delays due to weather in excess of the average.

5. Organize claim documentation on calendar month periods and submit in accordance with the procedures for claims established by the KCDC.

e. Approval by KCDC

1. If the extension of the contract time is appropriate, it will occur in accordance with the provisions of this solicitation.

2. KCDC shall not incur extra costs for any extra time increase to the contract.

30. **Wage Compliance (Davis Bacon Requirements)**
Federal Davis Bacon Wage Requirements apply to this work. The successful supplier will:

a. Submit certified payrolls showing compliance with the Davis Bacon requirements herein. Failure to do so is sufficient cause for withholding payment and/or termination of the contract.

b. Must pay its employees at least weekly pursuant to the Davis Bacon determination listed herein.
c. Will display all pages of Wage Posters, in a "prominent spot" at the job site. These are available from the Procurement Division.

d. Will allow KCDC to conduct on-site Davis Bacon interviews of the supplier's employees. KCDC will use HUD forms and record the information.

e. Classify employees by the applicable Davis Bacon classification. Classifications are determined by the work performed and the tools used-not by job titles.

f. General Decision Information for the work:

General Decision Number	TN20190092
Date	06-28-19
State	Tennessee
Construction Types	Building
Counties	Knox County in Tennessee
Residential	Building Construction Projects (does not include single-family homes or apartments up to and including 4 stories.
Modification Number	2

Classifications and rates:

Classifications and Rates	Rate	Fringe 1
Boilermaker	$30.07	$21.61
Bricklayer	$28.03	$2.39
Carpenter including drywall hanging but excludes cabinet installation and scaffold building)	$14.79	$0.25
Drywall Finisher/Taper	$14.09	$0.24
Electrician including alarm installation	$25.99	$11.67
Glazier	$14.89	$2.69
HVAC Mechanic (Installation of HVAC unit only. Excludes installation of HVAC pipe and duct).	$12.75	$1.49
Ironworkers, Structural and Reinforcing	$28.02	$14.97
Laborer: Common or General	$12.62	$2.45
Laborer: Mason Tender-Brick	$12.74	$0.00
Laborer: Roof Tearoff	$9.75	$0.49
Operator: Bobcat/skid steer/skid loader	$17.05	$0.00
Operator: Mechanic	$18.33	$3.67
Operator: Paver (Asphalt, Aggregate and Concrete)	$13.50	$0.00
Operator: Roller	$13.98	$0.00
Pipefitter includes HVAC pipe installation	$29.01	$13.90
Plumber excludes HVAC pipe installation	$18.73	$4.23
Roofer: Built up roof	$12.74	$0.00
Roofer: Rubber Roof	$16.82	$4.77
Roofer: Single Ply Roof	$16.50	$0.32
Sheet Metal Worker: Includes HVAC duct and metal roof installation but excluded siding/wall panel installation on metal buildings	$14.88	$1.48
Tile Finisher	$10.00	$0.74
Truck Driver includes dump truck, material truck and pickup truck	$12.56	$0.00
Welders: Receive rate prescribed for craft performing operation to which welding is incidental.		

g. Suppliers may not “use a classification” because there is not one listed that exactly identifies the work performed. Unlisted Classifications needed for work not included within the scope of the classifications listed above may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)). To request an additional classification:

- Write a brief letter to KCDC (upon award) stating the title needed and the proposed pay rate. Indicate that the employees are in agreement with the rate. The rate must bear a reasonable resemblance to other rates on the classification.

- If the additional classification is for a subcontractor, the subcontractor writes a similar letter to the General Supplier who then sends a cover letter to KCDC officially requesting the classification.

- KCDC will review the request and forward it to HUD and officially request it or KCDC will suggest that the supplier revise the request.

- HUD will review the request and approve it (or decline it) and send it to the Department of Labor for final approval.

- The Department of Labor will either approve the request or recommend a different minimum rate.

- HUD will notify KCDC of the decision.

- Should either HUD or the Department of Labor require a higher minimum rate, KCDC will notify the supplier. The higher minimum rate, if any, must be paid for work completed (back wages) and for all future work under this project.

h. These requirements apply to all subcontractors that are used by the successful supplier.

i. Davis Bacon rates are locked in at the bid opening provided that a contract is awarded within 90 days. If a contract is not awarded within 90 days after the bid opening and if a new decision is released, it will apply. Modifications released 10 days or less before a bid opening are not applicable as there is not time to incorporate the changes in the bid.

j. In all cases however, suppliers are required to adhere to Davis Bacon standards as the Department of Labor determines - irrespective of any announcements KCDC may have made.

SECTION 00 21 13: INSTRUCTIONS TO BIDDERS

SUMMARY

1.01 DOCUMENT INCLUDES

A. Invitation
   1. Bid Submission
   2. Intent
   3. Work Identified in Contract Documents
   4. Contract Time

B. Bid Documents and Contract Documents
   1. Definitions
   2. Contract Documents Identification
   3. Availability
   4. Examination
   5. Inquiries/Addenda
   6. Product/Assembly/System Substitutions

C. Site Assessment
   1. Site Examination
   2. Prebid Conference

D. Bid Submission
   1. Submission Procedure
   2. Bid Ineligibility

E. Bid Enclosures/Requirements
   1. Performance Assurance
   2. Insurance
   3. Bid Form Requirements
   4. Bid Form Signature
   5. Additional Bid Information
   6. Selection and Award of Alternates

F. Offer Acceptance/Rejection
   1. Duration of Offer
   2. Acceptance of Offer

1.02 RELATED DOCUMENTS

A. Document 01 10 00 - Summary.

B. Document 00 41 00 - Bid Form.

C. Document 00 43 23 - Alternates Form.

D. Document 00 43 25 - Substitution Request Form - During Procurement

INVITATION

2.01 INTENT

A. The intent of this Bid request is to obtain an offer to perform work to complete Work located at KCDC's Guy B. Love Towers for a Stipulated Sum contract, in accordance with Contract Documents.

2.02 WORK IDENTIFIED IN THE CONTRACT DOCUMENTS

A. Work of this proposed Contract comprises renovation, including general construction and various trade Work.

2.03 CONTRACT TIME

A. See paragraph 28 in the solicitation document.

BID DOCUMENTS AND CONTRACT DOCUMENTS

3.01 DEFINITIONS

A. Bid Documents: Contract Documents supplemented with Invitation To Bid, Instructions to Bidders, Information Available to Bidders, Bid Form Supplements To Bid Forms and Appendices identified.

B. Bid, Offer, or Bidding: Act of submitting an offer under seal.

C. Bid Amount: Monetary sum identified by the Bidder in the Bid Form.

3.02 CONTRACT DOCUMENTS IDENTIFICATION

A. Contract Documents are identified as Bid Number C20013, as prepared by Architect who is located at 414 Clinch Avenue, Knoxville, TN 37902, and with contents as identified in the Table of Contents.

3.03 AVAILABILITY

A. Bid Documents may be obtained online at the KCDC website.

3.04 EXAMINATION

A. Upon receipt of Bid Documents verify that documents are complete. Notify KCDC Procurement (**purchasinginfo@kcdc.org**) should the documents be incomplete.

B. Immediately notify Procurement, **purchasinginfo@kcdc.org** , upon finding discrepancies or omissions in the Bid Documents.

3.05 INQUIRIES/ADDENDA

A. Direct questions to Procurement, **purchasinginfo@kcdc.org** .

B. Addenda may be issued during the bidding period. All Addenda become part of Contract Documents. Include resultant costs in the Bid Amount. Bidders must check **www.kcdc.org** for addenda.

C. Clarifications requested by bidders must be in writing not less than 5 days before date set for receipt of bids. The reply will be in the form of an Addendum, a copy of which will be forwarded to known recipients.

3.06 PRODUCT/ASSEMBLY/SYSTEM SUBSTITUTIONS

A. Where the Bid Documents stipulate a particular product, substitutions will be considered up to 10 days before receipt of bids.

B. Submit substitution requests by completing the form in Section 00 43 25 - Substitution Request Form - During Procurement and sending it to **purchasinginfo@kcdc.org** . See this section for additional information and instructions. Use only this form- other forms of submission are unacceptable.

C. When a request to substitute a product is made, Owner may approve the substitution and issue an Addendum to its webpage.

D. The submission shall provide sufficient information to determine acceptability of such products.

E. Provide complete information on required revisions to other work to accommodate each proposed substitution.

F. Provide products as specified unless substitutions are submitted in this manner and accepted.

G. See Section 01 60 00 - Product Requirements for additional requirements.

SITE ASSESSMENT

4.01 SITE EXAMINATION

A. Examine the project site before submitting a bid.

B. Refer to the cover sheet for times and dates that units will be made available for viewing by bidders.

QUALIFICATIONS

5.01 EVIDENCE OF QUALIFICATIONS

A. To demonstrate qualification for performing the Work of this Contract, bidders may be requested to submit AIA A305.

5.02 SUBCONTRACTORS/SUPPLIERS/OTHERS

A. Owner reserves the right to reject a proposed subcontractor for reasonable cause.

B. Refer to General Conditions.

BID SUBMISSION

6.01 SUBMISSION PROCEDURE

A. Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.

B. Improperly completed information, irregularities in security deposit, may be cause not to open the Bid Form envelope and declare the bid invalid.

6.02 BID INELIGIBILITY

A. Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, may be declared unacceptable.

B. Bid Forms, Appendices, and enclosures that are improperly prepared may be declared unacceptable.

BID ENCLOSURES/REQUIREMENTS

7.01 PERFORMANCE ASSURANCE

A. Include the cost of performance assurance bonds in the Bid Amount.

7.02 INSURANCE

A. Review the insurance requirements in this document and indicated acceptance of the requirements on Solicitation Document A.

7.03 BID FORM REQUIREMENTS

A. Complete all requested information in the solicitation packet

7.04 ADDITIONAL BID INFORMATION

A. Submit the following Supplements concurrent with bid submission:
   1. Solicitation Document A - General Information and Cost
   2. Document 00 43 25 - Substitution Request Form - During Procurement.

7.05 SELECTION AND AWARD OF ALTERNATES

A. Indicate variation of bid price for Alternates listed on the Bid Form. Unless otherwise indicated, indicate Alternates as a difference in bid price by deducting from the base bid price.

B. Bids will be evaluated on the base bid price. After determination of a successful bidder, consideration will be given to Alternates and bid price adjustments.

OFFER ACCEPTANCE/REJECTION

8.01 DURATION OF OFFER

A. Bids shall remain open to acceptance and shall be irrevocable for a period of ninety (90) days after the bid closing date.

8.02 ACCEPTANCE OF OFFER

A. Owner reserves the right to accept or reject any or all offers.

B. After acceptance by Owner, a “Success Letter” will be issued. Upon review and acceptance of the Board of Commissioners, a formal contract will be issued.

END OF SECTION

SECTION 00 43 25: SUBSTITUTION REQUEST FORM - DURING PROCUREMENT

The materials, products and equipment described in the construction documents establish a standard of required function, dimension, appearance and quality and any proposed substitutions shall be the equivalent of the items in the construction documents.

No substitution requests for an equivalent product will be considered without written a request for approval addressed to the architect. Requests shall follow guidelines set forth this specification section and the AIA A701. Substitution requests to include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other disciplines that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer.

Project Title	_____	Project No.	_____
Submitted By:	_____	Contract No.	_____
Prime/Sub/Supplier:	_____	Date:	_____

Specification Title:	_____	Section No.	_____
Description:	_____	Paragraph:	_____
	_____	Page No.	_____

Proposed Substitution:	_____		
Trade Name:	_____	Model No.:	_____
Manufacturer:	_____		
Address:	_____	Phone No.:	_____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made by the undersigned to the Owner for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted By: _____

Firm:

Signed By: _____ _____

Address: _____

_____

Telephone: _____ Email: _____

Supporting Data Attached:

☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ Other _____

Describe the reason for the proposed substitution:

Describe what benefits the Client will receive from the proposed substitution:

Describe all differences between the proposed and specified product (attach separate sheet if needed):

Describe differences in dimensions and clearances that are affected by the proposed substitution:

Indicate if the proposed product is available in the specified grade and finish, etc. If not, submit finish samples for selection:

Describe differences if any in warranty between the proposed and specified products:

Describe differences if any in maintenance, service and availability of parts:

Describe what affect if any the proposed substitution will have on other trades:

Describe what affect if any the proposed substitution will make to the project schedule:

Describe what affect if any the proposed substitution will have to project cost:

List East Tennessee projects where the proposed substitute product is installed:

1.
2.
3.

Approval if given will be in the form of a written Addendum issued to all Bidders.

ARCHITECT REVIEW AND ACTION

☐ Substitution approved

☐ Substitution approved as noted

☐ Substitution rejected - Use specified materials.

☐ Substitution Request received too late - Use specified materials.

The Architect's decision of approval or disapproval of a proposed substitution shall be final. All proposed substitutions will be issued as an addendum before the bid date; approvals in any other manner are not a part of the contract documents. No substitutions will be considered after the bid date

Signed by: _____ Date: _____

END OF SECTION

SECTION 01 10 00: SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: KCDC's Guy B. Love Towers Renovations

B. Owner's Name: Knoxville's Community Development Corporation (KCDC).

C. Architect's Name: Studio Four Design.

D. The Project consists of the alteration of existing multi-family properties.

1.02 CONTRACT DESCRIPTION

A. Refer to General Conditions.

1.03 GENERAL DESCRIPTION OF ALTERATIONS WORK

A. Scope of work is shown in the drawings. The Contractor shall furnish all labor, materials, equipment and services required for the construction of all building work as further outlined by these plans and specifications.

B. Summary by References: Work of the Contract can be summarized by references to the Contract, General Conditions, Specifications, Drawings, Addenda and modifications to the Contract Documents issued subsequent to the initial printing of this project manual and including, but not necessarily limited to printed material referenced by any of these.

C. Scope of demolition and removal work is indicated on drawings and specified in Section 02 41 00.

D. Provide exterior caulking per elevation drawings.

E. Re-stripe accessible parking spaces and provide signage.

F. Renovate/reconfigure designated units as shown in the drawings for UFAS conformance.

G. Paint unit walls and ceilings complete.

H. Replace casework in unit kitchens.

I. Replace the floor finish in all interior areas except Corridors which have recently received new flooring.

J. Replace doors and lock hardware where scheduled, as specified.

K. Mechanical: Replace bathroom unit heaters and exhaust fans as shown on the drawings.

L. Plumbing: Replace fixtures as shown in the drawings.

M. Electrical: Replace generator, replace lighting where specified, replace unit electrical panels throughout and provide fire alarm as shown on the drawings.

1.04 WORK BY OWNER

A. Owner will furnish and install the following:
   1. Unit Kitchen Refrigerators.
   2. Unit Kitchen Range/Ovens.

B. Contractor will remove and dispose of appliances as directed by Owner.

1.05 OWNER OCCUPANCY

A. Owner/tenant intends to continue to occupy portions of the existing building during the entire construction period.

B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

C. Schedule the Work to accommodate Owner/tenant occupancy.

1.06 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to work areas indicated on drawings, paths for construction traffic to work area, and exterior staging areas to include front/side/rear yard..
   1. Locate and conduct construction activities in ways that will limit disturbance to site.

B. Arrange use of site and premises to allow:
   1. Owner/tenant occupancy.

C. Provide access to and from site as required by law and by Owner:
   1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit.

D. Time Restrictions:
   1. Limit conduct of especially noisy exterior work to the hours of 7:30 AM EST - 4 PM EST.

1.07 WORK SEQUENCE

A. Coordinate construction schedule and operations with Owner.

END OF SECTION

SECTION 01 25 00: SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedural requirements for proposed substitutions.

1.02 RELATED REQUIREMENTS

A. Section 00 21 13 - Instructions to Bidders: Restrictions on timing of substitution requests.

B. Section 00 43 25 - Substitution Request Form - During Procurement: Required form for substitution requests made prior to award of contract (During procurement).

C. Section 01 30 00 - Administrative Requirements: Submittal procedures, coordination.

D. Section 01 60 00 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.03 DEFINITIONS

A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
   1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
      a. Unavailability.
      b. Regulatory changes.
   2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
      a. Substitution requests offering advantages solely to the Contractor will not be considered.

1.04 REFERENCE STANDARDS

A. CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage); Current Edition.

PART 3 EXECUTION

2.01 GENERAL REQUIREMENTS

A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
   2. Agrees to provide the same warranty for the substitution as for the specified product.
   3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
   4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
   5. Waives claims for additional costs or time extension that may subsequently become apparent.
   6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.

C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
   1. Forms indicated in the Project Manual are adequate for this purpose, and must be used.

D. Limit each request to a single proposed substitution item.
   1. Submit an electronic document, combining the request form with supporting data into single document.

2.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

A. Section 00 21 13 - Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period, and the documents required.

B. Submittal Form (before award of contract):
   1. Submit substitution requests by completing the form attached to this section. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.

2.03 RESOLUTION

A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.

B. Architect will notify Contractor in writing of decision to accept or reject request.
   1. Architect's decision following review of proposed substitution will be noted on the submitted form.

2.04 ACCEPTANCE

A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

END OF SECTION

SECTION 01 30 00: ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General administrative requirements.

B. Preconstruction meeting.

C. Progress meetings.

D. Construction progress schedule.

E. Submittals for review, information, and project closeout.

F. Requests for Interpretation (RFI) procedures.

G. Submittal procedures.

1.02 RELATED REQUIREMENTS

A. Section 00 72 00 - General Conditions: Dates for applications for payment.

B. Section 01 60 00 - Product Requirements: General product requirements.

1.03 REFERENCE STANDARDS

A. AIA G716 - Request for Information; 2004.

B. AIA G810 - Transmittal Letter; 2001.

1.04 GENERAL ADMINISTRATIVE REQUIREMENTS

A. Comply with requirements of Section 01 70 00 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

B. Make the following types of submittals to Architect:
   1. Requests for Interpretation (RFI).
   2. Requests for substitution.
   3. Shop drawings, product data, and samples.
   4. Applications for payment and change order requests.
   5. Correction Punch List and Final Correction Punch List for Substantial Completion.
   6. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Schedule meeting after Notice of Award.

B. Attendance Required:
   1. Owner.
   2. Architect.
   3. Contractor.

C. Agenda:
   1. Execution of Owner-Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   3. Distribution of Contract Documents.

4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
6. Scheduling.

D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly intervals.

B. Attendance Required:
1. Contractor.
2. Owner.
3. Architect.
4. Contractor's superintendent.
5. Major subcontractors.

C. Agenda:
1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Maintenance of progress schedule.
7. Corrective measures to regain projected schedules.
8. Planned progress during succeeding work period.
9. Maintenance of quality and work standards.
10. Effect of proposed changes on progress schedule and coordination.
11. Other business relating to work.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 CONSTRUCTION PROGRESS SCHEDULE

A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
1. Include written certification that major contractors have reviewed and accepted proposed schedule.

C. Within 10 days after joint review, submit complete schedule.

D. Submit updated schedule with each Application for Payment.

3.04 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
1. Product data.
2. Samples for selection.

B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.

C. Samples will be reviewed for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

3.05 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner.

3.06 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. Submit for Owner's benefit during and after project completion.

3.07 SUBMITTAL PROCEDURES

A. General Requirements:
   1. Use a separate transmittal for each item.
   2. Transmit using approved form.
      a. Use Contractor's form, subject to prior approval by Architect.

B. Product Data Procedures:
   1. Submit only information required by individual specification sections.
   2. Collect required information into a single submittal.
   3. Do not submit (Material) Safety Data Sheets for materials or products.

C. Samples Procedures:
   1. Transmit related items together as single package.
   2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

3.08 SUBMITTAL REVIEW

A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.

B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.

C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.

D. Architect's and consultants' actions on items submitted for review:

1. Authorizing purchasing, fabrication, delivery, and installation:
    a. "Reviewed with no exceptions", or language with same legal meaning.
    b. "Reviewed as Noted ", or language with same legal meaning.
        1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
    c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
2. Not Authorizing fabrication, delivery, and installation:
    a. "Revise and Resubmit".
        1) Resubmit revised item, with review notations acknowledged and incorporated.
    b. "Rejected".
        1) Submit item complying with requirements of Contract Documents.

E. Architect's and consultants' actions on items submitted for information:
1. Items for which no action was taken:
    a. "Received" - to notify the Contractor that the submittal has been received for record only.
2. Items for which action was taken:
    a. "Reviewed" - no further action is required from Contractor.

END OF SECTION

SECTION 01 60 00: PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations.

E. Procedures for Owner supplied products.

1.02 RELATED REQUIREMENTS

A. Section 01 25 00 - Substitution Procedures: Substitutions made during procurement and/or construction phases.

1.03 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

B. Use of products having any of the following characteristics is not permitted:

C. Where other criteria are met, Contractor shall give preference to products that:

1. If used on interior, have lower emissions, as defined in Section 01 61 16.
2. If wet-applied, have lower VOC content, as defined in Section 01 61 16.

2.02 PRODUCT OPTIONS

A. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

A. See Section 01 25 00 - Substitution Procedures.

3.02 OWNER-SUPPLIED PRODUCTS

A. See Section 01 10 00 - Summary for identification of Owner-supplied products.

B. Owner's Responsibilities:

1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
2. Arrange and pay for product delivery to site.
3. On delivery, inspect products jointly with Contractor.
4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
5. Arrange for manufacturers' warranties, inspections, and service.

C. Contractor's Responsibilities:
1. Review Owner reviewed shop drawings, product data, and samples.
2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
3. Handle, store, install and finish products.
4. Repair or replace items damaged after receipt.

3.03 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

3.04 STORAGE AND PROTECTION

A. Provide protection of stored materials and products against theft, casualty, or deterioration.

B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 74 19.

C. Store and protect products in accordance with manufacturers' instructions.

D. Store with seals and labels intact and legible.

E. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

F. Provide off-site storage and protection when site does not permit on-site storage or protection.

G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

H. Comply with manufacturer's warranty conditions, if any.

I. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

J. Prevent contact with material that may cause corrosion, discoloration, or staining.

K. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

L. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 02 41 00: DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 10 00 - Summary: Description of items to be removed.

1.03 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

PART 3 EXECUTION

2.01 SCOPE

A. Remove items indicated, for recycling and disposal.

2.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Provide, erect, and maintain temporary barriers and security devices.
   3. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   4. Do not close or obstruct roadways or sidewalks without permit.
   5. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Protect existing structures and other elements that are not to be removed.

2.03 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Remove existing work as indicated and as required to accomplish new work.

C. Protect existing work to remain.
   1. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   2. Repair adjacent construction and finishes damaged during removal work.

2.04 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

END OF SECTION

SECTION 06 41 00: ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specially fabricated cabinet units.

B. Hardware.

1.02 RELATED REQUIREMENTS

A. Section 09 91 23 - Interior Painting: Field finishing of cabinet exterior.

B. Section 12 36 00 - Countertops.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2018).

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2018).

C. BHMA A156.9 - American National Standard for Cabinet Hardware; 2015.

D. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2016.

E. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

1. Scale of Drawings: 1-1/2 inch to 1 foot (125 mm to 1 m), minimum.
2. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

C. Product Data: Provide data for hardware accessories.

D. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches (300 mm) square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.

E. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1. Company with at least one project in the past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.
2. Single Source Responsibility: Provide and install this work from single fabricator.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

1.07 FIELD CONDITIONS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 CABINETS

A. Quality Standard: Economy Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Wood Veneer Faced Cabinet:
   1. Exposed Surfaces: HPVA HP-1 Grade A, Birch, plain sliced, random-matched.
   2. Semi-Exposed Surfaces: HPVA HP-1 Grade B, Birch, plain sliced, random-matched.
   3. Concealed Surfaces: Manufacturer's option.

C. Cabinets:
   1. Finish - Exposed Exterior Surfaces: Wood.
   2. Finish - Exposed Interior Surfaces: Wood.
   3. Finish - Semi-Exposed Surfaces: Wood
   4. Finish - Concealed Surfaces: Manufacturer's option.
   5. Door and Drawer Front Edge Profiles: Square edge with thin applied band.
   6. Door and Drawer Front Retention Profiles: Fixed panel.
   7. Casework Construction Type: Type A - Frameless.
   8. Interface Style for Cabinet and Door: Style 2 - Finish Inset; reveal overlay.
   9. Grained Face Layout for Cabinet and Door Fronts: Style and Rail, all Grades.
      a. Drawer fronts run grain either vertically or horizontally at the manufacturer's option.
      b. Doors: Vertical grain.
   10. Grained Face Layout for Cabinet and Door Fronts: Flush panel.
      a. Economy Grade: Drawer fronts run grain either vertically or horizontally at the manufacturer's option. Doors shall be vertical. Mismatch allowed.
   11. Adjustable Shelf Loading: 50 lbs. per sq. ft.
      a. Deflection: L/144.
   12. Cabinet Style: Flush overlay.
   13. Cabinet Doors and Drawer Fronts: Flush style.
   14. Drawer Side Construction: Multiple-dovetailed.
   15. Drawer Construction Technique: Dovetail joints.

2.02 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

2.03 COUNTERTOPS

A. Countertops are specified in Section 12 36 00.

2.04 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.
   1. Manufacturers:
      a. Franklin International, Inc; Titebond Original Wood Glue: www.titebond.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

B. Fasteners: Size and type to suit application.

C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

D. Concealed Joint Fasteners: Threaded steel.

E. Grommets: Standard plastic, painted metal, or rubber grommets for cut-outs, in color to match adjacent surface.

2.05 HARDWARE

A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.

B. Drawer and Door Pulls – ADA Units only: "U" shaped wire pull, steel with chrome finish, 4 inch centers ("U" shaped wire pull, steel with chrome finish, 100 mm centers).

C. Drawer and Door Pulls – All except ADA units: finger pull integrated into cabinet and drawer face panels, reverse solid bevel.

D. Drawer Slides:
   1. Type: Extension types as indicated.
   2. Static Load Capacity: Residential/Light Commercial grade.
   3. Mounting: Side mounted.
   4. Stops: Integral type.
   5. Features: Provide self-closing/stay closed type.

E. Drawer Systems: Integrated drawer slide and side.
   1. Side Type: Single Wall.
   2. Drawer Side Height: 3-1/2 inches (90 mm).
   3. Drawer Length: 16 inch (400 mm).
   4. Extension Type: Extension types as indicated.
   5. Static Load Capacity: Residential/Light Commercial grade.
   6. Mounting: Side mounted.
   7. Stops: Integral type.
   8. Features: Provide self-closing/stay closed and white epoxy finish type.

F. Hinges: European style concealed self-closing type, steel with polished finish.

2.06 SITE FINISHING MATERIALS

A. Stain, Shellac, Varnish, and Finishing Materials: In compliance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

2.07 FABRICATION

A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

2.08 SHOP FINISHING

A. Sand work smooth and set exposed nails and screws.

B. For opaque finishes, apply wood filler in exposed nail and screw indentations and sand smooth.

C. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.

D. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
   1. Transparent:
      a. System - 1, Lacquer, Nitrocellulose.
      b. Stain: As selected by Architect.
      c. Sheen: Flat.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.

B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

C. Use fixture attachments in concealed locations for wall mounted components.

D. Use concealed joint fasteners to align and secure adjoining cabinet units.

E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim for this purpose.

F. Secure cabinets to floor using appropriate angles and anchorages.

G. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.03 ADJUSTING

A. Adjust installed work.

B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 08 14 16: FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush configuration; fire-rated and non-rated.

1.02 RELATED REQUIREMENTS

A. Section 08 12 13 - Hollow Metal Frames.

B. Section 08 71 00 - Door Hardware.

C. Section 09 93 00 - Staining and Transparent Finishing: Field finishing of doors.

1.03 REFERENCE STANDARDS

A. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.

B. ANSI A208.1 - American National Standard for Particleboard; 2009.

C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2018).

D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2018).

E. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.

G. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2016.

H. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2017.

I. UL (DIR) - Online Certifications Directory; Current Edition.

J. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

K. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

L. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2013.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.

D. Samples: Submit two samples of door veneer, illustrating wood grain, stain color, and sheen.

E. Manufacturer's Installation Instructions: Indicate special installation instructions.

F. Manufacturer's Qualification Statement.

G. Installer's Qualification Statement.

H. Specimen warranty.

I. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Interior Doors: Provide manufacturer's warranty for 2 years.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 DOORS AND PANELS

A. Doors: Refer to drawings for locations and additional requirements.
   1. Quality Standard: Custom Grade, Standard Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
   2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at each location.
   2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
   3. Wood veneer facing for field transparent finish as indicated on drawings.

2.02 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.03 DOOR FACINGS

A. Veneer Facing for Transparent Finish: Match existing species and finish, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.

2.04 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:
   1. Provide solid blocks at lock edge for hardware reinforcement.
   2. Provide solid blocking for other throughbolted hardware.

C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
   1. Exception: Doors to be field finished.

E. Provide edge clearances in accordance with the quality standard specified.

2.05 FACTORY FINISHING - WOOD VENEER DOORS

A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
   1. Transparent:
      a. System - 1, Lacquer, Nitrocellulose.
      b. Stain: As selected by Architect.
      c. Sheen: Flat.

B. Factory finish doors in accordance with approved sample.

2.06 ACCESSORIES

A. Hollow Metal Door Frames: As specified in Section 08 12 13.

B. Door Hardware: As specified in Section 08 71 00.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
   1. Install fire-rated doors in accordance with NFPA 80 requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Field-Finished Doors: Trimming to fit is acceptable.
   1. Adjust width of non-rated doors by cutting equally on both jamb edges.
   2. Trim maximum of 3/4 inch (19 mm) off bottom edges.
   3. Trim fire-rated doors in strict compliance with fire rating limitations.

D. Use machine tools to cut or drill for hardware.

E. Coordinate installation of doors with installation of frames and hardware.

3.03 TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.

B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

END OF SECTION

SECTION 08 71 00: DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for wood and hollow metal doors.

B. Lock cylinders for doors that hardware is specified in other sections.

1.02 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; 2017.

C. BHMA A156.5 - American National Standard for Cylinders and Input Devices for Locks; 2014.

D. BHMA A156.18 - American National Standard for Materials and Finishes; 2016.

E. DHI (KSN) - Keying Systems and Nomenclature; 1989.

F. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.

C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

D. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

E. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

1.06 WARRANTY

A. Warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion.

1. Locksets and Cylinders: Three years, minimum.

PART 2 PRODUCTS

2.01 DOOR LOCKS AND LEVERS

1). Manufacturers listed in the hardware specification are as follows:

1. Locks and Deadbolts:

   Manufacturer: Stanley or Pamex NO SUBSTITUTION

A. Cylindrical Locks: Meet or exceeds ANSI/BHMA A156.2 Series 4000, Grade 2. Locksets shall be capable of receiving 6 or 7 pin, Small Format Interchangeable Cores, (SFIC). Provide lock sets and latch sets with 2-3/4 inch backset unless otherwise determined from existing door preparations. Provide cylindrical lock sets and latch sets model "AL" series "Jupiter" (JUP) design levers manufactured by Stanley or Pamex.

B. Deadbolts: Meet or exceeds ANSI/BHMA A156.5. Deadbolts shall be capable of receiving 6 or 7 pin SFIC cores. Provide deadbolt locks with 2-3/4 inch backset unless otherwise indicated or determined from existing door preparations. Provide deadbolt locks, model B500 series, manufactured by Schlage or equivalent product by other manufacturers.

2). Locks shall be master keyed into new SFIC master key system. Supply 4 keys per lock, 4 master keys and 4 Control keys total. Unless otherwise indicated.

3). Finish: Lock sets, latch sets and deadbolt locks hardware shall be satin nickel finish.

4). Provide hardware sets as follows:

Hardware Set #1: each to have:

Existing hardware to remain except the following:

1	Lever Passage	Stanley QCL230E619 or
		Pamex CAMBRIDGE GRADE #2 PASS US15 FL363B
1	Deadlock	Stanley SHD QDB281-619-S4-DBSB-FSK or
		Pamex G2 I/C CORE SNG CYL DB US15 FD7PA

Hardware Set #2: each to have:

Existing hardware to remain except the following:

1 Lever Privacy Stanley or Pamex

2.02 FINISHES

A. Finishes: Provide door hardware of same finish, unless otherwise indicated.
   1. Primary Finish: Satin nickel.

2.02 KEYING MACHINE

A. Provide a Key Punch Pro-Lok by the lock and deadbolt manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

3.03 ADJUSTING

A. Adjust hardware for smooth operation.

3.04 CLEANING

A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.

B. Clean adjacent surfaces soiled by hardware installation.

3.05 PROTECTION

A. Do not permit adjacent work to damage hardware or finish.

END OF SECTION

SECTION 09 65 00: RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient sheet flooring.

B. Resilient tile flooring.

C. Installation accessories.

1.02 REFERENCE STANDARDS

A. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2013a.

B. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing; 2004 (Reapproved 2014).

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

C. Verification Samples: Submit two samples, illustrating color and pattern for each resilient flooring product specified.

D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space.

C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

D. Protect roll materials from damage by storing on end.

1.06 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.01 TILE FLOORING

A. Vinyl Tile: Printed film type, with transparent or translucent wear layer.

1. Manufacturers:

a. Gerflor Creation Clic; Luxury Vinyl Tiles: https://www.gerflorusa.com/professionals-products/floor/creation-clic-system.html

b. Substitutions: Model numbers and performance criteria for Resilient Flooring manufactured by Gerflor are listed to establish a standard of quality for design, function, materials, workmanship, and appearance. Specific materials and product manufacturer(s) are specified to maintain standard building finishes and materials across multiple facilities for ease of maintenance. Therefore KCDC will not entertain requests for substitute products for this item.

2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
3. Wear Layer Thickness: 28 mil.
4. Total Thickness: 0.25 inch.
5. Pattern: Wood.
6. Color: #0360 – Deep Forest.

2.02 ACCESSORIES

A. Adhesive for Vinyl Flooring:
   1. Manufacturers:
      a. Basis-of-Design Product: Gerflor Gerfix LVT Spray.
      b. Coverage Type: Full-surface application.
      c. Maximum relative humidity of 95% when tested in accordance with ASTM F 2170.
      d. Maximum moisture vapor emission rate of 8 pounds per 1000 sq. ft. in 24 hours when tested in accordance with ASTM F1869.
      e. Substitutions: Model numbers and performance criteria for Resilient Flooring manufactured by Gerflor are listed to establish a standard of quality for design, function, materials, workmanship, and appearance. Specific materials and product manufacturer(s) are specified to maintain standard building finishes and materials across multiple facilities for ease of maintenance. Therefore KCDC will not entertain requests for substitute products for this item.

B. Moldings, Transition and Edge Strips: Metal.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
   1. Test in accordance with ASTM F710.
   2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

A. Remove existing resilient flooring and flooring adhesives; follow the recommendations of RFCI (RWP).

B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

C. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

D. Prohibit traffic until filler is fully cured.

E. Clean substrate.

F. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install in accordance with manufacturer's written instructions.

C. Adhesive-Applied Installation:
   1. Spread only enough adhesive to permit installation of materials before initial set.
   2. Fit joints and butt seams tightly.
   3. Set flooring in place, press with heavy roller to attain full adhesion.

D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
   1. Metal Strips: Attach to substrate before installation of flooring using stainless steel screws.

F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.

C. Install plank tile with a random offset of at least 6 inches from adjacent rows.

3.05 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

3.06 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 91 23: INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Materials for back priming woodwork.

D. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

E. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Floors, unless specifically indicated.
   6. Glass.
   7. Concealed pipes, ducts, and conduits.

1.02 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this section.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.

C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2017).

D. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2016.

E. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

F. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

G. SSPC-SP 2 - Hand Tool Cleaning; 2018.

H. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

I. SSPC-SP 13 - Surface Preparation of Concrete; 1997 (Reaffirmed 2003).

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:

1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
2. MPI product number (e.g. MPI #47).
3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
4. Manufacturer's installation instructions.
5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.

1. Where sheen is specified, submit samples in only that sheen.
2. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.

D. Samples: Submit two paper chip samples, _2__by__2__ inch (____by____ mm) in size illustrating range of colors and textures available for each surface finishing product scheduled.

E. Manufacturer's Instructions: Indicate special surface preparation procedures.

F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years' experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.

D. Minimum Application Temperatures for Paints: 50 degrees F (10 degrees C) for interiors unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. PPG Paints: www.ppgpaints.com/#sle.
   2. Sherwin-Williams Company: www.sherwin-williams.com/#sle.

C. Primer Sealers: Same manufacturer as top coats.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
   4. Supply each paint material in quantity required to complete entire project's work from a single production run.
   5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Flammability: Comply with applicable code for surface burning characteristics.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

D. Colors: Match existing building standard.

2.03 PAINT SYSTEMS - INTERIOR

A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry units, brick, wood, plaster, uncoated steel, shop primed steel, galvanized steel, and aluminum.
   1. Two top coats and one coat primer.

2. Top Coat(s): High Performance Architectural Interior Latex; MPI #138, 139, 140, or 141.
3. Top Coat Sheen:
    a. Eggshell: MPI gloss level 3; use this sheen at all locations.
4. Primer: As recommended by top coat manufacturer for specific substrate.

B. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals and wood:
1. Medium duty applications include doors, door frames, railings, handrails, guardrails, and balustrades.
2. Two top coats and one coat primer.
3. Top Coat(s): Interior Epoxy-Modified Latex; MPI #115 or 215.
4. Top Coat Sheen:
    a. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.

2.04 PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
1. Alkali Resistant Water Based Primer; MPI #3.
2. Interior Latex Primer Sealer; MPI #50.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

E. Test shop-applied primer for compatibility with subsequent cover materials.

F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Gypsum Wallboard: 12 percent.
2. Plaster and Stucco: 12 percent.
3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
5. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or repair existing paints or finishes that exhibit surface defects.

D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Clean concrete according to ASTM D4258. Allow to dry.
   3. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

H. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer.

I. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

J. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

K. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

L. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
   2. Prepare surface according to SSPC-SP 2.

M. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
   3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

N. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

O. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

G. Sand wood and metal surfaces lightly between coats to achieve required finish.

H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

I. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

B. Owner will provide field inspection.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 12 36 00: COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Countertops for architectural cabinet work.

B. Sinks molded into countertops.

1.02 RELATED REQUIREMENTS

A. Section 06 41 00 - Architectural Wood Casework.

B. Section 22 40 00 - Plumbing Fixtures: Sinks.

1.03 REFERENCE STANDARDS

A. ANSI A208.1 - American National Standard for Particleboard; 2009.

B. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2009.

C. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2018.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.

E. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2018).

F. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2018).

G. IAPMO Z124 - Plastic Plumbing Fixtures; 2017.

H. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.

I. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

J. PS 1 - Structural Plywood; 2009.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.

D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

F. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

G. Installation Instructions: Manufacturer's installation instructions and recommendations.

H. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 FIELD CONDITIONS

A. 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.

PART 2 PRODUCTS

2.01 COUNTERTOPS

A. Quality Standard: Economy Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
   1. Laminate Sheet, Type: NEMA LD 3, Grade HGS, 0.048 inch (1.2 mm) nominal thickness.
      a. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
      b. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.
      c. Laminate Core Color: Same as decorative surface.
      d. Finish: Matte or suede, gloss rating of 5 to 20.
      e. Surface Color and Pattern: As selected by Architect from the manufacturer's full line.
   2. Exposed Edge Treatment: Molded rubber edge with T-spline, sized to completely cover edge of panel.
      a. Color: As selected by Architect from the manufacturer's full line.
   3. Back and End Splashes: Same material, same construction.
   4. Fabricate in accordance with manufacturer's standard requirements.

C. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
   1. Flat Sheet Thickness: 1/2 inch (12 mm), minimum.
   2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
      a. Manufacturers:
         1) Formica Corporation; www.formica.com/#sle.

b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
c. Sinks and Bowls: Integral castings; minimum 3/4 inch (19 mm) wall thickness; comply with IAPMO Z124.
d. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
e. Color and Pattern: As selected by Architect from manufacturer's full line.

3. Other Components Thickness: 1/2 inch (12 mm), minimum.
4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch (32 mm) thick; square edge; use marine edge at sinks.
5. Back and End Splashes: Same sheet material, square top; minimum 4 inches (102 mm) high.
6. Fabricate in accordance with manufacturer's standard requirements.

2.02 MATERIALS

A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch (19 mm) thick; join lengths using metal splines.

B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

C. Joint Sealant: Mildew-resistant silicone sealant, white.

2.03 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
1. Join lengths of tops using best method recommended by manufacturer.
2. Fabricate to overhang fronts and ends of cabinets 1 inch (25 mm) except where top butts against cabinet or wall.
3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
2. Height: 4 inches (102 mm), unless otherwise indicated.

C. Solid Surfacing: Fabricate tops and wall panels up to 144 inches (3657 mm) long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.
1. Integral sinks: Shop-mount securely to countertop with adhesives, using flush configuration, as per manufacturer's instructions, and as detailed on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch (16 mm).

C. Seal joint between back/end splashes and vertical surfaces.

3.04 TOLERANCES

A. Variation From Horizontal: 1/8 inch in 10 feet (3 mm in 3 m), maximum.

B. Offset From Wall, Countertops: 1/8 inch (3 mm) maximum; 1/16 inch (1.5 mm) minimum.

C. Field Joints: 1/8 inch (3 mm) wide, maximum.

3.05 CLEANING

A. Clean countertops surfaces thoroughly.

3.06 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 27 01 00: REFERENCE STANDARDS

PART 1 GENERAL

1.01 DESCRIPTION

A. Telecommunications systems shall be provided as indicated on drawings and as called for hereinafter.

1.02 REFERENCE STANDARDS

A. BICSI TDMM current edition (Telecommunications Distribution Methods Manual).

B. ANSI/NECA/BICSCI-568, Standard for Installing Commercial Building Telecommunications Cable.

C. ANSI/TIA 569-D, Telecommunications Pathways and Spaces.

D. ANSI/TIA 568.0-D, Generic Telecommunications for Customer Premises Standard Series

568.1-D Commercial Building Cabling

568-C.2 Copper Cabling Components

568-C.4 Coax Cabling Components

E. ANSI/TIA 606-B, Addendum 1, Administration Standard for Commercial Telecommunications Infrastructure.

F. ANSI J-STD-607-B, Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.

I. ANSI/TIA 310-D, Cabinets, Racks, Panels, and Associated Equipment.

J. FCC Part 68, Connection of Terminal Equipment to the Telephone Network.

K. ADA of 2010 and Telecommunications Act of 1996, Physically Impaired and Accessibility.

L. International Building Code – 2018

M. IEEE 8-2.11.xx Wireless LAN's

N. NFPA 70, National Electrical Code (2017).

O. NFPA 101, Life Safety Code (2009).

P. ANSI/SCTE 77 Underground Enclosure Integrity

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 27 05 29: HANGERS AND SUPPORT

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish and install a system of cabling supports above accessible ceilings for network, voice, and CATV cabling as set forth hereinafter.

1.02 REFERENCE STANDARDS

A. See SECTION 27.01.00 REFERENCE STANDARDS

PART 2 PRODUCTS

2.01 MATERIALS

A. J-hooks shall be utilized above lay-in ceilings in individual rooms for support of low-voltage cabling. J-hooks shall be as follows:
   1. Use Panduit J-Pro Series non-metallic J-hooks for all horizontal cabling from outlet to cable tray. Steel J-hooks shall not be used.

B. Cabling support shall be located 4' to 5' on center throughout the entire length of network and CATV cabling runs above ceiling. Provide separate sets of low-voltage cabling supports along entire length of low-voltage cabling runs above ceiling to allow separation of network cabling and CATV cabling. Network cabling shall be installed in separate J-hook support system from CATV cabling. Locate supports well clear of acoustical lay-in ceiling tiles. Supports shall be located such that tiles can be removed without interfering with support system. J-hook supports shall be secured directly to metal wall studs or masonry walls, as applicable. J-hooks shall not be attached directly to gyp-board walls. J-hooks shall be located no further apart than 5'0" on center along entire length of runs, with supports adjusted to be closer together as needed to attach to metal studs. A maximum of 8 Category 6 cables shall be installed per J-hook.

C. Provide all necessary supports and attachments to allow connection to structure for these supports. Provide all necessary conduits, raceways, cable trays, sleeves, etc. as necessary for the installation.

PART 3 EXECUTION

3.01 INSTALLATION

A. Entire installation shall be in accordance with manufacturer's recommendations.

B. J-Hooks shall be installed per manufacturer’s recommendations and shall be grounded. J-Hooks shall be used for both CAT 6 and CATV cabling.

C. Provide two separate sets of low-voltage cabling supports along entire length of low-voltage cabling runs above ceiling. One set of supports shall be of Category 6 network wiring. The second set of supports shall be for CATV wiring. Locate supports well clear of acoustical lay-in ceiling tiles. Supports shall be located such that tiles can be removed without interfering with support system.

D. Re-use existing Wiremold Raceway / Conduit for Phone and CATV cables extending to apartments where possible and in good condition.

E. Coordinate installation of low-voltage supports with other trades as required.

END OF SECTION

SECTION 27 15 33: COAX HORIZONTAL CABLING

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish and install 1 GHz CATV wiring as described on drawings and called for hereinafter.

B. The catalog numbers specified herein are those of the Blonder-Tongue Company and constitute the type and quality of the products to be installed.

C. The quality and type of CATV materials must be accepted by industry standards. All passive and active equipment must be two-way and pass signals up to one GHZ "passive" and 750 MHZ “active”.

1.02 INSTALLER QUALIFICATIONS

A. Installation of CATV cabling shall be done by personnel regularly engaged in installation of such facilities. Installers shall have NCTI, SCTE, and BICSI certifications. Provide documentation of these certifications as part of the submittal process. Installer shall have working knowledge of all codes/standards related to CATV wiring installation.

1.04 REFERENCE STANDARDS

A. SECTION 27.01.00 – REFERENCE STANDARDS

B. ANSI/SCE 74 2003, Specification for braided 75 ohm Flexible Coaxial Cable.

PART 2 PRODUCTS

2.01 MATERIALS

A. Splitters: In the individual apartments, install splitters to take the cable TV feed and distribute it to each individual room where more than one CATV outlet is shown. Splitters/combiners shall be vertical ports, capable of passing one GHZ signal with built-in grounding lug, Truespec DSVXG or equivalent. "X" represents the number of ports. Arrange splitters/combiners so that signal is evenly distributed among all ports.

B. Wall Plates: Wall plates for CATV outlets shall be flush mounted with single-gang Standard F81 through connector with 0 db isolation, Hubbell AFP14EI.

C. Coaxial Cable: Coaxial cable shall be installed from each new television outlet location shown on drawings to the TTB on a homerun basis per apartment. No series wiring for TV shall be permitted except within apartment. The coaxial cable from the outlet to the TTB shall be Belden 7915A Series RG6 cable, aluminum braid shield, flame retardant PVC jacket meeting NEC Article 820V rating, ETL listed or equivalent.

D. Coaxial Connectors: Use compression type, Belden Thomas and Betts FSNS6U.

PART 3 EXECUTION

3.01 INSTALLATION

A. Each coaxial cable shall be tested for signal loss, length of cable, and meet the manufacturers specifications. Testing shall be in accordance with FCC Part 76 signal leakage requirements. Coaxial cable tests will involve continuity and RF leakage, 20-uV/m leakage limit (10 feet from network). Limit will yield a dipole level of -43.67 dBmV 75 ohms. Complete TV feed to each individual outlet to verify that a proper signal is being distributed. After proper documentation disconnect each room at the headend location and make each connection for proper identification.

B. Cable drops shall be bundled by use of approved plastic ties. Tape shall not be permitted to bundle cable drops.

D. Label each coaxial cable end with room number of outlet.

END OF SECTION

SECTION 26 05 00: ELECTRICAL GENERAL PROVISIONS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide all materials, labor, and equipment required to furnish and install a complete electrical system as indicated on the Drawings and as specified herein.

B. Electrical work includes, but is not limited to, the following:
   1. Modifications to the distribution system for lighting and power in new ADA units including the necessary feeders, panelboards, branch circuits, conduit, lighting fixtures, control switches, and receptacles.
   2. Modifications to the distribution system for lighting and power in Guy B. Love Towers including the necessary panelboards, branch circuits, and conduit.
   3. Grounding.
   4. Telephone and cable TV system raceways and boxes.
   5. Power wiring for equipment furnished under Division 21, 22 and 23.
   6. Data system raceways and boxes.
   7. Concrete foundations, curbs, pads, and bollards.
   8. Fire Alarm system expansion
   9. Single-station smoke alarms.
   10. Generator replacement
   11. Emergency Call System.

1.02 RELATED WORK

A. The following work shall be furnished under other Divisions of these Specifications, but shall be coordinated with said Divisions by Division 26 tradesman prior to bid.
   1. Flashing of conduits into roofing and outside walls.
   2. Painting.
   3. Cutting and patching.
   4. Heating, ventilating, air conditioning, and plumbing equipment.

1.03 DEFINITIONS

A. Provide: Shall mean "furnish, install, connect, and put in good working order."

B. Wiring: Shall mean "wire and cable, installed in raceway with all required boxes, fittings, connectors, etc. completely installed."

C. Engineer: Shall mean "Engineer of Record" whose seal is affixed to the contract specifications and drawings of Division 26.

1.04 CODES AND STANDARDS

A. Comply with applicable local, state, and federal codes.

B. Electrical work shall be installed in accordance with the Drawings and Specifications, the 2018 NEC, 2018 IBC, applicable accessibility code and NFPA.

C. In event of conflict between Drawings, Specifications and such codes, Engineer shall be notified in writing prior to bid. A ruling will then be made by the Engineer in writing. All work shall be installed in strict accordance with applicable codes without additional cost to Owner.

D. Contractor shall submit and/or file all necessary specifications and drawings as required by governing authorities.

1.05 SUBMITTALS

A. Provide submittals on materials and equipment identified in the Specifications and Drawings prior to manufacturer, order, or installation in accordance with Shop Drawings, Product Data, and Samples.

B. Submittals shall include but not be limited to the following:

- Lighting fixtures
- Panelboards
- Fire and Smoke Alarm Devices
- Standby Emergency Generator
- Diesel Storage Tank
- Emergency Call Devices

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SITE VISIT

A. Visit job site prior to bid date to determine actual conditions under which work shall be done, to become familiar with project, and to verify total scope of work required. Failure to do so shall not constitute a reason for an extra charge.

END OF SECTION

SECTION 26 05 01: BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL

1.01 QUALITY ASSURANCE

A. Qualifications of Manufacturer: All materials and equipment used in work of Division 26 shall be produced by manufacturers regularly engaged in manufacturer of similar items and with history of successful production acceptable to the Engineer. They shall be new and be UL listed and labeled or listed and labeled by another recognized testing laboratory where such label is available.

B. Qualifications of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in necessary crafts and who are completely familiar with specified requirements and methods needed for proper performance of work of this Section.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

A. Reference in Specifications to any article, device, product, material, fixture, form and type of construction, by name, make, or catalog number shall be interpreted as established standard of quality and shall not be construed as limiting competition. Any article, device, product, material, fixture, form and type of construction which in the judgment of Engineer, expressed in writing, is equal to that specified, may be used.

B. Substitution shall be approved by Engineer before purchase and/or installation. If unapproved materials are installed, work required to remove and replace unapproved items shall be done at the Contractor's expense.

PART 3 EXECUTION

3.01 INSTALLATION

A. Electrical drawings are diagrammatic and shall not be scaled for exact sizes or locations. They are not intended to disclose absolute or unconditional knowledge of actual field conditions.

B. Equipment shall be installed according to manufacturer's recommendations.

C. Protect work and materials from damage by weather, entrance of water, and dirt. Cap conduit during installation. Avoid damage to materials and equipment in place.

D. Satisfactorily repair or remove and replace damaged work with new materials.

E. Trenching and backfilling shall comply with Site Work of these Specifications and provide sheathing, shoring, dewatering and cleaning necessary to keep trenches and their grades in proper condition for work to be carried on. Trenches shall be excavated 6" below elevation of bottom of conduit. Backfill shall be per Site Grading and Filling.

F. Failure to route conduit through building without interfering with other equipment and construction shall not constitute a reason for an extra charge.

Equipment, conduit and fixtures shall fit into available space in building and shall not be introduced into building at such times and manner as to cause damage to structure. Equipment requiring services shall be readily accessible.

G. Sequence, coordinate, and integrate the various elements of electrical systems, materials, and equipment. Comply with the following requirements:

1. Coordinate electrical systems, equipment, and materials installation with other building components.
2. Verify all dimensions by field measurements.
3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.
4. Coordinate the installation of required supporting devices and sleeves to be set in poured in-place concrete and other structural components, as they are constructed.
5. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
7. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
8. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Engineer.
9. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, whether exposed or concealed.
10. Install electrical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
11. Install access panels or doors where units are concealed behind finished surfaces.
12. Insulate dissimilar metals so they are not installed in direct contact.

H. Conduits which pass through floor slabs (except ground floor) shall be sealed with Fire Stop Sealant. Seal around conduits or other wiring materials passing through partitions, floors, and fire rated walls. Use UL approved Fire Stop Sealant as detailed on the drawings.

I. Coordinate electrical power connection requirements with all equipment suppliers. Where power requirements differ from drawing design requirements, Engineer shall be notified for clarification and installation requirements prior to installing that portion of work. Cost for equipment and labor for improperly installed electrical connections not coordinated and approved by other trades and the Engineer shall be incurred by the Electrical Contractor and shall not constitute a reason for an extra charge because of rework.

3.02 CUTTING AND PATCHING

A. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

3.03 TESTING AND EQUIPMENT SERVICING

A. Entire installation shall be free from improper grounds and short or open circuits. Conductors shall be tested before energizing circuit. Test to ensure that entire system is in proper operating condition, and that adjustments and settings of circuit breakers, fuses, control equipment, and apparatus have been made. Correct defects discovered during tests.

3.04 REMOVAL OF DEBRIS

A. Remove surplus materials and debris caused by, or incidental to electrical work. Remove such debris at frequent intervals. Keep job site clean during construction.

3.05 IDENTIFICATION OF EQUIPMENT

A. Equipment shall be identified in accordance with Section 260553, “Electrical Identification.”

3.06 AS-BUILT DRAWINGS

A. Maintain one set of blue line electrical prints on site, marked to show as-built conditions and installations, prints to be turned over to Owner after job is complete.

3.07 TEMPORARY LIGHTING AND POWER

A. Provide temporary genset of equal size as generator replacement specified connected to main emergency distribution panel for each site during generator replacement.

3.08 POWER OUTAGES

A. Coordinate all power outages with Owner and submit for approval proposed schedule of work indicating extent, number, and length of outages required to perform work. Contractor shall include in bid cost of overtime labor required for power outage to occur after Owner's normal hours of operation.

3. 09 OTHER MATERIALS

A. Work of this Division shall also include those items not specifically mentioned or described, but which are obviously necessary to conform to the design intent, applicable codes and to produce complete electrical system that functions properly. These materials shall be as selected by Contractor but subject to approval of the Engineer.

3.10 OTHER COORDINATION

A. Contractor shall obtain and pay for all necessary permits and inspection fees required for the electrical installation.

3.11 GUARANTEE-WARRANTY

A. Guarantee work to be free of material and workmanship defects for a period of one year, from date of final acceptance for the project. Repair and replace defective work and other work damaged thereby which becomes defective during term of Guarantee-Warranty. Furnish Owner with three written copies of Guarantee-Warranty.

END OF SECTION

SECTION 26 05 16: CONDUIT

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide a complete conduit/raceway system to support all electrical equipment and systems. Conduit system includes conduit/raceway, couplers, connectors, fittings, boxes, covers and supports.

B. No conduit serving branch circuits shall be installed in or below concrete slabs unless required for branch circuits serving loads located in the center of a room.

1.02 QUALITY ASSURANCE

A. Listing and Labeling: Provide conduit/raceway that is listed and labeled.
   1. The term "listed and labeled": As defined in the National Electrical Code, Article 100.
   2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

B. Conduit/raceway and its installation shall comply with requirements of the National Electrical Code.

1.03 SUBMITTALS – FOR REVIEW/APPROVAL

A. The following information shall be submitted to the Engineer:
   1. Surface Metal Raceway and associated fittings and covers.

PART 2 PRODUCTS

2.01 CONDUIT/RACEWAYS

A. Electric Metallic Tubing (EMT): Allied, Wheatland, LTV Copperweld, or approved equal.

B. Rigid Metal Conduit (RMC): Allied, Wheatland, Republic, or approved equal.

C. Flexible Steel Conduit (Greenfield): Alflex, Electroflex, or approved equal.

D. Rigid Non-Metallic Conduit (PVC): Carlon Schedule 40, Cantex, Southern Pipe, Schedule 80 or approved equal.

E. Liquidtight Flexible Nonmetallic Conduit (LFNC): Aflex, Electroflex, or approved equal.

F. Surface Metal Raceway: Legrand 500/700 series or approved equal

2.02 CONDUIT/RACEWAY FITTINGS

A. Couplings and connectors: Appleton, T&B, Arlington, or 0.Z. Gedney.

B. Bushings: Appleton, T&B, O.Z., or Gedney

C. Straps and Hangers: Appleton, T&B, Steel City, or Minerallac.

D. Group Pipe supports: Unistrut, Kindorf, B-Line, or approved equal.

E. Expansion Fittings: O.Z. Gedney Type AX, or equal by Appleton, or approved equal.

F. Exposed Conduit Fittings: Appleton, Crouse-Hinds, or O.Z. Gedney.

G. Raceway Fittings: Legrand or approved equal.

PART 3 EXECUTION

3.01 CONDUIT/RACEWAY

A. In general, conduit/raceway installation shall follow layout shown on drawings. However, this layout is diagrammatic only and where changes are necessary due to structural conditions, other apparatus or other causes, such changes shall be made without cost to Owner.

   1. Offsets in conduits/raceways are not indicated and must be furnished as required.

B. Conduit/raceway shall be installed in accordance with the National Electrical Code.

C. Provide bushings on the open ends of conduit containing conductors. Insulated bushings shall be provided for conduits containing conductors #4 AWG or larger with an insulating ring an integral part of the bushing.

D. Use EMT where Drawings call for conduit to be concealed in walls, exposed in interior dry locations, or above ceilings or when cast in concrete slabs not on grade. Do not use EMT exposed in wet locations, or in exterior applications.

E. Use Schedule 40 PVC when installed underground. Use Schedule 80 PVC when exposed.

F. When PVC conduit is used, turn up perpendicular to slab.

G. Support conduit and secure to forms when cast in concrete so that conduit will not be displaced during pouring of concrete. Stuff boxes and cork fittings to prevent entrance of water during concrete pouring and at other times during construction, prior to completion of conduit installation.

H. Route all conduit at right angles or parallel to walls of building.

I. Use proper sized tools for bending. Do not heat metal conduit. Dents and flat spots will be rejected. Cut and thread conduit so ends will butt in couplings. Make threads no longer than necessary and ream pipe free of burrs.

J. Minimum conduit size 1/2" unless otherwise required.

K. Leave one #10 AWG or equivalent nylon pull wire in empty conduits.

L. Use short pieces, approximately five (5') feet of flexible conduit to connect motors and other devices subject to motion and vibration. Use liquid tight flexible conduit where outside or subject to water spray.

M. Use surface metal raceway in apartments where conduit can’t be concealed in walls or ceilings. Provide raceway cover and secure in place.

3.02 CONDUIT/RACEWAY FITTINGS

A. When EMT is installed concealed in walls or above ceilings use steel double set screw connectors. All connectors shall have throated insulating bushing.

B. Support conduit vertically and horizontally by straps or hangers. Do not exceed intervals as described in the National Electrical Code.

C. Use expansion fittings, properly bonded to assure ground continuity, across expansion joints in floors and ceilings. Use double lock nuts and bushings on panel feeders at panel cans.

D. Surface metal raceway fittings shall include flat, internal and external elbows, couplings for joining raceway sections, wire clips, blank end fittings, and device mounting brackets and plates as applicable.

END OF SECTION

SECTION 26 05 19: WIRE AND CABLE

PART 1 GENERAL

1.01 WORK INCLUDED

A. Wire and cable for all service, feeders, branch circuits, and instrument and control wiring rated 600 volts and below.

1.02 QUALITY ASSURANCE

A. Listing and Labeling: Provide wire and cable that is listed and labeled.
   1. The term "listed and labeled": As defined in the National Electrical Code, Article 100.
   2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

B. Wire and cable and its installation shall comply with requirements of the National Electrical Code.

PART 2 PRODUCTS

2.01 MATERIALS

A. Wires and cables shall meet applicable requirements of the National Electrical Code and UL for the type of insulation, jacket, and conductor specified or indicated.

B. All conductors shall be copper with 600 volt insulation unless otherwise indicated.

C. Wire and cable shall be manufactured by Belden, General Cable, Essex, Encore, Rome Cable, Southwire, or approved equal.

D. Use solid copper type THHN/THWN for branch circuit wiring #10 AWG and smaller. No conductor for branch circuit wiring shall be smaller than #12 AWG.

E. Use stranded copper, type THHN/THWN for feeder and power circuits #8 AWG and larger.

F. Provide color coded wire and with a different color for each phase and neutral and ground as follows: 120/208 volt circuits - phases A, B, and C: black, red, and blue, respectively; neutral: white; ground: green. Approved color tape is acceptable for feeders.

PART 3 EXECUTION

3.01 INSTALLATION

A. Complete conduit system before pulling any wire or cable. Use cable lubricants recommended by cable manufacturer as necessary.

B. Conductors shall be continuous from outlet to outlet or to branch circuit over-current devices. Make splices only in junction boxes. Splices shall not be made in panelboards. Control wiring shall be continuous between components and/or terminal boards.

C. A minimum of eight (8") inches of slack conductor shall be left in every outlet or junction box. There should also be enough slack so three (3") inches extends outside the outlet or junction box.

D. Make splices in conductors #10 AWG and smaller diameter with insulated, pressure-type connector. Use Scotchlok, Ideal, or equal wire connectors.

E. Make splices in conductors #8 AWG and larger diameter with solderless connectors and cover with insulation material equivalent to conductor insulation.

Use Burndy compression connectors with crimpit cover, type CC, or equal.

3.02 TESTING

A. After completion of the installation and splicing and prior to energizing the conductors, wire and cable shall be given continuity and insulation tests as herein specified.

B. Test wiring to verify that no short circuits, open circuits, or accidental grounds exist. Continuity tests shall be conducted using a dc device with bell or buzzer.

C. Perform megger tests on wiring #4 AWG and larger.

END OF SECTION

SECTION 26 05 26: GROUNDING AND BONDING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Equipment grounding conductors.

B. Bonding.

1.02 QUALITY ASSURANCE

A. Listing and Labeling: Provide grounding and bonding materials that are listed and labeled.
   1. The term "listed and labeled": As defined in the National Electrical Code, Article 100.
   2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

B. Components and installation shall comply with the requirements of the National Electrical Code (NEC).

C. Materials shall comply with UL 467, “Grounding and Bonding Equipment.”

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers shall be Burndy, T&B, or approved equal.

2.02 CONNECTORS

A. Exothermic welded connections shall be provided in kit form and selected for the specific types, sizes, and combinations of conductors and other items to be connected.

B. Pressure connectors shall be high-conductivity-plated units.

C. Bolted clamps shall be heavy-duty units listed for the application.

2.03 WIRE AND CABLE

A. All grounding conductors shall be copper.

B. The grounding electrode conductor shall be stranded.

C. Equipment grounding conductors shall have green insulation.

D. Bare copper conductors shall conform to the following:
   1. Solid conductors: ASTM B-3
   2. Assembly of stranded conductors: ASTM B-8
   3. Tinned Conductors: ASTM B-33

2.04 MISCELLANEOUS CONDUCTORS

A. Ground bus shall be bare annealed copper bars.

B. Braided bonding jumpers shall be copper tape, braided number 30 gauge bare copper wire, and terminated with copper ferrules.

C. Bonding strap conductor/connectors shall be soft copper, 0.05 inch thick and two (2") inches wide, unless otherwise noted.

PART 3 EXECUTION

3.01 INSTALLATION

A. Grounding system shall be in accordance with Article 250 of the NEC except where the Drawings or Specifications exceed NEC requirements.

B. Install code size green grounding conductors in all feeder and branch circuits. Bond conductors to chassis or fixed equipment.

C. All grounding conductors shall be bonded to multi-terminal ground bus at panelboard or other distribution equipment. Grouping of grounding conductors under a single lug is not acceptable.

3.02 CONNECTIONS

A. Make connections in such a manner as to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to assure high conductivity and make contact points closer in order of galvanic series.
2. Make connections with clean bare metal at points of contact.
3. Aluminum to steel connections shall be with stainless steel separators and mechanical clamps.
4. Aluminum to galvanized steel connections shall be with tin-plated copper jumpers and mechanical clamps.
5. Coat and seal connections involving dissimilar metals with inert material such as red lead paint to prevent future penetration of moisture to contact surfaces.

B. For compression-type connections, use hydraulic compression tools to provide the correct circumferential pressure for compression connectors. Use tools and dies recommended by the manufacturer of the connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on the ground conductor.

C. Terminate insulated equipment grounding conductors for feeders and branch circuits with pressure-type grounding lugs. Where metallic raceways terminate at metallic housings without mechanical and electrical connection to the housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground bus in the housing. Bond electrically noncontinuous conduits at both entrances and exits with grounding bushings and bare grounding conductors.

D. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values for connectors and bolts. Where manufacturer's torqueing requirements are not indicated, tighten connections to comply with torque tightening values specified in UL 486A and UL 486B.

E. Do not use flexible metal conduit and fittings as a grounding means. Pull a green wire in each piece of flexible conduit, and screw to conduit system with lugs at both ends.

3.03 FIELD QUALITY CONTROL

A. Perform continuity tests at all power receptacles to ensure the ground terminals are properly grounded to the facility ground network.

END OF SECTION

SECTION 26 05 29: SUPPORTING DEVICES

PART 1 GENERAL

1.01 WORK INCLUDED

A. This Section includes secure support from the building structure for electrical items by means of hangers, supports, anchors, sleeves, inserts, seals, and associated fasteners.

1.02 QUALITY ASSURANCE

A. Electrical Component Standard: Components and installation shall comply with the National Electrical Code.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, Slotted Metal Angle and U-Channel Systems shall be provided by Allied Tube & Conduit, American Electric, B-Line Systems, Inc., Unistrut Diversified Products, or approved equal.

B. Subject to compliance with requirements, Conduit Sealing Bushings shall be provided by Bridgeport Fittings, Inc., Cooper Industries, Inc., Killark Electric Mfg. Co., O-Z/Gedney, Raco, Inc., Spring City Electrical Mgf. Co., Thomas & Betts Corp., or approved equal.

2.02 COATINGS

A. Coating: Supports, support hardware, and fasteners shall be protected with zinc coating or with treatment of equivalent corrosion resistance using approved alternative treatment, finish, or inherent material characteristic. Products for use outdoors shall be aluminum or hot-dip galvanized.

2.03 MANUFACTURED SUPPORTING DEVICES

A. Raceway Supports: Raceways shall be supported with clevis hangers, riser clamps, conduit straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring steel clamps.

B. Fasteners: Types, materials, and construction features as follows:
   1. Expansion Anchors: Carbon steel wedge or sleeve type.
   2. Toggle Bolts: All steel springhead type.
   3. Powder-Driven Threaded Studs: Heat-treated steel, designed specifically for the intended service.

C. Conduit Sealing Bushings: Factory-fabricated watertight conduit sealing bushing assemblies suitable for sealing around conduit, or tubing passing through concrete floors and walls. Construct seals with steel sleeve, malleable iron body, neoprene sealing grommets or rings, metal pressure rings, pressure clamps, and cap screws.

D. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Provide plugs with number and size of conductor gripping holes as required to suit individual risers. Construct body of malleable-iron casting with hot-dip galvanized finish.

E. U-Channel Systems: 16-gauge steel channels, with 9/16-inch-diameter holes, at a minimum of 8 inches on center, in top surface. Provide fittings and accessories that mate and match with U-channel and are of the same manufacturer.

2.04 FABRICATED SUPPORTING DEVICES

A. General: Shop- or field-fabricated supports or manufactured supports assembled from U-channel components.

B. Steel Brackets: Fabricated of angles, channels, and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.

C. Pipe Sleeves: Provide pipe sleeves of one of the following:
   1. Sheet Metal: Fabricate from galvanized sheet metal; round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate sleeves from the following gage metal for sleeve diameter noted:
      a. 3-inch and smaller: 20-gauge.
      b. 4-inch to 6-inch: 16-gauge.
      c. over 6-inch: 14-gauge.
   2. Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe.
   3. Plastic Pipe: Fabricate from Schedule 80 PVC plastic pipe.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install supporting devices to fasten electrical components securely and permanently in accordance with NEC requirements.

B. Coordinate with the building structural system and with other electrical installation.

C. Raceway Supports: Comply with the NEC and the following requirements:
   1. Conform to manufacturer's recommendations for selection and installation of supports.
   2. Strength of each support shall be adequate to carry present and future load multiplied by a safety factor of at least four. Where this determination results in a safety allowance of less than 200 lbs., provide additional strength until there is a minimum of 200 lbs. safety allowance in the strength of each support.
   3. Install individual and multiple (trapeze) raceway hangers and riser clamps as necessary to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assembly and for securing hanger rods and conduits.
   4. Support parallel runs of horizontal raceways together on trapeze-type hangers.
   5. Support individual horizontal raceways by separate pipe hangers. Spring steel fasteners may be used in lieu of hangers only for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings only. For hanger rods with spring steel fasteners, use 1/4-inch-diameter or larger threaded steel. Use spring steel fasteners that are specifically designed for supporting single conduits or tubing.
   6. Space supports for raceway types not covered by the above in accordance with NEC.
   7. Support exposed and concealed raceway within 1 foot of an unsupported box and access fittings. In horizontal runs, support at the box and access fittings may be omitted where box or access fittings are independently supported and raceway terminals are not made with chase nipples or threadless box connectors.
   8. In vertical runs, arrange support so the load produced by the weight of the raceway and the enclosed conductors are carried entirely by the conduit supports with no weight load on raceway terminals.

D. Vertical Conductor Supports: Install simultaneously with installation of conductors.

E. Miscellaneous Supports: Support miscellaneous electrical components as required to produce the same structural safety factors as specified for raceway supports. Install metal channel racks for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes, transformers, and other devices.

F. In open overhead spaces, cast boxes threaded to raceways need not be supported separately except where used for fixture support; support sheet metal boxes directly from the building structure or by bar hangers. Where bar hangers are used, attach the bar to raceways on opposite sides of the box and support the raceway with an approved type of fastener not more than 24 inches from the box.

G. Sleeves: Install in concrete slabs and walls and all other fire rated floors and walls for raceways and cable installations. For sleeves through fire rated wall or floor construction, apply UL listed firestopping sealant in gaps between sleeves and enclosed conduits and cables in accordance with manufacturer's recommendations.

H. Conduit Seals: Install seals for conduit penetrations of slabs on grade and exterior walls below grade and where indicated. Tighten sleeve seal screws until sealing grommets have expanded to form watertight seal.

I. Fastening: Unless otherwise indicated, fasten electrical items and their supporting hardware securely to the building structure, including but not limited to conduits, raceways, cables, cable trays, busways, cabinets, panelboards, transformers, boxes, disconnect switches, and control components in accordance with the following:

1. Fasten by means of wood screws or screw-type nails on wood; toggle bolts on hollow masonry units; concrete inserts or expansion bolts on concrete or solid masonry; and machine screws, welded threaded studs, or spring-tension clamps on steel. Threaded studs driven by a powder charge and provided with lock washers and nuts may be used instead of expansion bolts and machine or wood screws. Do not weld conduit, pipe straps, or items other than threaded studs to steel structures. In partitions of light steel construction, use sheet metal screws.
2. Holes cut to depth of more than 1-1/2 inches in reinforced concrete beams or to depth of more than 3/4 inch in concrete shall not cut the main reinforcing bars. Fill holes that are not used.
3. Ensure that the load applied to any fastener does not exceed 25 percent of the proof test load. Use vibration- and shock- resistant fasteners for attachments to concrete slabs.

END OF SECTION

SECTION 26 05 33: OUTLET AND JUNCTION BOXES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Wall and ceiling outlet boxes.

B. Pull and junction boxes.

1.02 QUALITY ASSURANCE

A. Listing and Labeling: Provide outlet and junction boxes that are listed and labeled.
   1. The term "listed and labeled": As defined in the National Electrical Code, Article 100.
   2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

B. Outlet and junction boxes and their installation shall comply with the requirements of the National Electrical Code.

PART 2 PRODUCTS

2.01 OUTLET AND JUNCTION BOXES

A. Outlet and junction boxes shall be galvanized steel, 1-1/2” deep minimum by Raco, T&B/Steel City, Crouse Hinds or approved equal.

B. Boxes for interior areas with exposed conduit shall be pressed steel and in exterior areas with exposed conduit shall be cast metal with threaded hubs, "FS" type. Use galvanized steel for concealed boxes.

PART 3 EXECUTION

3.01 GENERAL

A. Outlet and junction boxes in inaccessible ceiling areas shall be located no more than 6 inches from ceiling access panel or from removable recessed luminaire.

B. Install boxes to preserve fire resistance rating of partitions and other elements, using UL listed fire stop materials and methods.

C. Do not install flush mounted boxes back-to-back in walls; provide minimum six (6") inches separation. Provide minimum twenty-four (24") inches separation in fire rated walls.

D. Do not fasten boxes to ceiling support wires.

E. Support boxes independently of conduit.

F. Bonding jumpers shall be used around knockouts.

3.02 OUTLET BOXES

A. Outlet boxes shall be securely anchored, set true, and plumb and no part of box shall extend beyond finished wall or ceiling. Flush mounted boxes shall be set to within 1/8" of finished wall and a plaster ring used to make cover flush with wall.

B. Select boxes according to intended use and type of outlet. Ceiling outlet boxes shall be four (4") inches octagon and 2-1/2" deep. Use four (4") inches square boxes where required. All ceiling outlet boxes shall have a fixture stud of the no bolt, self-locking type if required to hang the fixture specified at the outlet.

C. Receptacle and switch boxes installed in concrete block walls not plastered shall be Steel City, Appleton, Raco Series No. 690 through No. 699, or approved equal masonry boxes of proper depth and gang required and specifically designed for this purpose. If more than two conduits enter box from one direction, 4" square boxes with square-cut device covers not less than one (1") inch deep specifically designed for this purpose, shall be used. Round edge plaster rings will not be acceptable for block walls. Sectional or gangable type outlet boxes will not be acceptable except in drywall construction.

D. Mount outlet boxes worked to nearest block course. Confirm ADA compliance.

E. Install blank device plates on outlet boxes left for future use.

F. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices. Confirm accessibility code compliance.

3.03 JUNCTION BOXES

A. Pull and junction boxes shall be sized in accordance with the National Electrical Code according to number of conductors in box or type of service to be provided. Minimum size is 4-11/16” square and 2-1/2” deep.

B. Pull boxes shall be provided where necessary in the conduit system to facilitate conductor installation. Conduit runs longer than 100 feet or with bends exceeding 270 degrees shall have a pull box installed at a convenient intermediate location.

C. Install in locations as shown on Drawings and as required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements.

D. Install pull and junction boxes above accessible ceilings and in unfinished areas only.

3.04 ADJUSTING

A. Adjust flush-mounting outlets to make front flush with finished wall material.

B. Install knockout closures in unused box openings.

3.05 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 26 05 53: ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Extent and types of electrical identification are indicated herein and as follows:
   1. Operational instructions and warnings.
   2. Danger signs.
   3. Equipment/system identification signs.
   4. Conduit identification.
   5. Power and control wiring identification.
   6. Terminal marking.
   7. Arc-flash warning.
   8. Panelboard Legends.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, identification products shall be provided by W.H. Brady Co., Ideal Industries, Inc., Panduit, T&B, or approved equal.

2.02 MATERIALS

A. General: Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than single type is specified for an application, selection is Installer's option, but provide single selection for each application.

B. Cable/Conductor Identification Bands: Provide manufacturer's standard wrap-around type, vinyl-cloth, self-adhesive cable/conductor markers with either pre-numbered plastic coated type or write-on type with clear plastic self-adhesive cover flap, numbered to show circuit identification. Provide markers for all field control wiring.

C. Self-Adhesive Plastic Signs: Provide manufacturer's standard, self-adhesive or pressure-sensitive, pre-printed, flexible vinyl signs for operational instructions or warnings. Signs shall be of sizes suitable for application areas and adequate for visibility, with proper wording for each application (as examples: 208V, EXHAUST FAN or DANGER – HIGH VOLTAGE).

   1. Colors: Unless otherwise indicated or required by governing regulations, provide orange signs with black lettering.

D. Engraved Plastic-Laminate Signs: Provide three-layer engraving stock in sizes and thickness indicated, engraved with engraver's standard letter style of sizes and wording indicated, black and white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

   1. Thickness: 1/16", for units up to 20 sq. in. or eight (8") length; 1/8" for larger units.

2. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate substrate.

E. Underground Warning Tape: Provide four (4") inch wide detectable type, plastic, yellow warning tape with suitable warning describing type of cable/circuit over buried electrical lines.

2.03 LETTERING AND GRAPHICS

A. General: Coordinate names, abbreviations, and other designations used in electrical identification work, with corresponding designations shown, specified, or scheduled. Provide numbers, lettering, and working as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of electrical systems and equipment.

PART 3 EXECUTION

3.01 APPLICATION AND INSTALLATION

A. General Installation Requirements:

1. Coordination: Where identification is to be applied to surfaces, which require finish, install identification after completion of painting.

2. Regulations: Comply with governing regulations and requests of governing authorities for identification of electrical work.

3. Conduit Identification: Where electrical conduit is exposed in spaces with exposed mechanical piping, which is identified by a color-coded method, apply color-coded identification on electrical conduit in a manner similar to piping identification. Except as otherwise indicated, use orange as coded color for conduit.

4. Equipment/System Identifications: Install engraved plastic-laminate sign on each disconnect and control cabinets. Except as otherwise indicated, provide single line of text, 1/2" high lettering on 1-1/2" high sign (2" high where 2 lines are required), white lettering in black field. Provide text matching terminology and numbering of the contract documents and shop drawings. Provide identification and warning signs for each unit of the following categories of electrical work.

   - Electrical cabinets and enclosures.
   - Panelboards
   - Disconnect switches.

END OF SECTION

SECTION 26 05 73: OVERCURRENT PROTECTIVE DEVICES

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section includes circuit breakers and fuses.

1.02 SUBMITTALS

A. Provide manufacturer's product data for the following:
   1. Circuit breakers
   2. Enclosures
   3. Fuses (Provide complete list of all fuses and the equipment where they are used.)

B. Provide maintenance data for products for inclusion in the Operating and Maintenance Manual.

   1. Include a load current and overload relay heater list compiled by Contractor after motors have been installed. Arrange list to demonstrate selection of heaters to suit actual motor nameplate full load currents.

1.03 QUALITY ASSURANCE

A. Listing and Labeling: Provide overcurrent protective devices that are listed and labeled.
   1. The term "listed and labeled": As defined in the National Electrical Code, Article 100.
   2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

B. Overcurrent protective devices and their installation shall comply with the requirements of the 2018 National Electrical Code.

C. Circuit breakers shall comply with UL 489, NEMA AB 1, and NEMA AB 3.

D. Fuses shall conform to NEMA FU 1.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Circuit Breakers: Subject to compliance with requirements, provide products by Cutler-Hammer; General Electric Co.; Siemens Energy & Automation, Inc.; Square D Co.; or approved equal.

B. Fuses: Subject to compliance with requirements, provide products by Bussmann Mfg. Co., Littlefuse Co, Ferraz Shawmut, or approved equal.

2.02 MOLDED-CASE CIRCUIT BREAKERS

A. Circuit breakers shall be molded case, manually operated, trip-free, with inverse-time, thermal-overload protection, and instantaneous magnetic, short-circuit protection, as required. Circuit breakers shall be completely enclosed in a molded case, with the calibrated sensing element factory-sealed to prevent tampering.

B. Thermal-magnetic tripping elements shall be located in each pole of the circuit breaker and shall provide inverse-time-delay thermal overload protection and instantaneous magnetic short-circuit protection.

C. Breaker size shall be as required for the continuous current rating of the circuit. Breaker class shall be as required.

D. Interrupting capacity of the branch circuit breakers shall be sufficient to successfully interrupt the maximum short-circuit current imposed on the circuit at the breaker terminals. Circuit breaker minimum interrupting capacities shall be as shown on drawings and shall conform to NEMA AB 3.

E. Multipole circuit breakers shall be of the common-trip type having a single operating handle and shall have a two-position on/off indication. Circuit breakers shall have temperature compensation for operation in an ambient temperature of 104 degrees F. Circuit breakers shall have root mean square (rms) symmetrical interrupting rating sufficient to protect the circuit being supplied. Interrupting ratings may have selective type tripping (time delay, magnetic, thermal, or ground fault).

F. Breaker body shall be of phenolic composition. Breakers shall be capable of having such accessories as handle-extension, handle-locking, and padlocking devices attached where required.

G. Provide UL listed service entrance equipment when used for service disconnect.

H. Circuit breakers used for switching high intensity discharge lights or fluorescent lights shall be rated for that type of service.

2.03 ENCLOSED MOLDED-CASE CIRCUIT BREAKERS

A. Enclosed circuit breakers shall be thermal-magnetic, molded-case circuit breakers in surface-mounted, nonventilated enclosures, conforming to the appropriate articles of NEMA 250 and NEMA AB 1.

2.04 FUSES

A. A complete set of fuses for all switches shall be provided. Fuses shall have a voltage rating not less than the circuit voltage.

B. Provide Class RK5 fuses for motor branch circuits.

C. Fuses shall be labeled showing UL class, interrupting rating, and time-delay characteristics, when applicable.

D. Fuse holders field-mounted in a cabinet or box shall be porcelain. Field installation of fuse holders made of such materials as ebony asbestos, Bakelite, or pressed fiber shall not be used.

E. Provide a minimum of three (3) spare fuses of each size and type fuse installed.

F. Provide a complete list of all fuses and the equipment where they are used.

2.05 EQUIPMENT ENCLOSURES

A. Enclosures for equipment shall be in accordance with NEMA 250.

B. Equipment installed inside, clean, dry locations shall be contained in NEMA Type 1, general-purpose sheet-steel enclosures.

C. Equipment installed in wet locations shall be contained in NEMA Type 3R, rainproof, sheet-steel enclosures, constructed for outdoor use to protect against falling rain, sleet, and ice.]

D. Ferrous-metal surfaces of electrical enclosures shall be cleaned, phosphatized, and painted with the manufacturer's standard finish.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install overcurrent protective devices as indicated or required, in accordance with the manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements.

B. Coordinate with other work, including electrical wiring work, as necessary to interface installation of overcurrent protective devices.

C. Fasten circuit breakers without mechanical stresses, twisting or misalignment being exerted by clamps, supports, or cables.

D. Install enclosed circuit breakers plumb with operating handle at five (5') feet above finished elevation.

3.02 ADJUSTING

A. Inspect circuit breaker operating mechanisms for malfunctioning and adjust units for free mechanical movement.

3.03 FIELD QUALITY CONTROL

A. Prior to energizing overcurrent protective devices, test devices for continuity of circuitry and for short-circuits. Correct malfunctioning units, and then demonstrate compliance with requirements.

B. In the presence of the Owner or Owner's Representative, test each device and demonstrate its working as specified.

END OF SECTION

SECTION 26 24 00: MECHANICAL EQUIPMENT AND CONTROLS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. General provisions of contract, including general and supplementary conditions and general requirements apply to work specified in this section.

PART 2 PRODUCTS

2.01 STARTERS

A. All starters for Division 22 and 23 package mechanical equipment will be furnished by Division 22 and 23, but installed and connected by Division 26

2.02 CONTROL WIRING

A. All control wiring for mechanical equipment shall be provided in conduit under each respective division. Control components for mechanical equipment will be furnished and installed by Division 22 and 23.

2.03 POWER WIRING

A. All power wiring at 120 and 208volts shall be provided by Division 26.

PART 3 EXECUTION

3.01 INSTALLATION

A. Coordinate electrical power connection requirements with Mechanical Contractor. Where power requirements differ from drawing design requirements, Engineer shall be notified in writing. Contractor shall be given clarification and installation requirements prior to installation of the portion of work. Cost of equipment and labor for improperly installed electrical connections not coordinated and approved by Engineer and Mechanical Contractor shall be incurred by the Electrical Contractor and shall not constitute a reason for an extra charge because of any rework.

END OF SECTION

SECTION 26 24 16: PANELBOARDS

PART 1 GENERAL

1.01 SCOPE

A. The Contractor shall furnish and install the panelboards as specified and as shown on the contract drawings.

1.02 REFERENCES

A. The panelboards and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of NEMA and UL as follows:
   1. UL 67 – Panelboards
   2. UL 50 – Cabinets and boxes
   3. NEMA PB1
   4. Fed. Spec. W-P-115C
   5. Circuit breaker – Type I class I
   6. Fusible switch – Type II class I

1.03 SUBMITTALS – FOR REVIEW/APPROVAL

A. The following information shall be submitted to the Engineer:
   1. Breaker layout drawing with dimensions indicated and nameplate designation
   2. Component list
   3. Conduit entry/exit locations
   4. Assembly ratings including:
      a. Short-circuit rating
      b. Voltage
      c. Continuous current
   5. Cable terminal sizes
   6. Product data sheets

B. Where applicable, the following additional information shall be submitted to the Engineer:
   1. Key interlock scheme drawing and sequence of operations

1.04 SUBMITTALS – FOR CONSTRUCTION

A. The following information shall be submitted for record purposes:
   1. Final as-built drawings and information for items listed in Paragraph 1.04, and shall incorporate all changes made during the manufacturing process
   2. Installation information

1.05 QUALIFICATIONS

A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.

B. For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.

C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

D. The panelboards shall be UL labeled.

1.07 DELIVERY, STORAGE AND HANDLING

A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.08 OPERATION AND MAINTENANCE MANUALS

A. Equipment operation and maintenance manuals shall be provided with each assembly shipped and shall include instruction leaflets, instruction bulletins and renewal parts lists where applicable, for the complete assembly and each major component.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Eaton, Square-D, General Electric, and Siemens

The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety. Other manufacturers will be considered, provided their products meet the requirements of the documents.

2.02 RATINGS

A. Panelboards rated 240 Vac or less shall have short-circuit ratings as shown on the drawings or as herein scheduled, but not less than 10,000 amperes RMS symmetrical.

B. If applicable, panelboards rated 480 Vac shall have short-circuit ratings as shown on the drawings or as herein scheduled, but not less than 14,000 amperes RMS symmetrical.

C. Panelboards shall be labeled with a UL short-circuit rating. When series ratings are applied with integral or remote upstream devices, a label or manual shall be provided. It shall state the conditions of the UL series ratings including:
   1. Size and type of upstream device
   2. Branch devices that can be used
   3. UL series short-circuit rating

2.03 CONSTRUCTION

A. Interiors shall be completely factory assembled. They shall be designed such that switching and protective devices can be replaced without disturbing adjacent units and without removing the main bus connectors.

B. Trims for branch circuit panelboards shall be supplied with a hinged door over all circuit breaker handles. Doors in panelboard trims shall not uncover any live parts. Doors shall have a semi flush cylinder lock and catch assembly. Door-in-door trim shall be provided. Both hinged trim and trim door shall utilize three point latching. No tools shall be required to install or remove trim. Trim shall be equipped with a door-actuated trim locking tab. Equip locking tab with provision for a screw such that removal of trim requires a tool, at the owner's option. Installation shall be tamper resistant with no exposed hardware on the panelboard trim.

C. Distribution panelboard trims shall cover all live parts. Switching device handles shall be accessible.

D. Surface trims shall be same height and width as box. Flush trims shall overlap the box by 3/4 of an inch on all sides.

E. A directory card with a clear plastic cover shall be supplied and mounted on the inside of each door.

F. All locks shall be keyed alike.

2.04 BUS

A. Main bus bars shall be copper sized in accordance with UL standards to limit temperature rise on any current carrying part to a maximum of 65 degrees C above an ambient of 40 degrees C maximum.

B. A system ground bus shall be included in all panels.

C. Full-size (100%-rated) insulated neutral bars shall be included for panelboards shown with neutral. Bus bar taps for panels with single-pole branches shall be arranged for sequence phasing of the branch circuit devices. Neutral busing shall have a suitable lug for each outgoing feeder requiring a neutral connection.

2.05 BRANCH CIRCUIT PANELBOARDS

A. The minimum short-circuit rating for branch circuit panelboards shall be as specified herein or as indicated on the drawings. Panelboards shall be series rated. Panelboards shall be Eaton type Pow-R-Line 1a, Pow-R-Line 2a or Pow-R-Line 3a.

B. Bolt-on type, heavy-duty, quick-make, quick-break, single- and multi-pole circuit breakers of the types specified herein, shall be provided for each circuit with toggle handles that indicate when unit has tripped.

C. Circuit breakers shall be thermal-magnetic type with common type handle for all multiple pole circuit breakers. Circuit breakers shall be minimum 100-ampere frame and through 100-ampere trip sizes shall take up the same pole spacing. Circuit breakers shall be UL listed as type SWD for lighting circuits.

1. Circuit breaker handle locks shall be provided for all circuits that supply exit signs, emergency lights, energy management, and control system (EMCS) panels and fire alarm panels.

D. Circuit breakers shall have a minimum interrupting rating of 10,000 amperes symmetrical at 240 volts, and 14,000 amperes symmetrical at 480 volts, unless otherwise noted on the drawings.

2.06 DISTRIBUTION PANELBOARDS – CIRCUIT BREAKER TYPE

A. Distribution panelboards with bolt-on devices contained therein shall have interrupting ratings as specified herein or indicated on the drawings. Panelboards shall be series rated. Panelboards shall be Eaton type Pow-R-Line 3a or Pow-R-Line 4B. Panelboards shall have molded case circuit breakers as indicated below.

B. Where indicated, provide circuit breakers UL listed for application at 100% of their continuous ampere rating in their intended enclosure.

C. Provide shunt trips, bell alarms, and auxiliary switches as shown on the contract drawings.

2.07 ENCLOSURE

A. Enclosures shall be at least 20 inches wide, unless noted otherwise, and made from galvanized steel. Provide minimum gutter space in accordance with the National Electrical Code.

Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment, the box shall be sized to include the additional required wiring space. At least four interior mounting studs with adjustable nuts shall be provided.

B. Enclosures shall be provided with blank ends.

C. Where indicated on the drawings, branch circuit panelboards shall be column width type.

2.08 NAMEPLATES

A. Provide an engraved nameplate for each panel section.

2.09 FINISH

A. Surfaces of the trim assembly shall be properly cleaned, primed, and a finish coat of gray ANSI 61 paint applied.

PART 3 EXECUTION

3.01 FACTORY TESTING

A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.

3.02 INSTALLATION

A. The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawings.

END OF SECTION

SECTION 26 27 26: WIRING DEVICES AND PLATES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Switches

B. Receptacles

C. Plates

1.02 QUALITY ASSURANCE

A. Listing and Labeling: Provide wiring devices and plates that are listed and labeled.
   1. The term "listed and labeled": As defined in the National Electrical Code, Article 100.
   2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

B. Wiring devices and plates and their installation shall comply with the requirements of the National Electrical Code.

PART 2 PRODUCTS

2.01 SWITCHES

A. Switches shall be toggle, quiet-type with totally enclosed with bodies of thermoplastic and mounting strap. Color shall be selected by architect.

B. Switches shall be rated for 20 amps, 277 volts AC. Switches shall be specification grade Hubbell, P&S, Leviton, Cooper Wiring Devices, or approved equal.

2.02 RECEPTACLES

A. Receptacles shall be general purpose, heavy duty, duplex receptacles with bodies made of thermoplastic supported on a metal mounting strap in accordance with NEMA WD 1. Receptacles shall be 20 amp, 125 volt, specification grade Cooper Wiring Devices, Hubbell, Leviton, P&S. Color shall be selected by architect.

B. Ground fault circuit interrupter receptacles shall be the “feed-through” type rated to protect 20 amps. Receptacles shall be specification grade duplex receptacles with an impact-resistant nylon face with test and reset buttons. Color shall be selected by architect.
   1. 20 Amp, 125 Volt: Cooper Wiring Devices, Hubbell, Leviton, P&S, or approved equal.

C. Special Receptacles: As indicated on Drawings.

2.03 PLATES

A. Provide UL listed, one-piece device plates to suit the devices installed.

B. For metal outlet boxes, plates on unfinished walls shall be of zinc-coated sheet steel or cast-metal having round or beveled edges.

C. Plates on finished walls shall be nylon, mid-size.

D. Plates shall be same color as receptacle or toggle switch with which they are mounted. Screws shall be machine-type with countersunk heads in color to match finish of plate.

E. Plates installed in wet locations shall be gasketed and UL listed for “wet locations” as per NEC 406.8 (B).

F. Modular plates for data, cable television, and telephone by others.

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide proper size outlet boxes for all wiring devices in accordance with Section 260533, “Outlet and Junction Boxes.”

B. Install switches forty-eight (48") inches above finished floor on lock side and clear of door frame a minimum of three (3") inches unless otherwise noted. Prior to rough-in, coordinate with architectural drawings to determine lock side of door.

C. All switches shall be made by the same manufacturer.

D. Where two or more snap switches are to be installed at the same location, they shall be mounted in one-piece ganged switch boxes, with at gang cover plate.

E. Combination snap switch and single or duplex receptacles shall be mounted in two-gang switch box with one-piece device plate.

F. Receptacles shall be mounted 18" above finished floor unless otherwise noted.

G. All wiring devices shall be mounted in accordance with accessibility code requirements.

H. The finish of devices and cover plates shall be selected by the architect.

END OF SECTION

SECTION 26 28 13: DISCONNECT SWITCHES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Fused Disconnect Switches

1.02 SUBMITTALS

A. Provide product data showing switch's ratings and enclosure type.

1.03 QUALITY ASSURANCE

A. Listing and Labeling: Provide disconnect switches that are listed and labeled.
   1. The term "listed and labeled": As defined in the National Electrical Code, Article 100.
   2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

B. Disconnect switches and their installation shall comply with the requirements of the National Electrical Code.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Switches shall be Eaton, or approved equal. Examples are Square D, General Electric, Siemens Energy & Automation.

2.02 MATERIALS

A. Use heavy-duty type for 600 volt switches. Switches shall have quick make, quick break, load interrupter, enclosed knife switch manufactured to the requirements of NEMA KS 1.

B. All switches shall have externally operable handles with interlocking covers to prevent opening front cover with switch in the ON position and have provisions for multiple padlocks in the OFF position.

C. Provide equipment ground lug in each switch.

D. Provide NEMA 1 enclosures for interior installations, unless otherwise noted.

E. Provide NEMA 3R enclosures for exterior installations or in wet locations, unless otherwise noted.

F. Provide fuses as per equipment manufacturer recommendation, dual-element, time-delay, current limiting, with blown fuse indicator site glass.

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide safety switches sized as indicated on the Drawings.

B. Mount individually enclosed switches plumb and level with top four (4') feet above floor or grade, unless otherwise noted.

C. Provide a set of fuses in fusible disconnect switches, as per equipment manufacturer recommendations.

3.02 IDENTIFICATION

A. Identify disconnect switches in accordance with Section 26 05 53, "Electrical Identification."

END OF SECTION

SECTION 26 32 13: EMERGENCY STANDBY GENERATOR SET

PART 1 GENERAL

1.01 REFERENCES AND STANDARDS

A. The generator set covered by these specifications shall be designed, tested, rated, assembled and installed in strict accordance with all applicable standards below:
   1. CSA C22.2 No14
   2. CSA 282
   3. CSA 100
   4. EN61000-6
   5. EN55011
   6. FCC Part 15 Subpart B
   7. ISO8528
   8. IEC61000
   9. UL508
   10. UL2200
   11. UL142
   12. Designed to allow for installed compliance to NFPA 70, NFPA99 and NFPA 110
   13. The tank systems shall be designed and installed in accordance with applicable sections of NFPA30, NFPA31, NFPA37, NFPA321, UL80 and UL142. The day tank shall bear the label of Underwriters Laboratories standard 142 and UL508.

1.02 WORK INCLUDED

A. Installation
   1. The work includes supplying and installing a complete integrated generator system. The system consists of a diesel generator set with related component accessories.

B. Fuel System
   1. Diesel.

C. System Test
   1. A complete system load test shall be performed after all equipment is installed. Guidelines in the Start-up Section.

D. Requirements, Codes and Regulations
   1. The equipment supplied and installed shall meet the requirements of the NEC and all applicable local codes and regulations. All equipment shall be of new and current production by a MANUFACTURER who has 25 years of experience building this type of equipment. Manufacturer shall be ISO9001 certified. The Emergency Generator shall be by Caterpillar, Kohler, or Cummins.

1.03 SUBMITTALS

A. Engine-generator submittals shall include the following information:
   1. Factory published specification sheet.
   2. Manufacturer's catalog cut sheets of all auxiliary components such as battery charger, control panel, enclosure, etc.

3. Dimensional elevation and layout drawings of the generator set, enclosure and transfer switchgear and related accessories.
4. Weights of all equipment.
5. Concrete pad recommendation, layout and stub-up locations of electrical and fuel systems.
6. Interconnect wiring diagram of complete emergency system, including generator, switchgear, battery charger, control panel, and remote alarm indications.
7. Engine mechanical data, including heat rejection, exhaust gas flows, combustion air and ventilation air flows, fuel consumption, etc.
8. Generator electrical data including temperature and insulation data, cooling requirements, excitation ratings, voltage regulation, voltage regulator, efficiencies, waveform distortion and telephone influence factor.
9. Generator resistances, reactances, and time constants.
10. Generator locked rotor motor starting curves.
11. Manufacturer's documentation showing maximum expected transient voltage and frequency dips, and recovery time during operation of the generator set at the specified site conditions with the specified loads.
12. Manufacturer's and dealer's written warranty.
13. Fuel storage tank and day tank and associated accessories.

1.04 SYSTEM RESPONSIBILITY

A. Generator Set Distributor
   1. The completed engine generator set shall be supplied by the Manufacturer's authorized distributor only.

B. Requirements, Codes and Regulations
   1. The equipment supplied and installed shall meet the requirements of NEC and all-applicable local codes and regulations. All equipment shall be new, of current production. There shall be one source responsibility for warranty; parts and service through a local representative with factory trained service personnel.

1.05 WARRANTY

A. Two Year Standby (ISO 8528-1: ESP) Generator Set and tank Warranty
The manufacturer's standard warranty shall in no event be for a period of less than two (2) years from date of initial start-up of the system and shall include repair parts, labor, reasonable travel expense necessary for repairs at the job site, and expendables (lubricating oil, filters, antifreeze, and other service items made unusable by the defect) used during the course of repair. Running hours shall be limited to 500 hours annually for the system warranty by both the manufacturer and servicing distributor. Submittals received without written warranties as specified will be rejected in their entirety.

1.06 PARTS AND SERVICE QUALIFICATIONS

A. Service Facility
   1. The engine-generator supplier shall maintain 24-hour parts and service capability within 100 miles of the project site. The distributor shall stock parts as needed to support the generator set package for this specific project. The supplier must carry sufficient inventory to cover no less than 80% parts service within 24hrs and 95% within 48 hours.

B. Service Personnel
   1. The dealer shall maintain qualified factory trained service personnel.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Genset Requirements
   1. The generator set shall be Standby Duty rated at 125 ekW, 156 kVA, 0.8 power factor, 208 V, 3-Phase, 60 hertz, including radiator fan and all parasitic loads. Generator set shall be sized to operate at the specified load at a maximum ambient of 110F (43.3C) and altitude of 1,500.0 feet (304.8 m).

      Standby Power Rating:

      Power is available for the duration of an emergency outage

      Average Power Output = 70% of standby power

      Load = Varying

      Typical Hours/Year = 200 Hours

      Maximum Expected Usage = 500 hours/year

      Typical Application = Standby

B. Material and Parts
   1. All materials and parts comprising the unit shall be new and unused.

C. Engine
   1. The engine shall be spark ignited, four (4) cycle, water-cooled, while operating with nominal speed not exceeding 1800 RPM. The engine will utilize in-cylinder combustion technology, as required, to meet applicable EPA non-road mobile regulations and/or the EPA NSPS rule for stationary reciprocating compression ignition engines. Additionally, the engine shall comply with the State Emission regulations at the time of installation/commissioning. Actual engine emissions values must be in compliance with applicable EPA emissions standards per ISO 8178 Emissions Cycle at specified ekW / bHP rating. Utilization of the "Transition Program for Equipment Manufacturers" (also known as "Flex Credits") to achieve EPA certification is not acceptable. The in-cylinder engine technology must not permit unfiltered exhaust gas to be introduced into the combustion cylinder. Emissions requirements / certifications of this package: EPA T3
   2. Engine Governing

      The engine will be equipped with an isochronous electronic governor to maintain +/- 6 RPM steady state frequency variation from steady state no load to steady state full load.

2.02 GENERATOR

A. Generator Specifications
   1. The synchronous three phase generator shall be a salient-pole, brushless, 2/3-pitch, 12 lead, self-ventilated with drip-proof construction and amortisseur rotor windings and skewed for smooth voltage waveform in accordance with NEMA MG 1 and directly connected to the engine flywheel housing with a flex coupling. The generator shall meet performance class G2 of ISO 8528.

The excitation system shall enable the alternator to sustain 300% (250% for 50Hz) of rated current based on 105C (Class F) rise rating for ten seconds during a fault condition and shall improve the immunity of the voltage regulator to non-linear distorting loads. The excitation system shall be of brushless construction and be independent of main stator windings (either permanent magnet or auxiliary windings).

B. Voltage Regulator

1. Automatic Voltage Regulator

The automatic voltage regulator (AVR) shall maintain generator output voltage within +/- 0.5% for any constant load between no load and full load. The regulator shall be a totally solid-state design, which includes electronic voltage buildup, volts per Hertz regulation, over-excitation protection, shall limit voltage overshoot on startup, and shall be environmentally sealed.

C. Motor Starting

1. Provide locked rotor motor starting capability of minimum 672 skVA at 30% instantaneous voltage dip as defined per NEMA MG 1. Sustained voltage dip data is not acceptable.

2.03 CIRCUIT BREAKER

A. Circuit Breaker Specifications

1. Provide generator mounted 100% circuit breakers, molded case, one 600 amp trip, 3 pole, NEMA 1/IP22. Breaker shall utilize a solid-state trip unit, LSIG type adjustable. The breaker shall be UL/CSA Listed and connected to engine/generator safety shutdowns. Breaker shall be housed in an extension terminal box which is isolated from vibrations induced by the generator set. Mechanical type lugs, sized for the circuit breaker feeders shown on drawing, shall be supplied on the load side of breaker.

2.04 CONTROLS – GENERATOR SET MOUNTED

Provide a fully solid-state, microprocessor based, generator set control. The control panel shall be designed and built by the engine manufacturer. The control shall provide all operating, monitoring, and control functions for the generator set. The control panel shall provide real time digital communications to all engine and regulator controls via SAE J1939.

A. Environmental

The generator set control shall be tested and certified to the following environmental conditions.

1. –40°C to +70°C Operating Range
2. 95% humidity non-condensing, 30°C to 60°C
3. IP22 protection for rear of controller; IP55 when installed in control panel
4. 5% salt spray, 48 hours, +38°C, 36.8V system voltage
5. Sinusoidal vibration 4.3G's RMS, 24-1000Hz
6. Electromagnetic Capability (89/336/EEC, 91/368/EEC, 93/44/EEC, 93/68/EEC, BS EN 50081-2, 50082-2)
7. Shock: withstand 15G

B. Functional Requirements

The following functionality shall be integral to the control panel.

1. The control shall include a 33 x 132 pixel, 24mm x 95mm, positive image, transflective LCD display with text based alarm/event descriptions.

2. Audible horn for alarm and shutdown with horn silence switch
3. Standard ISO labeling
4. Multiple language capability
5. Remote start/stop control
6. Local run/off/auto control integral to system microprocessor
7. Cooldown timer
8. Speed adjust
9. Lamp test
10. Push button emergency stop button
11. Password protected system programming

C. Digital Monitoring Capability

The controls shall provide the following digital readouts for the engine and generator.

All readings shall be indicated in either metric or English units

Engine:

1. Engine oil pressure
2. Engine oil temperature
3. Engine coolant temperature
4. Engine RPM
5. Battery volts

Generator:

1. Generator AC volts (Line to Line, Line to Neutral and Average)
2. Generator AC current (Avg and Per Phase)
3. Generator AC Frequency
4. Generator kW (Total and Per Phase)
5. Generator kVA (Total and Per Phase)
6. Generator kVAR (Total and Per Phase)
7. Power Factor (Avg and Per Phase)
8. Total kW-hr
9. Total kVAR-hr
10. % kW
11. % kVA
12. % kVAR

D. Alarms and Shutdowns

The control shall monitor and provide alarm indication and subsequent shutdown for the following conditions. All alarms and shutdowns are accompanied by a time, date, and engine hour stamp that are stored by the control panel for first and last occurrence:

Engine Alarm/Shutdown:

1. Low oil pressure alarm/shutdown
2. High coolant temperature alarm/shutdown
3. Loss of coolant shutdown
4. Overspeed shutdown
5. Overcrank shutdown
6. Low coolant level alarm

7. Low fuel level alarm
8. Emergency stop depressed shutdown
9. Low coolant temperature alarm
10. Low battery voltage alarm
11. High battery voltage alarm
12. Control switch not in auto position alarm
13. Battery charger failure alarm
14. Generator Alarm/Shutdown:
    1. Generator Over Voltage
    2. Generator Under Voltage
    3. Generator Over Frequency
    4. Generator Under Frequency
    5. Generator Overcurrent

E. Inputs and Outputs

Programmable Digital Inputs

The Controller shall include the ability to accept eight (8) total with six (6) programmable digital input signals. The signals may be programmed for either high or low activation using programmable Normally Open or Normally Closed contacts.

Programmable Relay Outputs

The control shall include the ability to operate eight (8) total with six (6) programmable relay output signals, integral to the controller. The output relays shall be rated for 2A @ 30VDC and consist of six (6) Form A (Normally Open) contacts and two (2) Form C (Normally Open & Normally Closed) contacts.

Programmable Discrete Outputs

The control shall include the ability to operate one (1) discrete output, integral to the controller, which is capable of sinking up to 300mA.

F. Maintenance

All engine, voltage regulator, control panel and accessory units shall be accessible through a single electronic service tool. The following maintenance functionality shall be integral to the generator set control:

1. Engine running hours display (non-resettable)
2. Service maintenance interval (running hours or calendar days)
3. Engine crank attempt counter
4. Engine successful starts counter
5. 20 events are stored in control panel memory
6. Programmable cycle timer that starts and runs the generator for a predetermined time. The timer shall use 14 user-programmable sequences that are repeated in a 7-day cycle. Each sequence shall have the following programmable set points:
    a. Day of week
    b. Time of day to start
    c. Duration of cycle

G. Remote Communications

The control shall include Modbus RTU communications as standard via RS-485 half duplex with configurable baud rates from 2.4k to 57.6k.

Remote Monitoring Software

The control shall provide Monitoring Software with the following functionality

1. Provide access to all date and events on generator set communications network
2. Provide remote control capability for the generator set
3. Ability to communicate via Modbus RTU or remote modem

H. Local and Remote Annunciation

Remote Annunciator (NFPA 99/110, CSA 282)

Provide a remote annunciator to meet the requirements of NFPA 110, Level 1.

1. The annunciator shall provide remote annunciation of all points stated above and shall incorporate ring-back capability so that after silencing the initial alarm, any subsequent alarms will sound the horn.
2. Ability to be located up to 800 ft from the generator set.
3. Install remote annunciator in place of existing unit within building.

2.05 COOLING SYSTEM

A. The generator set shall be equipped with a rail-mounted, engine-driven radiator with blower fan and all accessories. The cooling system shall be sized to operate at full load conditions and 110 F* ambient air entering the room or enclosure (If an enclosure is specified). The generator set supplier is responsible for providing a properly sized cooling system based on the enclosure static pressure restriction.

2.06 FUEL SYSTEM

A. The engine fuel system shall be installed in strict compliance to the engine manufacturer's instructions.

B. Provide a double-wall fiberglass reinforced plastic (FRP) UL-listed underground storage tank as shown in the drawings with level and leak detection and monitoring. Tank shall have 24 hour full-load fuel supply. Tank shall be furnished with foot valve as required for use with day tank at genset.

C. Day Tank

1. Provide 10 gallon, double-wall welded steel day tank with pump (120V, 16A max. circuit) housed in or mounted to generator enclosure and compatible with underground storage tank.

2. Provide schedule 40, ASTM A 53, black iron pipe connections to the day tank. Make all connections to fixed installed pipe with pipe unions to facilitate tank service/removal.

(1) Supply to day tank, inlet to day tank pump

(2) Day tank overflow to bulk supply

(3) Supply and return to prime mover, as recommended by manufacturer.

(4) Vent sizes shall be as shown and as required by local codes and by UL 142,NFPA31 and NFPA37 as well as project specification requirements.

3. Installation General: The day tank shall be installed adjacent to the generator, on the same grade.
4. Day tank shall be of packaged design to include all inlet flow control devices, other valves, level controls, pump control, indicators, alarms and all other devices as required to form an integrated, functional system such that field installation is restricted largely to external piping, wiring and such intermediate devices that are required by code and/or good engineering practice to interconnect the bulk source of supply to the day tank, the day tank to the generator and to provide for external vents as per local codes and UL142, NFPA31 and NFPA37.
5. Pipe thread connections shall be provided for fuel oil supply from remote pump set, supply to generator, return from generator, overflow to main tank, vents, and drain with fire rated ball valve.
6. A weatherproof, screened vent cap shall be provided as a loose item for field installation at the outdoor vent termination.
7. The tank shall have interior corrosion inhibitor to deter corrosion prior to installation and use. The exterior of the day tank shall receive a heavy-duty industrial anti-corrosion coating and be finish painted.
8. Day tank shall be factory leak tested at 3PSI.
9. The tank shall be steel double-wall secondary containment construction bearing the UL 142 label. The containment shall be equipped with a leak detector that shall activate the “leak” alarm described below. A drain with fire rated ball valve is to be supplied. The containment shall be equipped with a separate e-vent as required by UL 142.
10. Supply fire rated ball valves as follows:
    a. Day tank drain
    b. Secondary containment drain
11. Fuel delivery system: Provide installed upon the day tank, a duplex fuel oil pump and duplex pump controller with automatic alternator for supply of fuel from the main tank to the day tank. This is a suction-lift application: adequate pipe sizes must be used in the system and a foot valve must be installed in the main tank if main is below level of day tank. Manual priming of the system is required.
12. Duplex pumps: (Specify GPM, up to 25GPM) at 1725 rpm, when operating with fuel oil having a viscosity of 32SSU.
13. Direct drive, motor driven pumps coupled via flexible coupling.
14. Motors to be TEFC construction, HP as required for pump at 50 PSI NEMA type B, continuous duty at 40°C, 1725 RPM, 120V AC, 60 hertz, 1.15 service factor
15. Pumps to be directly driven, positive displacement, internal gear type with mechanical shaft seal and cast iron body, machined steel gears.
16. Fire rated shutoff ball valves on pump inlets
17. Pump check valve, spring-type, cast iron construction
18. Flowswitch each pump

19. Suction strainer, cast iron wye type fuel oil strainer on each pump suction
20. Provide a piston type, 0.1 gallon per stroke hand pump installed and piped and equipped with fire-rated shutoff valves.
21. Day tank level controller. A UL Listed, integrated design, digital level controller shall be supplied which provides differential level control for activation of pumps, duplex pump alternator, tank level indication, system alarms and manual operating controls. Level controller shall be self-contained as a unit within a NEMA4 enclosure integral with the day tank assembly.
22. PLC based with 6-inch, color, touch-panel operator interface
23. Dual level sensor input:

    -4-20mA continuous sensor, analog-to-digital input

    -Point sensing float switches: low, refill start, refill stop, high, checkpoint for automatic cross check of sensors
24. Leak sensor
25. Spare I/O for options and design-build features
26. MODBUS and Ethernet network compatible
27. 4-20mA loop output for tank level
28. Operator touch-panel interface functions:

    -HOA switch

    -Test

    -Reset

    -Alarm silence

    -Numeric display of tank level in gallons (liters)

    -Graphic condition display of tank level and pump/status/alarm condition

    -Message indicators for status and alarm, including:

    -Normal operation

    -Pump running (fill, return, single or multiple pumps)

    -Tank filling

    -Loss of flow

    -Low

    -Critical low

    -High

    -Critical high

    -Leak

    -Not in auto

    -Controller failure with specific message

    -Other messages as determined by design-build option configuration
29. Relay dry contact outputs for the following (5A, SPDT):

    -Low alarms

-High alarms

-Leak

-Not in auto

-Other alarms as determined by design-build option configuration

D. Contractor shall leave tanks completely full after all testing and commissioning of the unit.

2.07 STARTING SYSTEM

A. Starting Motor - A DC electric starting system with positive engagement shall be furnished. The motor voltage shall be as recommended by the engine manufacturer.

B. Jacket Water Heater shall be provided and shall be sized to insure that genset will start within the specified time period and ambient conditions.

C. Batteries - A lead-acid storage battery set of the heavy-duty diesel starting type shall be provided. Battery voltage shall be compatible with the starting system.

D. Battery Charger - A current limiting battery charger shall be furnished to automatically recharge batteries. The charger shall be dual charge rate with automatic switching to the boost rate when required. The battery charger shall be mounted on the genset package or inside the genset enclosure/room.

2.08 ENCLOSURE

A. Sound Attenuated Weatherproof Enclosure

The complete diesel engine generator set, including generator control panel, engine starting batteries and fuel oil tank, shall be enclosed in a factory assembled, weather protective enclosure.

1. A weather resistant, sound attenuated enclosure of steel with electrostatically applied powder coated baked polyester paint. The enclosure shall have a resulting sound level of 78 dba @ 23ft with the genset running under full load. It shall consist of a roof, side walls, and end walls. Fasteners shall be either zinc plated or stainless steel.
2. Enclosure Sound Attenuation: Acoustical foam shall be provided between all supports and inside doors and sound baffles on air intake and air discharge.
3. Lube oil and coolant drains shall be extended to the exterior of the enclosure and terminated with drain valves. Cooling fan and charging alternator shall be fully guarded to prevent injury.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install equipment in accordance with manufacturer's recommendations, the project drawings and specifications, and all applicable codes.

3.02 START-UP AND TESTING

A. Coordinate all start-up and testing activities with the Engineer and Owner. After installation is complete and normal power is available, the manufacturer's local dealer shall perform the following:

1. Perform a 4 hour load bank test at a 1.0 PF at full nameplate rating. Loadbank, cables and other equipment required for this test to be supplied by the genset supplier.

3.03 OPERATIONS AND MAINTENANCE MANUALS

A. Provide two (2) sets of operation and maintenance manuals covering the generator, switchgear, and auxiliary components. Include final as-built wiring interconnect diagrams and recommended preventative maintenance schedules.

3.04 TRAINING

A. On-Site Training - Provide on-site training to instruct the owner's personnel in the proper operation and maintenance of the equipment. Review operation and maintenance manuals, parts manuals, and emergency service procedures.

END OF SECTION

SECTION 26 51 00: INTERIOR LIGHTING

PART 1 GENERAL

1.01 WORK INCLUDED

A. This Section includes interior lighting fixtures, lamps, drivers, ballasts, and accessories.

1.02 DEFINITIONS

A. Fixture: A complete lighting unit. Fixtures include lamps and parts required to distribute the light, position and protect lamps, and connect lamps to the power supply.

B. Luminaire: Fixture.

C. Average Life: The published time when 50 percent have failed and 50 percent have survived under normal conditions.

1.03 SUBMITTALS

Provide the following submittals:

A. Product data describing fixtures, lamps, and ballasts. Arrange product data for fixtures in order of fixture designation.

B. Shop drawings from manufacturers detailing nonstandard fixtures and indicating dimensions, weights, methods of field assembly, components, features, and accessories.

C. Maintenance data for products for inclusion in Operating and Maintenance Manual.

D. Provide complete set of fixture information and include in O&M Manuals.

1.04 QUALITY ASSURANCE

A. Listing and Labeling: Provide fixtures, ballasts, lamps, and emergency lighting units that are listed and labeled for their indicated use on the Project.
   1. Special Listing and Labeling: Provide fixtures for use in damp or wet locations and recessed in combustible construction specifically listed and labeled for such use.
   2. The term "Listed and Labeled": As defined in the 2017 National Electrical Code, Article 100.
   3. Listing and Labeling Agency Qualification: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

B. Interior lighting fixtures, lamps, ballasts, and accessories and their installation shall comply with the requirements of the 2017 National Electrical Code.

C. Manufacturers Qualifications: Firms experienced in manufacturing fixtures that are similar to those indicated for this Project and that have a record of successful in-service performance.

D. Coordination of Fixtures With Ceiling: Coordinate fixture mounting hardware and trim with the ceiling system.

1.05 EXTRA MATERIALS

A. Furnish extra materials matching products installed, as described below, packaged with protective covering for storage, and identified with labels describing contents. Deliver extra materials to the Owner.
   1. Lamps: 10 lamps for each 100 of each type and rating installed. Furnish at least 1 of each type.

2. Ballasts/Drivers: 1 for each 100 of each type and rating installed. Furnish at least 1 of each type.

PART 2 PRODUCTS

2.01 FIXTURE COMPONENTS, GENERAL

A. Metal Parts: Free from burrs and sharp corners and edges

B. Sheet Metal Components: Steel, except as indicated. Components are formed and supported to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating and free from light leakage under operating conditions. Arrange to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in the operating position.

D. Reflecting Surfaces: Minimum reflectances as follows, except as otherwise indicated:
   1. White Surfaces: 85 percent.
   2. Specular Surfaces: 83 percent.
   3. Diffusing Specular Surfaces: 75 percent.
   4. Laminated Silver Metallized Film: 90 percent.

E. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic plastic or water white, annealed crystal glass except as indicated.
   1. Plastic: Highly resistance to yellowing and other changes due to aging, exposure to heat and UV radiation.
   2. Lens Thickness: 0.125 inches, minimum.

2.02 LED & FLUORESCENT FIXTURES

A. Fixtures: Conform to UL 1570.

B. Ballasts: Conform to UL 935, "Fluorescent-Lamp Ballasts and LED Drivers."
   1. Certification: By Electrical Testing Laboratory (ETL).
   2. Type: Class P, high-power-factory type except as indicated otherwise.
   3. Sound Rating: A rating, except as indicated otherwise.
   4. Voltage: Match connected circuits.

C. Electronic Ballasts and Drivers: Solid-state, full-light-output, energy-saving type compatible with energy-saving lamps/boards. Conform to FCC Regulations Part 15, Subpart J. for electromagnetic interference. Conform to IEEE C62.41, "Guide for Surge Voltages in Low-Voltage AC Power Circuits," Category A, for resistance to voltage surges for normal and common modes.
   1. Minimum Power Factor: 90 percent.
   2. Minimum Operating Frequency: 20,000 Hz.
   3. Harmonic Content of Ballast Current: Less than 10 percent.

D. Electromagnetic Interference Filters: Integral to the fixture assembly. Provide one filter for each ballast. Suppress electromagnetic interference as required by MIL-STD-461, "Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference."

2.03 LAMPS

A. Conform to ANSI Standards, C78 series applicable to each type of lamp.

2.04 FINISH

A. Steel Parts: Manufacturer's standard finish applied over corrosion-resistant primer, free of streaks, runs, holidays, stains, blisters, and defects. Remove fixtures showing evidence of corrosion during project warranty period and replace with new fixtures.

B. Other Parts: Manufacturer's standard finish.

PART 3 EXECUTION

3.01 INSTALLATION

A. Setting and Securing: Set units plumb, square, and level with ceiling and walls, and secure according to manufacturer's printed instructions and approved shop drawings.

B. Support For Recessed and Semirecessed Fixtures: Install fixtures so they are supported independently from the suspended ceiling support system. Install fixture support rods or wires at a minimum of four rods or wires per fixture located not more than 6 inches from fixture corners.

1. Fixtures Smaller Than Ceiling Grid: Install a minimum of four (4) rods or wires for each fixture and locate at corner of the ceiling grid where the fixture is located. Do not support fixtures by ceiling acoustical panels.
2. Fixtures of Sizes Less Than Ceiling Grid: Center in the acoustical panel. Support fixtures independently with at least two (2) 3/4-inch metal channels spanning and secured to the ceiling tees.
3. Install support clips for recessed fixtures, securely fastened to ceiling grid members, at or near each fixture corners.

C. Lamping: Lamp units according to manufacturer's instructions. Fluorescent and LED lamp sources shall have minimum CRI of 82.

3.02 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Give advance notice of dates and times for field tests.

C. Provide instruments to make and record test results.

D. Tests: Verify normal operation of each fixture after fixtures have been installed and circuits have been energized with normal power source. Interrupt electrical energy to demonstrate proper operation of emergency lighting installation. Include the following in tests of emergency lighting equipment:

1. 1 ½ hour burn.

E. Replace or repair malfunctioning fixtures and components, then retest. Repeat procedure until all units operate properly.

3.03 ADJUSTING AND CLEANING

A. Clean fixtures upon completion of installation. Use methods and materials recommended by manufacturer.

B. Adjust aimable fixtures to provide required light intensities.

END OF SECTION

SECTION 26 61 00: GENERAL LIGHTING PROVISIONS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Fixtures

B. Controls

C. Lamps

D. Ballasts

E. Exterior Fixtures

F. Emergency Lighting

1.02 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 260500.

B. Submit shop drawings for luminaries showing pertinent physical characteristics and performance data.

C. Submit samples of luminaries prior to final production at Engineer's request on any proposed fixture substitution.

D. Provide a complete set of fixture information and include in O&M Manuals.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Provide fixtures as shown in the fixture schedule or approved equal.

2.02 FIXTURES

All LED fixtures shall have the following characteristics:

A. Minimum color rendering index (CRI) of 80

B. L70 of 50,000 or greater with minimum 5 year warranty to support lifetime claim

C. Passive cooling only for LED fixtures with less than 2000 lumens

D. Color Temperature within 4 SDCM or less (Standard Deviation Color Matching aka MacAdam Ellipse)

E. Remote Phosphor LEDs only where consistency of color over the life of the LED is critical

F. Driver lifetime of 50,000 hours or more, with minimum 5 year warranty to support lifetime claim

G. All light engines and drivers must be field-replaceable

H. Driver information must be available including brand, dimming options, and amperage rating

2.03 CONTROLS

A. Time switches shall be Tork, Intermatic, or Paragon of types and quantity shown on Drawings.

2.04 EMERGENCY EGRESS LIGHTING UNITS AND EXIT SIGNS

A. Provide fully automatic operation on power failure. Units shall have integral battery back-up for 1½ hours per NFPA. Units shall be connected unswitched to lighting circuits.

PART 3 EXECUTION

3.01 GENERAL

A. Furnish, locate, and install fixtures as indicated on Drawings.

3.02 INSTALLATION

A. Mount fixtures as called for in schedule on Drawings. Determine type of ceiling to be installed in each space and furnish fixtures suitable for exact type, including roof/floor or ceiling/floor fire rated design. Recessed fixtures shall be supported from building structure.

B. Lighting fixtures shall be structurally supported. Fluorescent fixtures mounted in the ceiling shall be attached to ceiling system as required by NEC 410-16(b). Surface mounted fixtures shall be supported from building structural system by rods or rods and clamps, or by fixture outlet box which in turn shall be supported by rods.

C. Receive, store, uncrate, and install light fixtures shown in schedule on drawings to be specified by others.

D. Adjust lighting fixtures to illuminate the intended area.

E. Wire recessed luminaries with Type THHN wire not smaller than No. 12.

F. Wire surface mounted luminaries with Type THHN wire not smaller than No. 12 from outlet boxes.

G. Locate no splice or tap within an arm or stem. Wire shall be continuous from splice in outlet box of building wiring system to lamp socket or ballast terminals.

END OF SECTION

SECTION 21 10 00: FIRE PROTECTION

PART 1 GENERAL

1.01 PROJECT SUMMARY

A. Work in this Section includes but is not necessarily limited to providing all engineering and associated costs, calculations, labor, materials, supervision, testing, permits and approvals required to design, install and obtain final acceptance of the automatic fire protection sprinkler system complete in all respects.

B. The fire protection system shall provide full and complete coverage of all areas and shall be compatible with the contract document layouts and avoid interference with work of all other trades in the building. Contractor shall provide offsets as needed to avoid other trades, including but not limited to mechanical ductwork, hydronic piping, structural elements and lighting.

C. Provide fire protection system complete with all component equipment and material items. Install and test in full conformity with the requirements of all applicable codes, National Fire Protection Association (NFPA) 13-2006 Edition.

1.02 DEFINITIONS

A. Working Plans: Documents, including shop drawings, calculations, and material specifications prepared according to NFPA 13 for obtaining approval from authorities having jurisdiction.

1.03 SYSTEM PERFORMANCE REQUIREMENTS

A. Sprinkler systems shall not be calculated to less than 5 psi or 10% below the actual water supply available, whichever is greater. Sprinkler plans and calculations must take into account and show elevation loss from the flow test location to the flowing sprinklers. Flow test information must be recent to within one (1) year previous to submittal of sprinkler drawings.

B. NFPA standards require that the spray deflector of the sprinkler heads be installed eighteen (18") inches minimum above the top of the shelves.

C. Sprinkler deflectors shall be positioned to avoid obstruction to both activation and discharge. Obstructions are (but are not limited to) lights, diffusers, duct-work, structural members (false or real), displayed signage or any object capable of impeding the proper activation and discharge of the fire sprinklers. Installation shall comply to the referenced NFPA 13 document (Chapter 4) and the manufacturers listing. The sprinkler contractor shall be responsible for final coordination.

D. All obstructions exceeding four (4') feet wide or which cannot be spaced around (to comply with 1.4.F) shall have sprinklers installed beneath the obstruction. If sprinklers are installed at or below 7'.6" they shall be equipped with a listed head guard.

E. All sprinkler heads in finished ceilings shall be symmetrically spaced to provide proper coverage, and to avoid interference with lights, diffusers, grilles, or other ceiling mounted equipment. The head layout shall conform to the typical pattern and centered in any ceiling tile or similar feature.

F. All overhead piping located in areas containing ceilings shall run concealed above the ceiling, without exception.

G. Consult the bid specification drawings for acceptable locations for all piping to be run exposed (areas without ceilings).

H. Inspector's tests to be provided with half-inch orifice, discharging at three (3") inches above a hard paved surface. Provide pressure relief valves at inspectors' test locations on all "grid" type systems. Al inspector's test shall not be located behind racking or other obstructions, and shall be located within eighteen (18") inches of an exterior door opening.

I. Provide flushing and drainage as per required in NFPA 13.

J. The calculations shall include all sprinklers within the most hydraulically demanding area along each branch line within the distance determined using a 1.2 multiplier (times the square feet of the area).

PART 2 PRODUCTS

2.01 GENERAL PARAMETERS

A. All materials submitted and installed shall be UL listed, individually or as any assembly to be installed in a fire protection system.

B. All materials shall be acceptable to all national and local applicable codes and standards.

2.02 SPRINKLER HEADS

A. No sprinklers to be installed are permitted to have a rubber O-ring seal. Only metallic "spring seal" or equivalent seals are allowed.

B. All sprinkler types and temperature ratings shall be as indicated on the drawings.

2.03 BRACKETS

A. Brackets for attaching pipe hangers to building structure shall be the size and type for the intended use, and acceptable to the structural engineer in accordance with NFPA 13.

2.04 SWITCHES

A. Provide all tamper and flow switches for indicating control valves and systems and as required by local ordinances.

2.05 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Specialty Valves and Devices:
      a. Grinnell Corp.
      b. Reliable Automatic Sprinkler Co., Inc.
      c. Viking Corp.

2. Water-Flow Indicators and Supervisory Switches:
    a. Grinnell Corp.
    b. Reliable Automatic Sprinkler Co., Inc.
    c. Viking Corp.
3. Sprinkler, Drain and Alarm Test Fittings:
    a. Central Sprinkler Corp.
    b. Grinnell Corp.
    c. Victaulic Co. of America
4. Sprinkler, Branch-line Test Fittings:
    a. Elkhart Brass Mfg. Co., Inc.
    b. Fire-End and Croker Corp.
    c. Smith Industries, Inc.; Potter-Roerner Div.
5. Sprinkler, Inspector's Test Fittings:
    a. Fire-End and Croker Corp.
    b. G/J Innovations, Inc.
    c. Triple R. Specialty of Ajax, Inc.
6. Fire Department Connections:
    a. Grinnell Corp.
    b. Guardian Fire Equipment, Inc.
    c. Reliable Automatic Sprinkler Co., Inc.
7. Sprinklers:
    a. Grinnell Corp.
    b. Reliable Automatic Sprinkler Co., Inc.
    c. Viking Corp.
8. Indicator Posts and Indicator-Post, Gate Valves:
    a. American Cast Iron Pipe Co.; Waterous Co.
    b. Grinnell Corp.
    c. Nibco, Inc.
9. Indicator Valves:
    a. Grinnell Corp.
    b. Nibco, Inc.
    c. Victaulic Co. of America
10. Fire Protection-Service Valves:
    a. Grinnell Corp.
    b. Nibco, Inc.
    c. Victaulic Co., of America
11. Grooved Couplings for Steel Pipe
    a. Grinnell Corp.
    b. National Fittings, Inc.
    c. Victaulic Co. of America

2.06 PIPE AND FITTINGS

A. Ductile-Iron Pipe: AWWA C151, push-on-joint type, with cement-mortar lining and seal coat according to AWWA C104. Include rubber gasket according to AWWA C111.

B. Ductile-Iron Pipe: AWWA C151, mechanical-joint type; with cement-mortar lining and seal coat according to AWWA C104. Include glad, rubber according to NFPA 1963 and matching local fire department sizes and threads, and bottom outlet with pipe threads. Include brass, lugged caps, gaskets, and brass chains; brass, lugged swivel connection and drop clapper for each hose-connection inlet; eighteen (18") inch (460-mm) high brass sleeve; and round, floor, brass, escutcheon plate with marking "AUTO SPKR."

1. Finish Including Sleeve: Polished chrome-plated.
2. Finish Including Sleeve: Rough chrome-plated.
3. Finish Including Sleeve: Polished brass.

C. Other Pipe: ASTM A795, Sch 40 Steel Pipe (or Sch 10 where allowed by NFPA 13).

2.07 PRESSURE GAUGES

A. Pressure Gauges: UL 393, 3 ½ to 4 ½ inch -)90 to 115 mm) diameter dial with dial range of 0 to 300 psig (0 to 1725 kPa).

PART 3 EXECUTION

3.01 INSTALLATION

A. Furnish and install under this Section all hangers and steel fabrications, other than building structure, required for proper support of piping and equipment.

3.02 IDENTIFICATION

A. Identify exposed or accessible piping with snap-on or strap-on type markers. Color or markers shall be red for all fire protection service. Indicate pipe contents and direction of flow on marker. Install markers on piping not more than 20 feet apart, at valves, at access panels and at least once above each space.

3.03 HANGER ATTACHMENTS

A. Support of pipes with diameter larger than 2 ½ inches may require modification of structural members to support increased loads. Suspend piping and equipment supported by building structure only by those methods, and only at those locations acceptable to the structural engineer.

B. Provide supplementary supporting steel fabrication to bridge between structural steel fabrication to bridge between structural members to receive the hanger. Attach supplementary members to building structure only by those methods, and at those locations acceptable to the structural engineer.

3.04 INSPECTION, TESTING, AND CLEANING

A. Arrange for all inspections, examinations and tests in full conformity with the requirements of all applicable codes, National Fire Protection Association (NFPA) standards and authority having jurisdiction necessary to obtain complete and final acceptance of the fire sprinkler system.

B. Leave entire sprinkler system clean in every respect at the conclusion of the work.

C. Testing will occur after installation of all systems has been completed (approximately two (2) to three (3) weeks prior to opening). The contractor shall be required to provide a lift, air, and water pumps for system pressurization, and any necessary hand tools and apparatus for complete testing and draining of the systems. One (1) test of all systems should be completed within one (1) day. If all or any systems fail, the contractor shall be responsible to be present and furnish all items listed above until such time that systems are found to be acceptable or in accordance with NFPA 13, 25, and the bid documents. The contractor is responsible for notifying the Owner when installation is complete and testing may begin. Please allow five (5) to ten (10) working days for scheduling.

D. The contractor shall furnish to the owner a complete set of signed and witnessed test certificates for the following:
   1. Interior wet system hydrostatic test(s).
   2. All system trip tests.

E. The Contractor shall train owner on use of all equipment and furnish two (2) copies to be left on site, of NFPA 25 the latest edition, and all apparatus manuals, please allow seven (7) days for scheduling.

3.05 WARRANTY

A. Provide warranty in accordance with the General Conditions for a period of at least one (1) year.

END OF SECTION

SECTION 22 04 01: PLUMBING FIXTURES

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Provide all labor, material, equipment, etc. required to complete fixture installation as specified herein and/or scheduled on the drawings.

B. Examine carefully architectural, equipment, electrical, and structural drawings and each division of this specification for items not a part of this plumbing section which may require plumbing connections. Unless explicitly indicated to the contrary, Contractor shall provide necessary supply, waste and vent lines, and make final connections to such items. It shall be Contractor's responsibility to locate supply, waste and vent lines, to such items in conformity with approved manufacturer's rough-in drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. General Provisions

B. Basic Materials and Methods

C. Pipe, Fittings, Joints

D. Piping Specialties

E. Supports and Anchors

F. Insulation

G. Plumbing

H. Plumbing Specialties

I. Plumbing Equipment and Domestic Water Heaters

J. Electrical Connections

PART 2 PRODUCTS

2.01 WATER CLOSET – FLUSH VALVE – see schedule on plans

2.02 WATER CLOSET – PRESSURE ASSISTED FLUSH TANK – see schedule on plans

2.03 LAVATORY – see schedule on plans

2.04 KITCHEN SINK - see schedule on plans

2.05 SHOWER/SHOWER HEAD - see schedule on plans

PART 3 EXECUTION

3.01 SUPPORTS

A. Support wall-hung fixtures: (1) from steel studs with steel plates secured to studs per detail, (2) from masonry with thru-bolts, and (3) from carriers where noted.

B. All fixtures designed for handicap use shall be mounted at handicap height as indicated by handicap code used in local area.

3.02 FIXTURE CONNECTIONS

A. Connect to plumbing fixtures and equipment provided under this and other sections of specifications.

B. See schedule on plans for connections sizes to fixtures.

C. Each fixture, floor drain, and piece of equipment requiring connection to drainage system to have separate traps installed as close to fixture as possible.

D. Provide deep seal P-traps under floor drains.

3.03 CLEANING AND TESTING

A. Test plumbing systems in accordance with test procedures and pressure as specified in Section for Plumbing Piping.

B. Clean and sterilize domestic water supply in accordance with test procedures as specified in Section for Plumbing Piping.

3.04 VALVES

A. Provide shut-off valves at all water connections to fixtures, equipment, etc. Provide ball valves for water supply entrance cut-off at each unit.

END OF SECTION

SECTION 22 05 00: GENERAL PROVISION FOR PLUMBING

PART 1 GENERAL

1.1 QUALITY ASSURANCE

A. Conform to the following:
   1. International Plumbing Code – 2012

1.2 STANDARDS

A. Comply with all pertinent standards.
   1. AWS: American Welding Society.
   2. ASME: American Society for Mechanical Engineers.
   3. MSS: Manufacturer's Standard Society.
   4. ASTM: American Society of Testing Materials.

1.3 SUBMITTALS

A. Submit under provisions of Division 01.
   1. Submit complete descriptions, specification data for material and equipment proposed. Clearly indicate proposed items when other items are shown on same sheet.
   2. Submittals in 3-ring binders shall include an index of contents and divider tabs.
   3. Shop Drawings:
      a. Plumbing Fixtures and Hardware
      b. Piping Systems
      c. Valves
      d. Insulation
      e. Pumps
      f. Water Heaters
      g. Plumbing Specialties

1.4 REGULATORY REQUIREMENTS

A. Perform Work specified in Division 22 in accordance with 2012 IPC and by the authority having jurisdiction.

1.5 PROJECT/SITE CONDITIONS

A. Layouts indicated on drawings are diagrammatical and intended to show relative positions and arrangement of equipment and piping. Coordinate plumbing work with other trades and measurements obtained at the job site, as applicable, prior to installation. Generally, install work in locations shown on Drawings, using as necessary, rises, drops, offsets, and alternate routings to fit in the available space unless prevented by Project conditions.

1.6 COMPLETENESS OF WORK

A. The Contract Documents depict plumbing systems which are intended to be complete and functioning systems. All products, materials, and labor necessary to render a fully functional system to fulfill the design intent shown on the documents shall be provided by the Contractor.

B. Model numbers referenced throughout the Division 22 Drawings and Specifications are intended to convey a general understanding of the type and quality of the product required. Where written descriptions differ from information conveyed by a model number, the written description shall govern. No extra shall be allowed because a model number is found to be incomplete or obsolete.

1.7 RECORD DRAWINGS

A. Provide record drawings that illustrate the work of Division 22 as finally constructed. Provide dimensions of material installed below slab/grade from fixed and visible reference points. Deliver record drawings to the architect in a form suitable for production.

B. Record drawings shall reflect all changes made to the Contract Documents, whether generated by addenda, change orders, or field conditions. Maintain a daily record of these changes and keep current set of drawings showing these changes.

C. Deliver record drawings to Architect within 30 days of Substantial Completion.

1.8 OWNER AND OPERATING MANUALS

A. Comply with the requirements of Division 01, but provide a minimum of three sets, in three ring binders, all sets identical.

B. Manuals shall include clear and comprehensive operating instructions with appropriate graphics and project specific marked data to enable owner to operate and maintain all systems specified in this Division.

C. Copies of approved submittals on furnished equipment shall be included.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 EXCAVATING AND BACKFILLING

A. Provide trenching, excavating, and backfilling necessary for performance of plumbing work in accordance with Division 02.

3.2 CUTTING AND PATCHING

A. Repair or replace damage caused by cutting or installation of work specified in Division 22.

B. Perform repairs with materials which match existing and install in accordance with the appropriate section of these specifications.

C. Correct unnecessary damage caused due to the installation of plumbing work.

3.3 FLASHING AND COUNTERFLASHING

A. Counter flash pipes where penetration of roofs and outside walls occur.

3.4 DELIVERY, STORAGE, AND PROTECTION

A. Insofar as possible, deliver items in manufacturer's original unopened packaging. Where deliver in original packaging is not practical, provide cover and shielding for all items with protective materials to keep them from being damaged. Use care in loading, transporting, unloading, and storing to keep items from being damaged.

B. Store items in a clean, dry place, and protect from damage. Mechanical equipment may not be staged or stored outdoors unless intended for outdoor use. Do not install damaged or wet insulation; remove from site.

C. Protect nameplates on motors, pumps, and similar equipment. Do not paint or insulate over nameplate data.

D. Protect valves and piping from damage. Cover equipment during work of finishing trades.

E. Keep dirt and debris out of pipes.

F. Repair, restore, and replace damaged items.

G. Cover factory finished equipment during work of finished trades, such plumbing fixtures and water heaters.

3.5 SLEEVES

A. Floors: Sleeve all pipe penetrations. Extend sleeve 1-1/2" above finished floor, except piping within pipe chases. Sleeve shall be flush with underside of floor.

B. Masonry or concrete walls: Sleeve all pipe penetrations. Sleeves shall be flush on both sides of wall.

C. Drywall partitions: Sleeve all penetration of piping in systems over 160 degree F.

D. Seal voids between outside surface of sleeve and wall, partition or floor. Seals shall be airtight.

E. Install piping, insulation and sleeves in strict accordance with applicable U.L. floor or partition assembly instructions. Coordinate with Division 07 firestop manufacturer's installation instructions.

F. Penetrations not sleeved or firestopped:

1. Seal voids between pipe and partition. Seals shall be airtight.

3.6 ESCUTCHEON PLATES

A. Provide chromium plates escutcheon plates for exposed uninsulated pipes projecting through floors or walls in "finished" spaces. Mechanical rooms, storerooms, electric closets, and janitor closets are not considered "finished" spaces.

B. Clearance between sleeve and pipe: Minimum of 1/2 inch for hot piping and 1 inch for cold piping or as otherwise dictated by U.L. Fire Resistance Directory.

3.7 TESTING

A. Test all installed equipment and systems and demonstrate proper operation. Correct and retest work found defective when tested.

B. Thoroughly check piping system for leaks. Do not add any leak-stop compounds to the system. Make repairs to piping system with new materials. Peening, doping, or caulking of joints or holes is not acceptable.

C. Test hot and cold domestic water piping systems upon completion of rough-in and before connection to fixtures at a water pressure of 125 psig for two hours without leaks.

D. Test drainage and venting system with necessary openings plugged to permit system to be filled with water and subjected to a minimum water pressure of 10 feet head at top of system. System to hold water for two hours without a water level drop greater than 4" in a 4" standpipe and without visible leakage. Test system in sections if minimum head can be maintained in each section.

E. Conduct air or smoke test if in opinion of Designer reasonable cause exists to suspect leakage or low quality workmanship.

F. Test flush valves for proper operation.

END OF SECTION

SECTION 22 07 19: PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

1.02 REFERENCES

A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

B. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus.

C. ASTM C 195 - Standard Specification for Mineral Fiber Thermal Insulating Cement.

D. ASTM C 449/C 449M - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.

E. ASTM C 547 - Standard Specification for Mineral Fiber Pipe Insulation.

F. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

G. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.

1.03 SUBMITTALS

A. See Administrative Requirements, for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 5 years of experience and approved by manufacturer.

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient conditions required by manufacturers of each product.0

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84.

2.02 GLASS FIBER

A. Insulation: ASTM C 547; rigid molded, noncombustible.

1. 'K' ('Ksi') value: ASTM C 177, 0.24 at 75 degrees F (0.035 at 24 degrees C).
2. Maximum service temperature: 850 degrees F (454 degrees C).
3. Maximum moisture absorption: 0.2 percent by volume.

B. Insulation: ASTM C 547; semi-rigid, noncombustible, end grain adhered to jacket.
1. 'K' ('Ksi') value: ASTM C 177, 0.24 at 75 degrees F (0.035 at 24 degrees C).
2. Maximum service temperature: 650 degrees F (343 degrees C).
3. Maximum moisture absorption: 0.2 percent by volume.

C. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E 96 of 0.02 perm-inches (0.029 ng/Pa s m).

D. Tie Wire: 0.048 inch (1.22 mm) stainless steel with twisted ends on maximum 12 inch (300 mm) centers.

E. Vapor Barrier Lap Adhesive:
1. Compatible with insulation.

F. Insulating Cement/Mastic:
1. ASTM C 195; hydraulic setting on mineral wool.

G. Indoor Vapor Barrier Finish:
1. Cloth: Untreated; 9 oz/sq yd (305 g/sq m) weight.
2. Vinyl emulsion type acrylic, compatible with insulation, white color.

H. Outdoor Vapor Barrier Mastic:
1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.

I. Insulating Cement:
1. ASTM C 449/C 449M.

2.03 JACKETS

A. PVC Plastic.
1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
a. Minimum Service Temperature: 0 degrees F (-18 degrees C).
b. Maximum Service Temperature: 150 degrees F (66 degrees C).
c. Moisture Vapor Permeability: 0.002 perm inch (0.00029 ng/Pa s sq m), maximum, when tested in accordance with ASTM E 96.
d. Thickness: 15 mil (0.38 mm).
e. Connections: Brush on welding adhesive.
2. Covering Adhesive Mastic:
a. Compatible with insulation.

B. Aluminum Jacket: ASTM B 209 (ASTM B 209M) formed aluminum sheet.
1. Thickness: 0.016 inch (0.40 mm) sheet.
2. Finish: Smooth.
3. Joining: Longitudinal slip joints and 2 inch (50 mm) laps.
4. Fittings: 0.016 inch (0.4 mm) thick die shaped fitting covers with factory attached protective liner.
5. Metal Jacket Bands: 3/8 inch (10 mm) wide; 0.015 inch (0.38 mm) thick aluminum.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

E. Glass fiber insulated pipes conveying fluids below ambient temperature:
   1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

F. For hot piping conveying fluids 140 degrees F (60 degrees C) or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

G. For hot piping conveying fluids over 140 degrees F (60 degrees C), insulate flanges and unions at equipment.

H. Glass fiber insulated pipes conveying fluids above ambient temperature:
   1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

I. Inserts and Shields:
   1. Application: Piping 1-1/2 inches (40 mm) diameter or larger.
   2. Shields: Steel between pipe hangers or pipe hanger rolls and inserts.
   3. Insert location: Between support shield and piping and under the finish jacket.
   4. Insert configuration: Minimum 6 inches (150 mm) long, of same thickness and contour as adjoining insulation; may be factory fabricated.
   5. Insert material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

J. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 078400.

K. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet (3 meters) above finished floor): Finish fiberglass insulation with PVC jacket and fitting covers.

L. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement.

Cover with aluminum jacket with seams located on bottom side of horizontal piping.

3.03 SCHEDULES

A. Plumbing Systems:
   1. Domestic Water Supply:
      a. Fiberglass Insulation:
         1) Pipe Size Range: All sizes.
         2) Thickness: 1 1/2 inch HW, 1 inch HWR, 1/2 in CW.

END OF SECTION

SECTION 22 10 05: PLUMBING PIPING

PART 1 GENERAL

1.01 REFERENCES

A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers (ANSI B16.18).

B. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers.

C. ASME B31.1 - Power Piping; The American Society of Mechanical Engineers (ANSI/ASME B31.1).

D. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

E. ASTM B 32 - Standard Specification for Solder Metal.

F. ASTM B 42 - Standard Specification for Seamless Copper Pipe, Standard Sizes.

G. ASTM B 88 - Standard Specification for Seamless Copper Water Tube.

H. AWS A5.8/A5.8M - Specification for Filler Metals for Brazing and Braze Welding; American Welding Society.

I. AWWA C651 - Disinfecting Water Mains; American Water Works Association; (ANSI/AWWA C651).

J. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.

K. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.

L. NFPA 54 - National Fuel Gas Code; National Fire Protection Association.

1.02 QUALITY ASSURANCE

A. Perform Work in accordance with local standards.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

1.03 REGULATORY REQUIREMENTS

A. Perform Work in accordance with plumbing code.

B. Conform to local requirements for installation of backflow prevention devices.

C. Provide certificate of compliance from authority having jurisdiction indicating approval of installation of backflow prevention devices.

1.04 DELIVERY, STORAGE, AND PROTECTION

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.01 SANITARY SEWER AND CONDENSATE PIPING, ABOVE GRADE

A. Sanitary Sewer - Cast Iron Pipe: CISPI 301, hubless svc. wt.
   1. Fittings: DWV Cast Iron.
   2. Joints: CISPI 310, neoprene caskets and stainless steel clamp-and-shield assemblies.

B. Condensate Piping - Copper Tube: ASTM B 88 (ASTM B 88M), Type L (B), Drawn (H).
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   2. Joints: ASTM B 32, alloy Sn95 solder.

2.02 WATER PIPING, ABOVE GRADE

A. Copper Tube: ASTM B 88 (ASTM B 88M), Type L (B), Drawn (H).
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   2. Joints: ASTM B 32, alloy Sn95 solder.

B. Pex Tube: ASTM F 877, SDR 9 tubing.
   1. Fittings: ASTM F 1807, metal-insert type with copper or stainless-steel crimp rings and matching PEX tube dimensions.

2.03 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 Inches and Under:
   1. Ferrous pipe: Class 150 malleable iron threaded unions.
   2. Copper tube and pipe: Class 150 bronze unions with soldered joints.

B. Flanges for Pipe Size Over 1 Inch (25 mm):
   1. Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
   2. Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.04 TRANSITION FITTINGS

General Requirements:

- Same size as pipes to be joined.
- Pressure rating at least equal to pipes to be joined.
- End connections compatible with pipes to be joined.
- Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

2.05 PIPE HANGERS AND SUPPORTS

A. Plumbing Piping - Drain, Waste, and Vent:
   1. Conform to ASME B31.9.
   2. Hangers for Pipe Sizes 1/2 Inch (15 mm) to 1-1/2 Inches (40 mm): Carbon steel, adjustable swivel, split ring.
   3. Hangers for Pipe Sizes 2 Inches (50 mm) and Over: Carbon steel, adjustable, clevis.
   4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
   5. Wall Support for Pipe Sizes to 3 Inches (80 mm): Cast iron hook.
   6. Wall Support for Pipe Sizes 4 Inches (100 mm) and Over: Welded steel bracket and wrought steel clamp.
   7. Vertical Support: Steel riser clamp.
   8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
   9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

B. Plumbing Piping - Water:
   1. Conform to ASME B31.9.
   2. Hangers for Pipe Sizes 1/2 Inch (15 mm) to 1-1/2 Inches (40 mm): Carbon steel, adjustable swivel, split ring.
   3. Hangers for Cold Pipe Sizes 2 Inches (50 mm) and Over: Carbon steel, adjustable, clevis.
   4. Hangers for Hot Pipe Sizes 2 Inches (50 mm) to 4 Inches (100 mm): Carbon steel, adjustable, clevis.
   5. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
   6. Multiple or Trapeze Hangers: Steel channels with welded supports or spacers and hanger rods.
   7. Wall Support for Pipe Sizes to 3 Inches (80 mm): Cast iron hook.
   8. Wall Support for Pipe Sizes 4 Inches (100 mm) and Over: Welded steel bracket and wrought steel clamp.
   9. Vertical Support: Steel riser clamp.
   10. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
   11. Floor Support for Hot Pipe Sizes to 4 Inches (100 mm): Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.

2.06 BALL VALVES

A. Construction, under 2 Inches (50 mm): MSS SP-110, Class 150, 400 psi (2760 kPa) CWP, bronze, two piece body, stainless steel brass ball, full port, teflon seats and stuffing box ring, blow-out proof stem, lever handle, threaded ends with union. Nibco TS 585 or approved equal.

2.07 BUTTERFLY VALVES

A. Construction 2 Inches (50 mm) and Larger: MSS SP-67, 150 psi CWP, cast or ductile iron body, aluminum bronze disc, resilient replaceable EPDM seat, grooved ends, extended neck, infinite position lever handle with memory stop. Nibco WD 3010 or approved equal.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.02 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom, conserve space, and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

H. Provide access where valves and fittings are not exposed.

I. Install vent piping penetrating roofed areas to maintain integrity of roof assembly.

J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

K. Provide support for utility meters in accordance with requirements of utility companies.

L. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.

M. Install bell and spigot pipe with bell end upstream.

N. Install valves with stems upright or horizontal, not inverted.

O. Pipe vents from gas pressure reducing valves to outdoors and terminate in weatherproof hood.

P. Install water piping to ASME B31.9.

Q. Sleeve pipes passing through partitions, walls and floors.

R. Inserts:
   1. Provide inserts for placement in concrete formwork.
   2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
   3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches (100 mm).
   4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
   5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

S. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.9.
   2. Support horizontal piping as scheduled.
   3. Install hangers to provide minimum 1/2 inch (15 mm) space between finished covering and adjacent work.
   4. Place hangers within 12 inches (300 mm) of each horizontal elbow.
   5. Use hangers with 1-1/2 inch (40 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   6. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
   7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
   8. Provide copper plated hangers and supports for copper piping.
   9. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
   10. Provide hangers adjacent to motor driven equipment with vibration isolation.

3.04 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.

B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C. Install gate, ball, or butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers.

D. Provide lug end butterfly valves adjacent to equipment when provided to isolate equipment.

E. Provide plug valves in natural gas systems for shut-off service.

F. Provide flow controls in water recirculating systems where indicated.

3.05 ERECTION TOLERANCES

A. Drainage Piping: Establish invert elevations within 1/2 inch (10 mm) vertically of location indicated and slope to drain at minimum of 1/8 inch per foot (1:100) slope.

B. Water Piping: Slope at minimum of 1/32 inch per foot (1:400) and arrange to drain at low points.

3.06 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Disinfect water distribution system.

B. Prior to starting work, verify system is complete, flushed and clean.

C. Ensure Ph of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

D. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.

E. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

F. Maintain disinfectant in system for 24 hours.

G. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

H. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

I. Take samples no sooner than 24 hours after flushing, from 5 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.07 SCHEDULES

A. Pipe Hanger Spacing:
   1. Metal Piping:
      a. Pipe size: 1/2 inches (15 mm) to 1-1/4 inches (32 mm):
         1) Maximum hanger spacing: 6.5 ft (2 m).
         2) Hanger rod diameter: 3/8 inches (9 mm).

      b. Pipe size: 1-1/2 inches (40 mm) to 2 inches (50 mm):
         1) Maximum hanger spacing: 10 ft (3 m).
         2) Hanger rod diameter: 3/8 inch (9 mm).

c. Pipe size: 2-1/2 inches (65 mm) to 3 inches (75 mm):
    1) Maximum hanger spacing: 10 ft (3 m).
    2) Hanger rod diameter: 1/2 inch (13 mm).

d. Pipe size: 3 inches (75 mm) to 4 inches (100 mm):
    1) Maximum hanger spacing: 12 ft (3.5 m).
    2) Hanger rod diameter: 1/2 inch (13 mm).

END OF SECTION

SECTION 22 11 19: DOMESTIC WATER PIPING SPECIALTIES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Temperature-actuated, water mixing valves.
   2. Water-hammer arresters.
   3. Air vents.
   4. Flexible connectors.

1.02 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For domestic water piping specialties.
   1. Include diagrams for power, signal, and control wiring.

1.03 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

A. Potable-water piping and components shall comply with NSF 61 Annex G and NSF 14. Mark "NSF-pw" on plastic piping components.

2.02 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.03 TEMPERATURE-ACTUATED, WATER MIXING VALVES

A. Water-Temperature Limiting Devices:
1. Standard: ASSE 1017.
2. Pressure Rating: 125 psig (860 kPa).
3. Type: Thermostatically controlled, water mixing valve.
4. Material: Bronze body with corrosion-resistant interior components.
   5. Connections: Threaded inlets and outlet.

   6. Accessories: Check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.

B. Primary, Thermostatic, Water Mixing Valves:
   1. Standard: ASSE 1017.
   2. Pressure Rating: 125 psig (860 kPa)minimum unless otherwise indicated.
   3. Type: Exposed-mounted, thermostatically controlled, water mixing valve.
   4. Material: Bronze body with corrosion-resistant interior components.
   5. Connections: Threaded inlets and outlet.
   6. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle

2.04 WATER-HAMMER ARRESTERS

C. Water-Hammer Arresters:
   1. Standard: ASSE 1010 or PDI-WH 201.
   2. Type: Metal bellows.
   3. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

2.05 AIR VENTS

D. Bolted-Construction Automatic Air Vents:
   1. Body: Bronze.
   2. Pressure Rating and Temperature: 125-psig (860-kPa) minimum pressure rating at 140 deg F (60 deg C).
   3. Float: Replaceable, corrosion-resistant metal.
   4. Mechanism and Seat: Stainless steel.
   5. Size: NPS 3/8 (DN 10) minimum inlet.
   6. Inlet and Vent Outlet End Connections: Threaded.

E. Welded-Construction Automatic Air Vents:
   1. Body: Stainless steel.
   2. Pressure Rating: 150-psig (1035-kPa) minimum pressure rating.
   3. Float: Replaceable, corrosion-resistant metal.
   4. Mechanism and Seat: Stainless steel.
   5. Size: NPS 3/8 (DN 10) minimum inlet.
   6. Inlet and Vent Outlet End Connections: Threaded.

2.06 FLEXIBLE CONNECTORS

A. Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.
   1. Working-Pressure Rating: Minimum 200 psig (1380 kPa).
   2. End Connections NPS 2 (DN 50) and Smaller: Threaded copper pipe or plain-end copper tube.
   3. End Connections NPS 2-1/2 (DN 65) and Larger: Flanged copper alloy.

B. Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.

   1. Working-Pressure Rating: Minimum 200 psig (1380 kPa).

2. End Connections NPS 2 (DN 50) and Smaller: Threaded steel-pipe nipple.
3. End Connections NPS 2-1/2 (DN 65) and Larger: Flanged steel nipple.

PART 3 EXECUTION

3.01INSTALLATION

A. Install temperature-actuated, water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet.

B. Install water-hammer arresters in water piping according to PDI-WH 201.

C. Install air vents at high points of water piping.

3.02 CONNECTIONS

A. Comply with requirements for ground equipment in Section 260526 "Grounding and Bonding for Electrical Systems."

B. Fire-retardant-treated-wood blocking is specified in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for electrical connections.

3.03 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:
Test each pressure vacuum breaker and reduced-pressure-principle backflow preventer according to authorities having jurisdiction and the device's reference standard.

B. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.04 ADJUSTING

A. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

END OF SECTION

SECTION 23 05 93: TESTING, ADJUSTING, AND BALANCING FOR HVAC

GENERAL

1.01 SERVICES

A. The balancing agency shall inspect the installation of the piping systems and the temperature controls.

B. Perform test and balance in accordance with AABC or NEBB Standards.

C. The TAB Contractor shall work with the Control Contractor to assist in calibrating all water flow stations and pipe mounted differential pressure sensors.

D. The Contractor shall provide Test and Balance Agency with copy of plans and specifications of Construction Documents. The Contractor shall correct prompt deficiencies of materials and workmanship identified as delaying the completion of the TAB work. The Contractor shall be responsible for any additional costs to the Owner resulting from his failure to have the HVAC systems and Building ready or from his failure to correct deficiencies promptly.

PRODUCTS (Not Applicable)

Part 3 - EXECUTION

3.01 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.

B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine equipment performance data including pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance.

To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

G. Examine test reports specified in individual system and equipment Sections.

H. Examine HVAC equipment and verify that bearings are greased and equipment with functioning controls is ready for operation.

I. Examine operating safety interlocks and controls on HVAC equipment.

J. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.02 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures for balancing the systems. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:

1. Airside:
   a. Duct systems are complete with terminals installed.
   b. Volume and fire dampers are open and functional.
   c. Fans are operating, free of vibration, and rotating in correct direction.

3.03 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.

B. Mark equipment and balancing devices, valve position indicators, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

C. Take and report testing and balancing measurements in inch-pound (IP) units.

3.04 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

D. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

F. Verify that motor starters are equipped with properly sized thermal protection.

G. Check dampers for proper position to achieve desired airflow path.

H. Check for airflow blockages.

I. Check for proper sealing of air-handling-unit components.

J. Verify that air duct system is sealed as specified in Section 233113.

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.
    a. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
    b. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.

2. Measure fan static pressures as follows:
    a. Measure static pressure directly at the fan outlet or through the flexible connection.
    b. Measure static pressure directly at the fan inlet or through the flexible connection.

3. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.

4. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.
    a. Measure airflow of submain and branch ducts.
    b. Adjust submain and branch duct volume dampers for specified airflow.

c. Re-measure each submain and branch duct after all have been adjusted.

C. Adjust air inlets for each space to indicated airflows.
   a. Measure inlets airflow.
   b. Adjust each inlet for specified airflow.
   c. Re-measure each inlet after they have been adjusted.

D. Verify final system conditions.
   a. Re-measure and confirm that total airflow is within design.
   b. Re-measure all final fan operating data, rpms, volts, amps, and static profile.
   c. Mark all final settings.
   d. Measure and record all operating data.
   e. Record final fan-performance data.

3.06 TOLERANCES

A. Set HVAC system's air flow rates within the following tolerances:

   1. Exhaust Air Flow Rate: Plus or minus 5 percent.

3.07 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

   1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
   2. Include a list of instruments used for procedures, along with proof of calibration.
   3. Certify validity and accuracy of field data.

B. Final Report Contents: In addition to certified field-report data, include the following:
   1. Manufacturers' test data.
      a. Field test reports prepared by system and equipment installers.
      b. Other information relative to equipment performance; do not include Shop Drawings and Product Data.

C. General Report Data: In addition to form titles and entries, include the following data:
      a. Title page.
      b. Name and address of the TAB specialist.
      c. Project name.
      d. Project location.
      e. Engineer's name and address.
      f. Contractor's name and address.
      g. Report date.
      h. Signature of TAB supervisor who certifies the report.

i. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
j. Summary of contents including the following:
    1. Indicated versus final performance.
    2. Notable characteristics of systems.
    3. Description of system operation sequence if it varies from the Contract Documents.
    4. Nomenclature sheets for each item of equipment.
    5. Notes to explain why certain final data in the body of reports vary from indicated values.
    6. Data for terminal units, including manufacturer's name, type, size, and fittings.
k. Notes to explain why certain final data in the body of reports vary from indicated values.

D. Fan Reports:

1. Unit Data:

- System and unit identification.
- Location and zone.
- Apparatus used for test.
- Area served.
- Make.
- Number from system diagram.
- Type and model number.
- Size.
- Effective area in sq. ft.

2. Test Data (Indicated and Actual Values):

- Airflow rate in cfm.
- Air velocity in fpm.
- Preliminary airflow rate as needed in cfm.
- Preliminary velocity as needed in fpm.
- Final airflow rate in cfm.
- Final velocity in fpm.
- Space temperature in deg F.

3.08 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

END OF SECTION 23 05 93

SECTION 23 31 13: SHEET METAL DUCTWORK

PART 1 GENERAL

1.01 DUCTWORK

A. Low pressure ductwork refers to systems operating at 2.0" w.g. total static pressure with velocities up to 2000 FPM.

B. Provide and/or construct all materials, ductwork, joints, transitions, dampers, access doors, etc., as set forth in these specifications necessary to install the low pressure sheet metal ductwork required by the Mechanical Drawings.

C. Seal all duct openings with plastic during construction. Protect the return/negative pressure side of ductwork system throughout the entire construction period.

1.02 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with the latest edition of SMACNA "HVAC Duct Construction Standards," (Metal and Flexible) and performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA "HVAC Duct Construction Standards" (Metal and Flexible).

PART 2 PRODUCTS

2.01 RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA "HVAC Duct Construction Standards" (Metal and Flexible) based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.02 ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

   1. Manufacturer: Eastern Sheet Metal, SEMCO, or United Sheet Metal.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

   1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows shall be smooth radius with a centerline radius of 1.5 times the duct diameter.

E. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," "90 Degree Tees and Laterals," and "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.03 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.04 JOINT SEALER

A. Manufacturer by Hardcast Iron Grip, Polymer #11 or United McGill Corp. Provide two Stage Sealant Process.

   Stage 1: Apply fiber DT tape.
   Stage 2: Brush on RTA-50 sealant over fiber tape.

2.05 GASKETS AND SEALS

A. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

B. Round Duct Joint O-Ring Seals:
   1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for10-inch wg static-pressure class, positive or negative.

   2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.

   3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

PART 3 EXECUTION

3.01 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Seal all low pressure transverse and longitudinal joints with approved sealer in accordance with manufacturer's recommendation instructions.

D. Install round ducts in maximum practical lengths.

E. Install ducts with fewest possible joints.

F. Protect duct interiors from moisture, construction debris and dust, and other foreign materials.

3.02 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

3.03 CONNECTIONS

A. Make connections to equipment with flexible connectors.

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.04 START UP

A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.05 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:

B. Exhaust Ducts - Low Pressure
   1. Ducts Connected Upstream from Exhaust Fans:
      a. Pressure Class: Negative 2-inch wg.

END OF SECTION

SECTION 23 33 00: AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Backdraft dampers.

B. Duct access doors.

C. Duct test holes.

D. Fire dampers.

E. Flexible duct connections.

F. Volume control dampers.

1.02 REFERENCES

A. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems; National Fire Protection Association.

B. NFPA 92A - Standard on Smoke-Control Systems; National Fire Protection Association.

C. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association.

D. UL 33 - Heat Responsive Links for Fire-Protection Service; Underwriters Laboratories Inc.

E. UL 555 - Standard for Fire Dampers; Underwriters Laboratories Inc.

F. UL 555S - Standard for Leakage Rated Dampers for Use in Smoke Control Systems; Underwriters Laboratories Inc.

1.03 SUBMITTALS

A. Product Data: Provide for shop fabricated assemblies including volume control dampers, duct access doors, duct test holes, and hardware used. Include electrical characteristics and connection requirements.

1.04 PROJECT RECORD DOCUMENTS

A. Record actual locations of access doors, test holes, and all dampers.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect dampers from damage to operating linkages and blades.

1.07 EXTRA MATERIALS

A. Provide two of each size and type of fusible link.

PART 2 PRODUCTS

2.01 BACKDRAFT DAMPERS

A. Gravity Backdraft Dampers, Size 18 x 18 inches (450 x 450 mm) or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.

2.02 DUCT ACCESS DOORS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Access doors with sheet metal screw fasteners are not acceptable.

2.03 DUCT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

2.04 FIRE DAMPERS

A. Fabricate in accordance with NFPA 90A and UL 555, and as indicated.

B. Ceiling Dampers: Galvanized steel, 22 gage (0.76 mm) frame and 16 gage (1.5 mm) flap, two layers 0.125 inch (3.2 mm) ceramic fiber on top side with locking clip.

C. Horizontal Dampers: Galvanized steel, 22 gage (0.76 mm) frame, stainless steel closure spring, and lightweight, heat retardant non-asbestos fabric blanket.

D. Fusible Links: UL 33, separate at 160 degrees F (71 degrees C) with adjustable link straps for combination fire/balancing dampers.

2.05 FLEXIBLE DUCT CONNECTIONS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Flexible Duct Connections: Fabric crimped into metal edging strip.

1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd (1.0 kg/sq m).
    a. Net Fabric Width: Approximately 2 inches (50 mm).

2. Metal: 3 inches (75 mm) wide, 24 gage (0.6 mm) thick galvanized steel.

C. Leaded Vinyl Sheet: Minimum 0.55 inch (14 mm) thick, 0.87 lbs per sq ft (4.2 kg/sq m), 10 dB attenuation in 10 to 10,000 Hz range.

2.06 VOLUME CONTROL DAMPERS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch (150 x 760 mm).

C. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inch (200 x 1825 mm). Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

D. End Bearings: Except in round ducts 12 inches (300 mm) and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.

E. Quadrants:
1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
3. Where rod lengths exceed 30 inches (750 mm) provide regulator at both ends.

PART 3 EXECUTION

3.01 PREPARATION

A. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 233100 for duct construction and pressure class.

B. Provide back draft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide for cleaning kitchen exhaust ducts in accordance with NFPA 96. Provide minimum 8 x 8 inch (200 x 200 mm) size for hand access, 18 x 18 inch (450 x 450 mm) size for shoulder access, and as indicated. Provide 4 x 4 inch (100 x 100 mm) for balancing dampers only. Review locations prior to fabrication.

D. Provide duct test holes where indicated and required for testing and balancing purposes.

E. Provide fire dampers at locations indicated, where ducts and outlets pass through fire rated components, and where required by authorities having jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.

F. Demonstrate re-setting of fire dampers to Owner's representative.

G. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.

H. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.

I. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.

J. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

SECTION 23 34 23: HVAC EXHAUST FANS

Part 1 General

1.01 GENERAL QUALITY ASSURANCE

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. AMCA Compliance: Fans shall have AMCA-Certified performance ratings and shall bear the AMCA-Certified Ratings Seal.

Part 2 PRODUCTS

2.01 CENTRIFUGAL ROOF VENTILATORS

A. Twin City, Greenheck, Cook or approved equal.

B. Housing: Removable, All aluminum housing roof mounted, belt driven, down blast centrifugal exhaust fan; square, one-piece, aluminum base with venturi inlet cone.

1. Hinged Subbase: Galvanized-steel hinged arrangement permitting service and maintenance.

C. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.

D. Belt Drives:
1. Resiliently mounted to housing.
2. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
3. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
4. Pulleys: Cast-iron, adjustable-pitch motor pulley.
5. Fan and motor isolated from exhaust airstream.

E. Accessories:
1. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted outside fan housing, factory wired through an internal aluminum conduit.
2. Bird Screens: Removable, 1/2-inch , aluminum or brass wire.
3. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.
4. Motorized Dampers: Parallel-blade dampers mounted in curb base with electric actuator; wired to close when fan stops.

F. Roof Curbs: Galvanized steel; mitered and welded corners; 1-1/2-inch thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to suit roof opening and fan base.

1. Configuration: Built-in raised cant and mounting flange.
2. Overall Height: 12 inches.
3. Pitch Mounting: Manufacture curb for roof slope.
4. Metal Liner: Galvanized steel.

2.02 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Motor Requirements for HVAC Equipment."

   1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

B. Enclosure Type: Totally enclosed, fan cooled.

Part 3 Execution

EXECUTION INSTALLATION

A. Install fans in accordance with manufacturer's published instructions.

B. Secure roof hoods and centrifugal roof mounted fans to curbs with stainless steel screws.

C. Connect ducts to fans to allow for straight and smooth airflow.

D. Provide flexible connections between fans and ducts.

E. Install fans level.

F. Check fan alignment and balance. Correct improperly aligned or vibrating fans.

G. Final installation to be free of leaks.

H. Ensure fans are interlocked with appropriate systems and/or controls.

END OF SECTION

SECTION 23 37 00: AIR OUTLETS AND INLETS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Registers/grilles.

1.02 REFERENCES

A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; Air Movement and Control Association International, Inc.

B. ASHRAE Std 70 - Method of Testing for Rating the Performance of Air Outlets and Inlets; American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.

1.03 SUBMITTALS

A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

B. Project Record Documents: Record actual locations of air outlets and inlets.

1.04 QUALITY ASSURANCE

A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.

B. Test and rate louver performance in accordance with AMCA 500-L.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of experience.

PART 2 PRODUCTS

2.01 CEILING EXHAUST AND RETURN REGISTERS/GRILLES – See Drawings.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

C. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

E. Paint ductwork visible behind air outlets and inlets matte black.

END OF SECTION

SECTION 23 81 13: PACKAGED TERMINAL AIR-CONDITIONERS, THROUGH-WALL UNITS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes packaged, terminal, through-the-wall air conditioners.

1.02 SUBMITTALS

A. Shop Drawings: For packaged, terminal air conditioners.
   1. Include plans, elevations, sections, details for wall penetrations, and attachments to other work.
   2. Include details of equipment 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.

1.03 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of packaged, terminal air conditioners that fail in materials or workmanship within specified warranty period.

   1. Warranty Period for Sealed Refrigeration System: Manufacturer's standard, but not less than five years from date of Substantial Completion, including components and labor.
   2. Warranty Period for Nonsealed System Parts: Manufacturer's standard, but not less than five years from date of Substantial Completion, including only components and excluding labor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide equipment by manufacturer specified in plans, or by an approved equal manufacturer. Alternative equipment by another manufacturer must still be approved prior to purchase.
   1. Equal manufacturers:
      a. Trane
      b. Friedrich
      c. LG
      d. Amana
      e. General Electric

2.02 MANUFACTURED UNITS

A. Description: Factory-assembled and -tested, self-contained, packaged, terminal air conditioner with room cabinet, electric refrigeration system, heating, and temperature controls; fully charged with refrigerant and filled with oil; with cord-connected chassis.

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. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1 Ventilation for Acceptable Indoor Air Quality and ASHRAE 170-2013 Ventilation of Health Care Facilities

D. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1.

2.03 CHASSIS

A. Cabinet: 18 gauge thick powder-coated steel with removable front panel with concealed latches. Retain "Mounting," "Top," and "Discharge Grille" subparagraphs below if units are not scheduled on Drawings.
   1. Mounting: Wall with wall sleeve.
   2. Top: Angled.
   3. Discharge Grille: Reversible-polycarbonate discharge grille allowing upward and horizontal airflow, tamperproof, and carrying a flame test rating in accordance with UL standard 494.
   4. Louvers: Extruded aluminum with enamel finish; color chosen by architect.
   5. Finish: Baked enamel.
   6. Finish of Interior Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
   7. Subbase: Enameled steel with adjustable leveling feet and adjustable end plates.
   8. Wall Sleeves: Galvanized steel with powder-coated paint.

B. Refrigeration System: Direct-expansion indoor coil with capillary restrictor and hermetically sealed scroll compressor with vibration isolation and overload protection.
   1. Indoor and Outdoor Coils: Seamless copper tubes mechanically expanded into aluminum fins with capillary tube distributor on indoor coil.
   2. Accumulator.
   3. Constant-pressure expansion valve.
   4. Reversing valve.
   5. Charge: R-410A.

C. Indoor Fan: Forward curved, centrifugal; with motor and positive-pressure ventilation damper with concealed manual operator.

D. Filters: Washable polyurethane in molded plastic frame.

E. Condensate Drain: Drain pan to direct condensate to outdoor coil for re-evaporation and piping to direct condensate to building waste and vent piping.

F. Outdoor Fan: Forward curved, centrifugal or propeller type with separate motor.

   1. Indoor and Outdoor Fan Motors: Two speed; comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
      a. Fan Motors: Permanently lubricated split capacitor.
      b. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
      c. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.

2.04 HEATING

A. Heat Pump: Heat Pump operation with refrigerant reversing valve.

B. Emergency Heat Electric-Resistance Heating Coil: Nickel-chromium-wire, electric-resistance heating elements with contactor and high-temperature-limit switch.

2.05 CONTROLS

A. Remote Control: Standard unit-mounted controls with remote-mounted, low-voltage, adjustable thermostat with touchpad temperature control and with touchpad for heating, cooling, and fan operation. Include the following features:

1. Low-Ambient Lockout Control: Prevents cooling-cycle operation below 40 deg F (5 deg C) outdoor air temperature.
2. Heat-Pump Ambient Control: Field-adjustable switch changes to heat-pump heating operation above 40 deg F (5 deg C) and to supplemental heating below plus 25 deg F (minus 4 deg C).
3. Temperature-Limit Control: Prevents occupant from exceeding preset setback or setup temperature.
4. Reverse-Cycle Defrost: Solid-state sensor monitors frost buildup on outdoor coil and reverses unit to melt frost.

B. Outdoor Air: Manual intake damper.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install units' level and plumb, maintaining manufacturer's recommended clearances and tolerances.

B. Install wall sleeves in finished wall assembly; seal and weatherproof. Joint-sealant materials and applications are specified in Section 079200 "Joint Sealants."

C. Install and anchor wall sleeves to withstand, without damage to equipment and structure, seismic forces required by building code.

3.02 FIELD QUALITY CONTROL

A. Tests and Inspections:
1. Inspect for and remove shipping bolts, blocks, and tie-down straps.
2. After installing packaged, terminal air conditioners and after electrical circuitry has been energized, test for compliance with requirements.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Packaged, terminal air conditioners will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION

General Information about the Supplier	
Sign Your Name to the Right of the Arrow → By signing, you indicate you read and agree to "KCDC's General Instructions to Suppliers" on **www.kcdc.org**.	
Printed Name and Title →	
Company Name →	
Street Address →	
City/State/Zip →	
Contact Person (Please Print Clearly) →	
Telephone Number →	
Cell Number →	
Supplier's E-Mail Address (Please Print Clearly) →	

Addenda
Addenda are at www.kcdc.org. Click on "Procurement" and then on "Open Solicitations" to find addenda. Please check for addenda prior to submitting a proposal.
Acknowledge addenda have been issued by checking below as appropriate:

None ☐	**Addendum 1 ☐**	**Addendum 2 ☐**	**Addendum 3 ☐**	**Addendum 4 ☐**	**Addendum 5 ☐**

Statistical Information (Check all the apply)	
This business is at least 51% owned and operated by a woman	**Yes ☐ No ☐**
This business qualifies as a small business by the State of Tennessee *Total gross receipts of not more than $10,000,000 average over a three-year period* ***OR*** *employs no more than 99 persons on a full-time basis*	**Yes ☐ No ☐**
This business qualifies as a Section 3 business by defined herein	**Yes ☐ No ☐**

This business is owned & operated by persons at least 51% of the following ethnic background:					
Asian/Pacific ☐	**Black ☐**	**Hasidic Jew ☐**	**Hispanic ☐**	**Native Americans ☐**	**White ☐**

Prompt Payment Discount
A prompt payment discount of _____% is offered for payment within ____ days of submission of an accurate and proper invoice.

Insurance
I have reviewed the insurance requirements and will comply with them without exception. Yes ☐ No ☐

Pursuant to and in compliance with the solicitation documents, the supplier signing Solicitation Document A, having thoroughly examined the work to be performed, agrees to perform the work for the following total bid amount for the above referenced project. The prices quoted cover all of the supplier's expenses including, but not limited to, overhead, profit, insurance, subcontractors, supplies and bonding.

Complete all "blanks"-even if the amount is $0.00

Cost Information	
Total Project Cost for Alterations at Love Towers	**$**

Deduct Alternates	
Alternate No. 1: No new vanities	-$
Alternate No. 2: No new generator	-$

Unit Prices – Guy B. Love Towers		
Description	**Cost**	**Unit of Measure**
Unit Price No. 1: Caulking of exterior concrete joints OTHER than locations shown in drawings to be included in the base bid.	$	Linear foot

Supplier: _____

Conflict of Interest:

1. No commissioner or officer of KCDC or other person whose duty it is to vote for, let out, overlook or in any manner superintend any of the work for KCDC has a direct interest in the award or the supplier providing goods or services.

2. No employee, officer or agent of the grantee or sub-grantee will participate in selection, or in the award or administration of an award supported by Federal funds if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when the employee, officer or agent, any member of his immediate family, his or her partner, or an organization, which employs, or is about to employ, any of the above, has a financial or other interest in the supplier selected for award.

3. The grantee's or sub-grantee's officers, employees or agents will neither solicit nor accept gratuities, favors or anything of monetary value from suppliers, potential suppliers, or parties to sub-agreements.

4. By submission of this form, the supplier is certifying that no conflicts of interest exist.

Drug Free Workplace Requirements:

5. Private employers with five or more employees desiring to contract for construction services attest that they have a drug free workplace program in effect in accordance with TCA 50-9-112.

Eligibility:

6. The supplier is eligible for employment on public contracts because no convictions or guilty pleas or pleas of nolo contender to violations of the Sherman Anti-Trust Act, mail fraud or state criminal violations with an award from the State of Tennessee or any political subdivision thereof have occurred.

General:

7. Supplier fully understands the preparation and contents of the attached offer and of all pertinent circumstances respecting such offer.

8. Such offer is genuine and is not a sham offer.

Iran Divestment Act:

9. Concerning the Iran Divestment Act (TCA 12-12-101 et seq.), by submission of this bid/quote/quotes, each supplier and each person signing on behalf of any supplier certifies, and in the case of a joint bid/quote/quotes, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each supplier is not on the list created pursuant to § 12-12-106.

Supplier: _____

Non-Collusion:

10. Neither the said supplier nor any of its officers, partners, KCDC, agents, representatives, employees or parties interest, including this affiant, has in any way colluded conspired, connived or agreed, directly or indirectly, with any other responder, supplier, or person to submit a collusive or sham offer in connection with the award or agreement for which the attached offer has been submitted or to refrain from making an offer in connection with such award or agreement, or collusion or communication or conference with any other supplier, or, to fix any overhead, profit, or cost element of the offer price or the offer price of any other supplier, or to secure through any collusion, conspiracy, connivance, or unlawful agreement any advantage against KCDC or any person interested in the proposed award or agreement.

11. The price or prices quoted in the attached offer are fair, proper and not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the supplier or any of its agents, representatives, KCDC, employees, or parties in interest, including this affiant.

Accuracy of Electronic Copies:

12. If the supplier provides electronic copies of the bid/proposal/quote to KCDC, the supplier certifies that the information provided on paper and in the electronic format is identical unless specifically noted otherwise.

No Contact/No Advocacy Affidavit

13. After this solicitation is issued, any contact initiated by any supplier or proposer with any owner's representative concerning this proposal is strictly prohibited-except for communication with the Procurement Division. My signature signifies that no unauthorized contact occurred.

14. To ensure the integrity of the review and evaluation process, respondents to this solicitation nor any firm representing them, may not lobby or advocate to owner's staff or Board members. My signature signifies that no unauthorized advocacy occurred.

The undersigned hereby acknowledges receipt of these affidavits and certifies that the submittal in response to this solicitation is in full compliance with the listed requirements.

Signed by	
Printed Name	
Title	
Subscribed and sworn to before me this date	
By (Notary Public)	
My Commission Expires on	
Notary Stamp	

Representations, Certifications, and Other Statements of Bidders

Public and Indian Housing Programs

Table of Contents

1. Certificate of Independent Price Determination

(a) The bidder certifies that--

(1) The prices in this bid have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other bidder or competitor relating to (i) those prices, (ii) the intention to submit a bid, or (iii) the methods or factors used to calculate the prices offered;

(2) The prices in this bid have not been and will not be knowingly disclosed by the bidder, directly or indirectly, to any other bidder or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a competitive proposal solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the bidder to induce any other concern to submit or not to submit a bid for the purpose of restricting competition.

(b) Each signature on the bid is considered to be a certification by the signatory that the signatory--

(1) Is the person in the bidder's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(l) through (a)(3) above; or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(l) through (a)(3) above.

_____ *[insert full name of person(s) in the bidder's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the bidder's organization];*

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the bidder deletes or modifies subparagraph (a)2 above, the bidder must furnish with its bid a signed statement setting forth in detail the circumstances of the disclosure.

☒ [Contracting Officer check if following paragraph is applicable]

(d) Non-collusive affidavit. (applicable to contracts for construction and equipment exceeding $50,000) ● in Solicitation Document B attached

(1) Each bidder shall execute, in the form provided by the PHA/IHA, an affidavit to the effect that he/she has not colluded with any other person, firm or corporation in regard to any bid submitted in response to this solicitation. If the successful bidder did not submit the affidavit with his/her bid, he/she must submit it within three (3) working days of bid opening. Failure to submit the affidavit by that date may render the bid nonresponsive. No contract award will be made without a properly executed affidavit.

(2) A fully executed "Non-collusive Affidavit" [ ] is, [ ] is not included with the bid.

2. Contingent Fee Representation and Agreement

(a) Definitions. As used in this provision:

"Bona fide employee" means a person, employed by a bidder and subject to the bidder's supervision and control as to time, place, and manner of performance, who neither exerts, nor proposes to exert improper influence to solicit or obtain contracts nor holds out as being able to obtain any contract(s) through improper influence.

"Improper influence" means any influence that induces or tends to induce a PHA/IHA employee or officer to give consideration or to act regarding a PHA/IHA contract on any basis other than the merits of the matter.

(b) The bidder represents and certifies as part of its bid that, except for full-time bona fide employees working solely for the bidder, the bidder:

(1) [ ] has, [ ] has not employed or retained any person or company to solicit or obtain this contract; and

(2) [ ] has, [ ] has not paid or agreed to pay to any person or compan employed or retained to solicit or obtain this contract any commission, percentage, brokerage, or other fee contingent upon or resulting from the award of this contract.

(c) If the answer to either (a)(1) or (a)(2) above is affirmative, the bidder shall make an immediate and full written disclosure to the PHA/IHA Contracting Officer.

(d) Any misrepresentation by the bidder shall give the PHA/IHA the right to (1) terminate the contract; (2) at its discretion, deduct from contract payments the amount of any commission, percentage, brokerage, or other contingent fee; or (3) take other remedy pursuant to the contract.

3. Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions (applicable to contracts exceeding $100,000)

(a) The definitions and prohibitions contained in Section 1352 of title 31, United States Code, are hereby incorporated by reference in paragraph (b) of this certification.

(b) The bidder, by signing its bid, hereby certifies to the best of his or her knowledge and belief as of December 23, 1989 that:

(1) No Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with the awarding of a contract resulting from this solicitation;

(2) If any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with this solicitation, the bidder shall complete and submit, with its bid, OMB standard form LLL, "Disclosure of Lobbying Activities;" and

(3) He or she will include the language of this certification in all subcontracts at any tier and require that all recipients of subcontract awards in excess of $100,000 shall certify and disclose accordingly.

(c) Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by section 1352, title 31, United States Code. Any person who makes an expenditure prohibited under this provision or who fails to file or amend the disclosure form to be filed or amended by this provision, shall be subject to a civil penalty of not less than $10,000, and not more than $100,000, for each such failure.

(d) Indian tribes (except those chartered by States) and Indian organizations as defined in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B) are exempt from the requirements of this provision.

4. Organizational Conflicts of Interest Certification

The bidder certifies that to the best of its knowledge and belief and except as otherwise disclosed, he or she does not have any organizational conflict of interest which is defined as a situation in which the nature of work to be performed under this proposed contract and the bidder's organizational, financial, contractual, or other interests may, without some restriction on future activities:

(a) Result in an unfair competitive advantage to the bidder; or,

(b) Impair the bidder's objectivity in performing the contract work.

[ ] In the absence of any actual or apparent conflict, I hereby certify that to the best of my knowledge and belief, no actual or apparent conflict of interest exists with regard to my possible performance of this procurement.

5. Bidder's Certification of Eligibility

(a) By the submission of this bid, the bidder certifies that to the best of its knowledge and belief, neither it, nor any person or firm which has an interest in the bidder's firm, nor any of the bidder's subcontractors, is ineligible to:

(1) Be awarded contracts by any agency of the United States Government, HUD, or the State in which this contract is to be performed; or,

(2) Participate in HUD programs pursuant to 24 CFR Part 24.

(b) The certification in paragraph (a) above is a material representation of fact upon which reliance was placed when making award. If it is later determined that the bidder knowingly rendered an erroneous certification, the contract may be terminated for default, and the bidder may be debarred or suspended from participation in HUD programs and other Federal contract programs.

6. Minimum Bid Acceptance Period

(a) "Acceptance period," as used in this provision, means the number of calendar days available to the PHA/IHA for awarding a contract from the date specified in this solicitation for receipt of bids.

(b) This provision supersedes any language pertaining to the acceptance period that may appear elsewhere in this solicitation.

(c) The PHA/IHA requires a minimum acceptance period of 90 calendar days.

(d) In the space provided immediately below, bidders may specify a longer acceptance period than the PHA's/IHA's minimum requirement. The bidder allows the following acceptance period: calendar days.

(e) A bid allowing less than the PHA's/IHA's minimum acceptance period will be rejected.

(f) The bidder agrees to execute all that it has undertaken to do, in compliance with its bid, if that bid is accepted in writing within (1) the acceptance period stated in paragraph (c) above or (2) any longer acceptance period stated in paragraph (d) above.

7. Small, Minority, Women-Owned Business Concern Representation

The bidder represents and certifies as part of its bid/ offer that it --

(a) [ ] is, [ ] is not a small business concern. "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding, and qualified as a small business under the criteria and size standards in 13 CFR 121.

(b) [ ] is, [ ] is not a women-owned business enterprise. "Women-owned business enterprise," as used in this provision, means a business that is at least 51 percent owned by a woman or women who are U.S. citizens and who also control and operate the business.

(c) [ ] is, [ ] is not a minority business enterprise. "Minority business enterprise," as used in this provision, means a business which is at least 51 percent owned or controlled by one or more minority group members or, in the case of a publicly owned business, at least 51 percent of its voting stock is owned by one or more minority group members, and whose management and daily operations are controlled by one or more such individuals. For the purpose of this definition, minority group members are:

(Check the block applicable to you)

[ ] Black Americans
[ ] Hispanic Americans
[ ] Native Americans
[ ] Asian Pacific Americans
[ ] Asian Indian Americans
[ ] Hasidic Jewish Americans

9. Certification of Eligibility Under the Davis-Bacon Act (applicable to construction contracts exceeding $2,000)

(a) By the submission of this bid, the bidder certifies that neither it nor any person or firm who has an interest in the bidder's firm is a person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(b) No part of the contract resulting from this solicitation shall be subcontracted to any person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

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

10. Certification of Nonsegregated Facilities (applicable to contracts exceeding $10,000)

(a) The bidder's attention is called to the clause entitled **Equal Employment Opportunity** of the General Conditions of the Contract for Construction.

(b) "Segregated facilities," as used in this provision, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise.

(c) By the submission of this bid, the bidder certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The bidder agrees that a breach of this certification is a violation of the Equal Employment Opportunity clause in the contract.

(d) The bidder further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) prior to entering into subcontracts which exceed $10,000 and are not exempt from the requirements of the Equal Employment Opportunity clause, it will:

(1) Obtain identical certifications from the proposed subcontractors;

(2) Retain the certifications in its files; and

(3) Forward the following notice to the proposed subcontractors (except if the proposed subcontractors have submitted identical certifications for specific time periods):

Notice to Prospective Subcontractors of Requirement for Certifications of Nonsegregated Facilities

A Certification of Nonsegregated Facilities must be submitted before the award of a subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Employment Opportunity clause of the prime contract. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

Note: The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

11. Clean Air and Water Certification (applicable to contracts exceeding $100,000)

The bidder certifies that:

(a) Any facility to be used in the performance of this contract [ ] is, [ ] is not listed on the Environmental Protection Agency List of Violating Facilities:

(b) The bidder will immediately notify the PHA/IHA Contracting Officer, before award, of the receipt of any communication from the Administrator, or a designee, of the Environmental Protection Agency, indicating that any facility that the bidder proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities; and,

(c) The bidder will include a certification substantially the same as this certification, including this paragraph (c), in every nonexempt subcontract.

12. Bidder's Signature

The bidder hereby certifies that the information contained in these certifications and representations is accurate, complete, and current.

(Signature and Date) _____

(Typed or Printed Name) _____

(Title) _____

(Company Name) _____

(Company Address)

Previous edition is obsolete

form **HUD-5369-A** (11/92)

The supplier must demonstrate a good faith effort to utilize Minority Owned Businesses (MOB) and Woman Owned Businesses (WOB). To assist in this effort, KCDC posts the web links of organizations, which can provide suppliers with a list of minority and women owned businesses on its web site. These lists can be useful to the supplier in preparing a response to this solicitation.

Place a checkmark in either Section One or Section Two of this form. Provide the information in Section One if you check that box.

Section One ☐ The following companies were asked for pricing for the attached bid. Provided the listed companies meet bid document requirements and their pricing is competitive, it is our intent to use the companies listed. Attached hereto or to be provided to KCDC within five calendar days of solicitation opening is our Form of Commitment/Statement of Effort (**failure to submit Form of Commitment/Statement of Effort timely is cause to reject the bid**.)

Company Name	Person	Product/Service	MOB	WOB

Section Two ☐ MOB/WOB's were not contacted because sub-suppliers/contractors will not be needed to complete the contract and all work will be completed by the supplier. Other MOB/WOB's not shown above, will be considered during the duration of the contract in the event the supplier decides additional subcontractors or supplier will be used (to complete all or part of the contract).

Signed by	
Print Name and Title	
Subscribed and Sworn to before me on this date	
By	
Notary Public (stamp/signature)	
My Commission Expires on	

Place a checkmark in either Section One or Section Two of this form.

Section One Does not apply - MOB/WOB subcontractors will not be used. ☐ (Stop Here)

Section Two MOB/WOB Subcontractors will be used. ☐ (Complete this page)

I, _____ do certify the supplier has or will enter into a formal agreement with the MOB/WOB enterprise for work listed in this schedule.

Supplier Name	MOB	WOB	Contact Person	Type of Supplies to be Provided	Type of Work to be Performed	Dollar Value of Supplies or Service

COMPLETE THE FOLLOWING BOXES IF BOX ABOVE WAS NOT COMPLETED

The following companies were listed on the Good Faith Compliance Affidavit submitted with my bid.

Company Name	Person	Product/Service	MOB	WOB

Explain why each of the above companies could not be used to provide the needed products or services.

Company Name	Reason

Above information submitted by _____

Printed/Typed Name and Title:_____

INSURANCE

The Contractor shall maintain, at Contractor's sole expense, on a primary and non-contributory basis, at all times during the life of the contract insurance coverages, limits, and endorsements described herein. All insurance must be underwritten by insurers with an A.M. Best rating of A- :VI or better. Upon award, the Contractor shall provide Certificate(s) of Insurance and amendatory endorsements to KCDC evidencing said insurance coverages. **See paragraph "6" for exact naming of certificate holder and additional insured**.

The Contractor agrees the insurance requirements herein as well as KCDC's review or acknowledgement, is not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by the Contractor under this contract. KCDC's failure to require a certificate of insurance, acceptance of a non-conforming certificate, or allowing the Contractor to commence work shall not operate as a waiver of these minimum insurance requirements or the liabilities and obligations assumed by the Contractor under this contract.

1. **Commercial General Liability Insurance:** occurrence version general liability insurance with a minimum combined single limit of $1,000,000 per occurrence with $2,000,000 in the aggregate covering the following perils: bodily injury, personal injury, and broad form property damage including products/completed operations for one year after completion of the Project(s). Limits must apply separately to the work/location in this contract.

   Such insurance shall contain or be endorsed to contain a provision that includes **KCDC, its officials, officers, employees, and volunteers** as additional insureds with respect to the Contractor's ongoing and completed operations, providing coverage at least as broad as CG 20 10 07 04 and 20 37 07 04 endorsements. The coverage shall contain no special limitations on the scope of its protection afforded to the listed insureds.

2. **Commercial Automobile Liability Insurance:** in an amount not less than $1,000,000 (combined single limit) for all owned, hired, and non-owned vehicles utilized by Contractor in connection with the Project. Coverage is to include coverage for loading and unloading hazards.

   Such insurance shall contain or be endorsed to contain a provision that includes **KCDC, its officials, officers, employees, and volunteers** as additional insureds.

3. **Workers' Compensation Insurance and Employers Liability Insurance:** Workers' Compensation Insurance with statutory limits as required by the State of Tennessee or other applicable laws.

4. **Builder's Risk**: coverage shall be written on an All-Risk, Replacement Cost, and Completed Value Form basis in an amount at least equal to one-hundred percent (100%) of the projected completed value of the Work, as well as subsequent modifications of that sum due to Change Order(s). Contractor agrees to be responsible for reporting increases in the projected completed value of the work due to Change Order(s).

Coverage shall insure against the perils of fire and extended coverage and physical loss or damage including, but not limited to, theft, vandalism, malicious mischief, collapse, temporary building and debris removal including demolition occasioned by enforcement of any applicable legal requirements and shall cover reasonable compensation for architect's services and expenses required as a result of such insured loss. Insurance is to cover all property of contractor (and its subcontractors) and KCDC at the construction site. Coverage shall cover the completed value of the construction including without limitation, slab on grade, excavations, foundations, caissons, tenant finish work, and retaining walls around the perimeter of the project. Any exclusion of so-called underground damage to pipes, collapse of structure, or damage resulting from explosion or blasting shall be deleted. Such policy shall provide that any loss thereunder shall be payable to the Contractor, KCDC, and others as their interests may appear and shall also have a replacement cost endorsement.

5. Other Insurance Requirements:

a. Upon award, Contractor shall furnish KCDC with original Certificate(s) of Insurance and amendatory endorsements effecting coverage required by this section.

b. Provide a waiver of subrogation **for each required policy herein**. When required by the insurer, or should a policy condition not permit Contractor to enter into a pre-loss agreement to waive subrogation without an endorsement, the policy should be endorsed with a Waiver of Transfer of Rights of Recovery Against Others, or its equivalent. This waiver of subrogation requirement shall not apply to any policy which includes a condition specifically prohibiting such an endorsement, or voids coverage should contractor enter into such an agreement on a pre-loss basis.

c. A **minimum 30-day cancellation notice** for all insurances (by endorsement if necessary) is required.

d. Replace certificates, policies, and endorsements for any such insurance expiring prior to completion of services.

e. Maintain such insurance from the time services commence until services are completed or through such extended discovery/reporting/tail period as required. Failure to maintain or renew coverage or to provide evidence of renewal may be treated by KCDC as a material breach of contract.

f. Any deductibles and/or self-insured retentions greater than $50,000 must be disclosed to and approved by KCDC prior to the commencement of services. Use of large deductibles and/or self-insured retentions will require proof of financial ability as determined by KCDC.

g. All policies must be written on an occurrence basis with the exception of Errors and Omissions Liability (E & O) / Professional Liability and Pollution Liability which may be claims made coverage.

h. **Require all subcontractors** to maintain during the term of the resulting contract commercial general liability insurance, automobile liability insurance, and workers' compensation/employers liability insurance (unless subcontractor's employees are covered by contractor's insurance) in the same manor and limits as specified for the Contractor.

6. **Certificate Holder and Additional Insured:**

   KCDC, its officials, officers, employees, and volunteers
   901 N Broadway
   Knoxville, TN 37917

7. **Right to Revise or Reject:** KCDC reserves the right to revise any insurance requirement, including but not limited to, limits, coverages, and endorsements based on changes in scope of work/specifications, insurance market conditions affecting the availability or affordability of coverage.

8. **No Representation of Coverage Adequacy:** The coverages, limits or endorsements required herein protect the primary interests of KCDC, and the Contractor agrees in no way should these coverages, limits or endorsements required be relied upon when assessing the extent or determining appropriate types and limits of coverage to protect the Contractor against any loss exposures, whether as a result of the project or otherwise.

Certificate Holder & Additional Insured	KCDC, its officials, officers, employees, and volunteers 901 N Broadway Knoxville, TN 37917
GL *(Contractor & Subcontractors)*	$1M / $2M
Auto *(Contractor & Subcontractors)*	$1M (owned, hired, & non-owned)
WC & Employers Liability *(Contractor & Subcontractors)*	Statutory limits
Builders Risk *(Contractor)*	100% of projected completed value
30-day cancellation *(Contractor & Subcontractors)*	Required– must indicate on COI
Primary non-contributory *(Contractor & Subcontractors)*	Required – must indicate on COI
Waiver of Subrogation *(Contractor & Subcontractors)*	Required – must indicate on COI

Solicitation Document F Envelope Coversheet for Alterations at Love Towers C20013

State Law requires certain supplier license information on the front of your envelope. You are responsible for providing the correct information on the envelope front but KCDC provided this form as a guide to help you. Failure to supply this information may invalidate your bid. **Attach this completed page to the front of your bid envelope**

Bid Due Date/Time	12-03-19 at 2:00 p.m.
State of Tennessee Supplier's License Holder Name	
State of Tennessee Supplier's License Number	
Pertinent State of Tennessee Supplier's License Classification	
State of Tennessee Supplier's License Expiration Date	

Subcontractors to be used on this project (If subcontract work is not required, write "none required")

Electrical Subcontractor Name on the State of Tennessee's Supplier's License		**State of Tennessee Supplier License Number**	
State of Tennessee Supplier License Classification(s)		**Expiration Date of State Supplier's License**	
HVAC Subcontractor Name on the State of Tennessee's Supplier's License		**State of Tennessee Supplier License Number**	
State of Tennessee Supplier License Classification(s)		**Expiration Date of State Supplier's License**	
Masonry Subcontractor Name on the State of Tennessee's Supplier's License		**State of Tennessee Supplier License Number**	
State of Tennessee Supplier License Classification(s)		**Expiration Date of State Supplier's License**	
Plumbing Subcontractor Name on the State of Tennessee's Supplier's License		**State of Tennessee Supplier License Number**	
State of Tennessee Supplier License Classification(s)		**Expiration Date of State Supplier's License**	

Advisements:

1. KCDC will not consider notes changing the bid written on the bid envelope.
2. For the listed subcontractor types above, you may only list one firm.
3. State requirement information is at **https://www.tn.gov/commerce/regboards/contractors.html**