KANSAS CITY KANSAS PUBLIC SCHOOLS / USD 500

PURCHASING OFFICE | 2010 N. 59TH STREET | ROOM 370 \ KANSAS CITY, KS 66104
WEB SITE: WWW.KCKPS.ORG/PURCHASING

ELECTRICAL UPGRADES HARMON HIGH SCHOOL

BID NO:	IFB 23-014	ISSUE DATE:	MAY 30, 2023

Kansas City Kansas Public Schools will receive sealed bids, on this form at the Purchasing Office, 2010 N. 59th Street, Room 370, Kansas City, KS 66104 until **2:00pm, June 20, 2023**, at which time bids received will be publicly opened and read, all in accordance with bid instructions, specifications and/or bid conditions attached hereto or as shown below.

Contact/Technical Contact:
Brian Hernandez, Assistant Purchasing Director | (913) 279-2244 | eMail: brian.hernandez@kckps.org

BID INSTRUCTIONS:

FAXED BIDS WILL NOT BE ACCEPTED / EMAILED BIDS WILL NOT BE ACCEPTED.

Per attached specifications listed in this invitation to bid. Bidders must specify unit price on services/rates/deliverables on the Bid Form or bid may be determined to be non-responsive.

- Pricing shall be FOB Kansas City, KS (All freight and fuel charges must be included in the bid price).
- Award will be to ONE (1) contractor.
- The District reserves the right to reject any or all bids, to waive any informalities, irregularities, or technical defects in bids, and unless otherwise specified by the District to accept any item or groups of items in the bid, as may be in the best interest of the District.
- Time (days, weeks, etc.) required for delivery is a significant consideration with respect to this award process. The time required for delivery must be indicated in the space provided or your bid may be found non-responsive and may not be considered.
- Bid shall include copies of pertinent warranty information pertaining to the product or service offered. The bidder agrees that equipment furnished under any resultant purchase order issued by Kansas City Kansas Public Schools shall be covered by commercial warranties the contractor gives to any customer for such supplies. All warranty information and certificates shall be furnished and become the property of the District upon delivery and acceptance of said items and/or the contractor must honor services and all rights and remedies stated in the warranties.
- All items are new manufacture unless otherwise specifically stated in this bid.
- All products must have passed the first line quality standard as set by the manufacturer and no seconds, blemished articles or items having defective workmanship are included.
- Bid may not be considered if a service charge, minimum dollar or minimum quantity order is

applied.

- The outcome of this bid will be posted on the District's Purchasing site www.kckps.org/purchasing under Awards Section and will include a bid tabulation/summary.
- Bidder shall acknowledge all addenda for this bid and include the form acknowledgetheir bid.

SUMMARY OF WORK:

It is the intent of the Kansas City Kansas Public Schools, Kansas City, Kansas to enter into an agreement for Electrical Upgrades for JC Harmon High School.

Copies of the bid must be submitted in a sealed envelope with the Electrical Upgrades at JC Harmon High School on the envelope. Any bid form that does not include a separate dollar value for each item will be deemed non-responsive and will not be considered. Any proposal that lists, "$0", or "no bid" in lieu of a dollar value will be deemed non-responsive and will not be considered.

All work will begin by May 30, 2024, and is to be completed prior to August 1st, 2024.

PRE-BID MEETING

A pre-bid meeting will be held: June 6, 2023 @ 1:00 PM

J.C. Harmon High School
2400 Steele Road
Kansas City, Kansas 66106

Attendance is recommended, but not mandatory.

Bid Security

Bid Bond: Bid security shall be submitted with each bid in the amount of five percent (5%) of the bid amount. No bids may be withdrawn for a period of sixty (60) days after opening of bids. Owner reserves the right to reject any and all bids and to waive informalities and irregularities.

Payment & Performance Bond: Bidder agrees to furnish a Payment & Performance Bond, in the amount of 100% (one hundred percent) of total contract value after receipt of contract. This is for projects that exceed $100,000 in value; Reference KSA 60-1111.

Prevailing Wage/Union

Prevailing Wage IS NOT required. There is no union labor requirement for this solicitation.

Time of Completion

Successful bidder shall begin the Work on receipt of the Notice to Proceed and shall complete the Work (Substantial Completion) no later than **August 1, 2024**.

Liquidated Damages

Completion of this project before August 1, 2024, is imperative. At the District's sole discretion, liquidated damages in the amount of Two-Hundred-Fifty Dollars ($250.00) per calendar day will be assessed against the Contract if the project is not completed by the date indicated.

Clean-Up

The Contractor will keep the premises free from accumulations of debris and waste materials caused by its employees in performance of the work. At completion of the project, Contractor shall remove all crating, packaging, waste and

debris from the building and the site, and all tools, scaffolding and surplus materials, and shall leave the building and site "broom clean" or its equivalent.

Permits, Codes and Ordinances
Each Contractor shall file and pay for required permits affecting its work (if applicable). Each contractor shall conform to applicable codes and ordinances, including OSHA requirements.

Damage to District Property
Contractor at its own expense shall promptly remedy and repair all damages or loss to any property caused in whole or part by its employees, subcontractor(s), supplier or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable.

No Smoking: The District adheres to the mandatory "No Smoking" policy on school premises and/or at school functions. All bidders shall comply with this "No Smoking" policy.

INCLEMENT WEATHER OR EMERGENCY

IF THERE IS A BUILDING CLOSING THE DAY OF THE OPENING OF PROPOSALS DUE TO INCLEMENT WEATHER OR AN EMERGENCY, THE OPENING OF PROPOSALS WILL OCCUR AT 2:00PM (CENTRAL) THE NEXT BUSINESS DAY THE DISTRICT IS OPEN.

TABLE OF CONTENTS

BID IFB 23-xxx

LUMP SUM PROPOSAL

KANSAS CITY KANSAS SCHOOL DISTRICT

Electrical Upgrades at Harmon High School

General Construction for:

PROPOSAL OF:_____
(Hereinafter called "Bidder"),

A CORPORATON* ORGANIZED AND EXISTING UNDER THE LAWS

OF THE STATE OF_____

A PARTNERSHIP* CONSISTING OF_____

AN INDIVIDUAL* TRADING AS_____

*Complete applicable designation.

TO: KANSAS CITY KANSAS PUBLIC SCHOOLS
PURCHASING OFFICE
2010 N. 59TH STREET, ROOM 370
KANSAS CITY, KS 66104

1. The undersigned, having familiarized itself with local conditions affecting the cost of the work at the place where the work is to be done and with all Bidding Documents, including the Instructions to Bidders, Plans and Specifications, General and Supplementary Conditions, the Standard Form of Agreement and the other Contract Documents, and having examined the location of the proposed work and considered the availability of labor and materials, hereby proposes and agrees to perform everything required to be performed, and to provide and furnish any and all labor, materials, supervision, necessary tools, equipment, and all utility and transportation service necessary to perform and complete in a workmanlike and timely manner all of the work required for the project, all in strict conformance with the Instructions to Bidders and other Contract Documents (including Addenda Nos. _____, through _____, the receipt of which is hereby acknowledged), for the lump sums hereinafter specified.

2. FOR BASE BID

The Lump Sum of _____

_____ Dollars ($_____).

Additional breakdown requirements are described in Section 01010 Summary of Work, Part 1.11 – Additional Owner Requested Bid Breakdown.

3. TAX EXEMPTION

This project shall be considered Tax Exempt. Federal, State and local taxes shall not be included with the Bid. Subsequent to the award of the construction contract, the School District will obtain from the State of Kansas a sales tax exemption certificate number. The sales tax exemption certificate will permit the Contractor to purchase materials for incorporation into this project without paying sales tax, provided that the Contractor furnishes the certificate number to the material supplier.

4. CHANGES IN THE WORK

Changes in the work shall be as established in the Contract Documents. The following fees shall be used for lump sum pricing and actual cost pricing of additions and deletions to the work included in the Bid, Namely:

		Not to Exceed
A.	To Contractor for work performed by his own forces	10%
B.	To Contractor for work performed by other than his own forces	5%
C.	To Subcontractor for work performed by his own forces	10%
D.	To Subcontractor for work performed by other than his own forces	5%

Percentages for overhead and profit will not be allowed on bond premiums.

5. A. In the execution of the Agreement, no person shall on the grounds of race, color, religion, sex, disability, or national origin be excluded from full employment rights, be denied the benefits of, or otherwise subject to discrimination under any program, service or activity under the provisions of any and all applicable Federal and state laws against discrimination. Bidder shall furnish all information and reports required by the rules, regulations, and order of the Secretary of Labor for purposes of investigating to determine compliance with such laws.

B. Bidder shall observe the provisions of the Kansas Acts Against Discrimination and shall not discriminate against any person in the performance of work under the Agreement because or race, religion, color, sex, physical handicap unrelated to such person's ability to engage in the particular work, national origin or ancestry.

C. In all solicitations or advertisements for employees, Bidder shall include the phrase, "equal opportunity employer", or similar phrase approved by the Owner.

D. If bidder fails to comply with the provisions of K.S.A. 441031, bidder shall be deemed to have breached the Agreement and it may be canceled, terminated or suspended in whole or in part, by Owner.

E. If bidder is found guilty of a violation of the Kansas Acts Against Discrimination under a decision or order of Owner that has become final, bidder shall be deemed to have breached the present Agreement and it may be canceled, terminated, or suspended in whole or in part, by Owner.

F. Bidder shall include the provisions of paragraphs A through E above in every subcontract or purchase order so that such provisions shall be binding upon all subcontractors and vendors.

8. The undersigned hereby proposes and agrees to substantially and/or finally complete the work or segments of the work on or before the scheduled dates listed in Section 01010-Summary of Work, and to pay as liquidated damages the corresponding amount stipulated in Section 10101-Summary of Work for each consecutive calendar day thereafter that the work or segment of the work remains substantially and/or finally incomplete in accordance with the Contract Documents. This provision shall be applied, and the daily liquidated damages amount(s) shall be calculated separately as to each substantial and/or final complete date stated.

9. Accompanying the Bid is Bid Security of at least 5% of the bid in the form of a Bid Bond in the amount of ___ Dollars ($_____),
payable without condition to the Owner, which it is agreed shall be retained as liquidated damages for the delay and extra expense caused the Owner, if the undersigned fails to execute the Contract and furnish the bonds required by the Contract Documents, within the time stated in the Contract Documents.

10. In submitting the Bid it is understood that the right to reject any and all bids has been reserved by the Owner and that this bid may not be withdrawn for a period of sixty (60) days from the opening.

Date this day of_____, 202__.

Name of Bidder

Address of Bidder

Authorized Officer

Title

Telephone Number

(Seal)

ATTESTED:

SECTION 01010 - SUMMARY OF WORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of the Work.

B. Work under other contracts.

C. Products furnished by the owner.

C. Contractor use of site (and premises).

D. Code of Conduct.

E. Existing conditions.

F. Work sequence, Schedule for Completion and liquidated damages.

G. Time extensions for adverse weather.

H. Owner occupancy.

I. Time extension for factors other than weather.

1.02 DESCRIPTION OF THE WORK

A. The Contractor shall furnish all labor, materials, facilities, insurance, management, equipment, services, employee training and testing, permits and agreements necessary to perform the work required.

B. See plans and specifications for complete extent of work.

C. The bidder must perform the work in its entirety. Transferring or sharing prime responsibility for the work will not be allowed and will be considered cause for termination.

D. The General Contractor shall be represented full time, at the site, by a competent Superintendent from beginning of the work until final completion unless otherwise approved by the Owner. The superintendent shall oversee and direct the daily construction activities at the work site including scheduling of workers and delivery of equipment and materials to meet the project schedule. The superintendent shall also inspect work in progress to ensure that work conforms to the plans and specifications. The Superintendent shall be dedicated to these duties and shall physically perform work or “wear tools” only on a limited basis.

1.03 WORK UNDER OTHER CONTRACTS.

B. Items noted ‘NIC’ (Not in Contract), will be furnished and installed by owner.

1.04 CONTRACTOR USE OF SITE AND PREMISES

A. Limit use of site and premises to allow owner occupancy and use of the existing building, parking lots, and hard play areas during construction.

B. The contractor shall coordinate the use of the site and locations for all equipment storage, job trailers, portable lavatory facilities, generators, etc., with the architect and owner. The owner shall have the final approval for all site use by the contractor.

1.05 CONTRACTOR AND VENDOR EMPLOYEES CODE OF CONDUCT

Kansas City Kansas Public Schools requests that all contractor and vendor employees conduct themselves in an acceptable manner while performing work on school district property. The following items are prohibited on school district property:

1. No physical or verbal contact is to be made with students or non-designated staff.
2. No smoking in public or student occupied areas of the building or areas of the site.
3. No drugs and/or alcohol are to be consumed or present on district sites.
4. No firearms, or hunting items, are to be present on the site.
5. Foul and/or abrasive language is not to be used.
6. All workers are to wear clothing on all parts of their body; no shirtless workers. Apparel should be appropriate to a school campus.

Utilize designated areas for vehicle access and parking, material storage, etc.

All workers are to wear a nametag, which identifies the company name and the individual's name.

1.06 EXISTING CONDITIONS

A. The contract drawings are based on information taken from original construction drawings and from inspections of the site.

B. Bidders are advised that "as-built" conditions may vary from those shown on the drawings. Bidders shall not later request, nor expect to receive, additional payment for work related to variations which can be determined by examination of the existing building and site, by the date set for receipt of Bids for this Contract.

1.07 WORK SEQUENCE AND SCHEDULING

A. The Contractor and all Subcontractors, sub-subcontractors and Suppliers shall furnish sufficient forces, supervision, construction plant and equipment, and shall work such hours as may be required to insure the prosecution of the work in accordance with the Progress Schedule stated herein. If in the opinion of the Owner, the Contractor falls behind the Progress Schedule, the Contractor shall take such steps as may be necessary to improve the progress and the Owner may require them to increase the number of shifts, and/or overtime operations, days of work including holidays, Saturdays and Sundays, all without additional costs to the Owner.

B. Schedule requirements for each Option and Phase are outlined as follows.

Bidding Documents Available:	Monday May 8, 2023	
Pre-Bid Meeting:	Wednesday, May 17 2023	1:00PM
Bids Due:	Tuesday May 31, 2023	2:00PM
School Board Approval:	Tuesday, June 6, 2023	
Construction Date Start	Thursday, May 30, 2024 (non-disruptive activities and work may occur sooner to ease summer construction)	
Substantial Completion	Tuesday, August 1, 2024	

C. Liquidated Damages of $500 dollars (five hundred) per day per building associated with substantial and $500 dollars (five hundred) per day per building final completion are incurred the calendar day following the substantial and final completion dates listed above, until substantial and final completion are achieved. The damages for final completion start as stated above or fourteen (14) days after the established substantial completion date.

1.08 TIME EXTENSIONS FOR ADVERSE WEATHER

A. The Contractor shall comply with all provisions of the General Conditions in submitting any request for extension of Contract Time due to unusually severe weather.

B. Definitions:

1. Adverse Weather - atmospheric conditions at a definite time and place which are unfavorable to construction activities.
2. Unusually Severe Weather - weather which is more severe than the adverse weather anticipated for the season, location, or activity involved.

C. In order for any request of time extension due to unusually severe weather to be valid, the Contractor must document both of the following conditions.

1. The weather experienced at the project site during the Contract period is more severe that the adverse weather anticipated for the project location during any given month.
2. The unusually severe weather actually caused a delay to the completion of the project. The delay must be beyond the control and without fault or negligence by the Contractor.

D. The following schedule of monthly anticipated adverse weather delays will constitute the baseline for monthly weather time evaluations. The contractor's progress schedule must reflect these anticipated adverse weather delays in all weather-affected activities:

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY WORK DAYS
BASED ON FIVE (5) DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
10	8	7	6	7	7	5	5	5	4	5	9

E. Upon receipt of the Notice to Proceed, and continuing throughout the contract, the Contractor shall record on their daily construction report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50% or more of contractor's scheduled work day.

F. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in the previous month), and shall be calculated chronologically from the first to the last day of each month, and be recorded as full work days.

1. If the number of actual adverse weather delay days in a given month exceeds the number of days anticipated in Paragraph D, above, the difference shall be multiplied by 7/5 to convert any qualifying workday delays to calendar days. The resulting number of qualifying lost days shall be added to the contract time.
2. The determination that unusually severe weather occurred does not automatically mean an extension of time will be granted. The contractor must substantiate the unusually severe weather delayed work activities on the critical path of the Progress Schedule.

G. Full consideration for equivalent fair weather workdays shall be given. If the number of actual adverse weather delays in a given month is less than the number of days anticipated in Paragraph D, above, the difference shall be multiplied by 7/5 to convert any work day increases to calendar days. The resulting number of qualifying extra days will be accumulated and subtracted from any future month's days lost due to unusually severe weather.

1. The net cumulative total of extra days/lost days shall not result in a reduction of Contract Time and the Date of Substantial Completion shall not be changed as a result of unusually favorable weather.

H. In converting workdays to calendar days, fractions 0.5 and greater shall be rounded up to the next whole number. Fractions less than 0.5 shall be dropped.

I. The contractor shall summarize and report all actual adverse weather delay days for each month to the architect by the tenth (10^{th}) of the following month. A narrative indicating the impact of adverse weather conditions on the scheduled critical activities shall be included.

1. Any claim for extension of time due to unusually severe weather shall be submitted to the architect and owner within twenty-one (21) days of the last day of the month in which the delay occurred. Resolution of any claim shall follow the procedures established by the general conditions and as prescribed above.

J. The contractor shall include and indicate the monthly anticipated adverse weather days, listed in Paragraph D, above, in their progress schedule. (Reference Section 01300 for Progress Schedule requirements.)

1. The contractor shall indicate the actual adverse weather days (whether less or more than the anticipated days) in their monthly progress schedule update.

1.09 OWNER OCCUPANCY

A. The existing building, parking lots and hard play areas will be used and occupied by the School District during portions of the Contract Time. Occupants will include, but not be limited to: students, faculty, parents, and other groups so authorized to use the building and/or site by the school district.

B. School will be in session from 8:00 a.m. to 3:30 p.m., Mondays through Fridays, spring and fall semesters, throughout the contract time. In addition, the hours from 7:30 a.m. to 8:30 a.m. and from 3:30 p.m. to 4:30 p.m., Monday through Friday, will be reserved for arrival and departure of the school district occupants and delivery of materials and equipment is to be scheduled outside of these hours. The school is unoccupied for summer recess and will be available for general contractor access.

C. The work shall be confined to limited areas of the site. The contractor shall work with the Project Team to develop a schedule of areas to receive work. The schedule will identify specific areas of the building and site to receive work at specific times. This schedule shall be submitted by the Contractor to the Architect for approval before the work begins.

D. The owner will move loose furnishings out of the existing building with his own work forces prior to scheduled demolition. This will include furniture, equipment, wall hangings, books, maps, clocks, and loose educational materials prohibiting work.

1.10 TIME EXTENSION FOR FACTORS OTHER THAN WEATHER

A. If the contractor incurs a delay due to factors out of his control, the contractor shall submit a claim within twenty-one (21) days after the occurrence for additional time to the architect and project team.

B. If a proposal request for additional work causes the contractor additional time to perform the original contract requirements the contractor may submit a claim for additional time to the Architect and Project Team. The Contractor shall include in his proposal its request for time extension (if any), and shall include sufficient information and dates to demonstrate whether and to what extent the change will delay the completion of the contract in its entirety.

A. The determination that delays have occurred beyond the Contractor's control does not automatically mean an extension of time will be granted. The Contractor must substantiate the delay by indicating suspended work activities on the critical portion of the project schedule.

END OF SECTION

SECTION 01020 - CONTRACT CONSIDERATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cash Allowances.

B. Schedule of values.

C. Bid Cost Breakdown.

D. Application for Progress Payment.

E. Application for Final Payment

F. Change Orders and/or Clarifications.

1.02 RELATED SECTIONS

A. N.A.

1.03 CASH ALLOWANCES

(Architect to include allowances, as applicable.)

1.04 SCHEDULE OF VALUES

A. The Contractor will submit to the Architect, a Schedule of Values that includes all major categories of work and per building if applicable. The Schedule of Values will annotate a value for the construction schedules and progress meeting notes required by the contract documents. The dollar amounts are to include all labor, material, overhead and profit applicable to each item in the breakdown. As a sub-breakdown, each item is to be separated into an estimated labor and materials line item. The Contractor must submit an estimated total value for the projected cost of supplies, materials, and equipment required. Submit typed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet. Contractor's standard from of electronic media printout will be considered as an alternate form of submission.

B. Submit Schedule of Values in triplicate within fourteen (14) calendar days after the contract for construction is executed and prior to any submission of an Application for Payment. Schedule shall list the installed value of the component parts of the work, broken down in sufficient detail to serve as a basis for computing values for progress payments during construction.

C. Format: At a minimum, use the Table of Contents in this Project Manual to identify each line item with number and title of the major specification section.

D. Add to the Schedule of Values approved Change Orders, with each Application for Payment. List Change Orders in numerical sequence with each Application for Payment.

E. Correlate line items in the Schedule of Values with other required additional schedules and forms including:

a. Contractor's construction schedule
b. Contract payment request form
c. List of subcontractors.
d. List of products.
e. List of principle suppliers and fabrications.
f. Schedule of submittals.

F. Prior to making application for the first progress payment, the Contractor must submit the Schedule of Values. No progress payments will be made until the schedule of values has been received, reviewed, and approved by the Architect and School District. The costs assigned to the breakdown are to total the contract sum. The approved Schedule of Values is to be used by the Contractor on their Application for Payment.

1.05 BID COST BREAKDOWN
(See Bid Form for any applicable requirements)

1.06 APPLICATION FOR PROGRESS PAYMENTS

A. At a time consistent with the requirements of this section, the General Conditions, and the Owner-Contractor Agreement, and for each calendar month during the progress of the work, submit three (3) copies of a properly notarized itemized Application for Payment prepared in a manner consistent with the Schedule of Values.

B. The amount shown on the Application for Payment shall be established by the value of work completed through the last day of the application period based upon the Contractor's estimate of labor and materials incorporated in the work and of materials suitably stored in accordance with the contract through the last day of the previous application, less the aggregate of previous payments, and less the retainage as specified in this section.

C. The form of application for payment shall be the May, 1983 edition of AIA Document G702. "Application and Certificate for Payment", supported by AIA Document G703. "Continuation Sheet", May, 1983 edition.

D. Provide the following itemized data on Continuation Sheet:

a. Format, schedules, line items, and values shall be from the Schedule of Values accepted by Architect.
b. Include names, trades and amount for subcontractors.

1. Application Form:

a. Fill in required information, including that for change orders executed prior to the date of submittal application.
b. Fill in summary of dollar values to agree with the respective totals indicated on the continuation sheet.
c. Execute certificate with the signature of a responsible officer of the contractor's firm.

2. Continuation sheets:

a. Fill in total list of all scheduled component items of work, with each number and the scheduled dollar value of each item.
b. Fill in the dollar value in each column for each scheduled line item when work has been performed or products stored. Round off values to nearest dollar, or as specified in the Schedule of Values.
c. List each change order executed prior to the date of submission, at the end of the continuation sheets. List by change order number, description, and breakdown of costs as for an original component item of work.

E. Substantiating Data for Progress Payments:

1. Substantiating data is required to verify a payment request. Contractors are to include a cover letter identifying:

a. Project.
b. Application number and date.
c. Detailed list of enclosures.

d. For stored products: Item number and identification as shown on application, and description of specific material. Include Bill of Sale, Non-Negotiable Bailment Receipt (see form at the end of this section) and applicable insurance certificate.

2. Submit one copy of the data cover letter for each of the applications.

F. Applications for Payment shall be accompanied by cost breakdowns from the contractor, subcontractors and sub-sub-contractors.

G. The three notarized copies of the application for payment will be transferred to the architect to be certified for payment. Provide a copy (non-notarized) to the owner's representative.

1.07 APPLICATION FOR FINAL PAYMENT

A. Submit final Application for Payment following the procedures specified above for progress payments.

B. Before submitting final Application for Payment, forward concurrently to the Architect, the written warranties and guarantees, Record and Information Manuals and other documents required by the contract documents. Place properly in approved storage at the site the extra stock and spare parts specified. Contractor will obtain the signature of the Architect verifying receipt of the extra stock and spare parts.

C. Properly executed "Final Lien Waiver and Release" and Contractor's "Affidavit" (see applicable forms at the end of this section) shall be submitted to the Architect in duplicate prior to final payment.

D. Application for Final Payment shall be accompanied by a properly executed "Consent of Surety Company to Final Payment: AIA Document G707, April, 1970 edition.

1.08 CHANGES AND/OR CLARIFICATIONS

A. Request for Information (RFI)

1. If during the construction of the project, clarification of the documents is required, it shall be brought to the attention of the Architect. The Architect will either provide clarification or the Contractor will issue a Request for Information (RFI) to the Architect. Each RFI will be dated and sequentially numbered. The Architect shall provide his written response to the RFI and return the RFI response to the Contractor for distribution to all effected contractors.
2. Responses to RFI's are not authorization to proceed with work requiring additional compensation. If additional compensation is required, the Contractor shall immediately advise the Architect, and Owner.

B. Proposal Request (PR)

1. Should the owner contemplate making a change in the work, the architect will issue a Proposal Request (PR) to the Contractor. If the described change impacts cost and/or time, the Contractor will prepare a proposal and submit it to the Architect. The Contractor's proposed cost shall be broken down completely giving quantity and unit costs by each trade of each item, labor cost with hourly rates, allowable overhead and profit (both adds and deducts). The Owner and Architect will review the pricing to determine if a change order will be issued. Contractors are not to proceed with additional work until written authorization has been received. No additional amount will be paid for submittal in this form or for resubmittal should the breakdown be considered inadequate by the Architect and Owner.

C. Change Orders (CO)

1. If the Owner determines that a Proposal Request will be accepted, the Architect will

prepare a change order (CO) which will be dated and numbered sequentially. The change order will describe the change or changes, will refer to the Proposal Request and Proposal number and becomes valid when signed by the Owner, the Architect and the Contractor.

2. Where unit prices are not required by the bid documents and value of changes or extra work is determined by estimate and acceptance in a lump sum, by cost and percentages, or by cost and a fixed fee, the percentages for overhead and profit, or commission to be allowed for net increases shall in no case exceed the figures identified on the bid form.
3. Estimates for material shall be based on reasonable current market value at which materials are available to the Contractor and Subcontractor. Upon request, submit satisfactory evidence of such costs. Labor unit costs shall include associated insurance.
4. When authorized by the Owner, time and material accounting of a change in work may be used. The Contractor shall maintain an accurate account of labor and material involved in each change. Such time and material records are subject to verification. Notify Architect and Owner when work on each change is to start and when it has been completed. To receive full recognition, labor assigned to Contract changes must, insofar as possible, work continuously on the change, rather that interchanging between contract work and the change.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

FINAL LIEN WAIVER AND RELEASE

Reference that certain Agreement between _____, as Contractor, and _____, as Owner, dated _____, on the project known as _____ located at
for work to be performed by said Contractor.

Reference also that certain invoice of Contractor to said Owner in the Amount of $_____ for work, labor and materials installed in or furnished for said project by and through _____.

The receipt by Contractor of Owner's remittance for the amount said invoice, contingent upon the final clearance and payment of said remittance, shall constitute payment for the full contract amount, including change orders and all other claims or demands of any nature whatsoever which Contractor has or may have in connection with the Project or Contract referenced herein, of $_____, for which Contractor (a) agrees to and does hereby waive and release said property, project and the Owner and all bond or payment sureties and guarantors from; and (b) does hereby agree to protect, indemnify, defend and hold harmless said property, project, Owner, sureties and guarantors against;

(1) any and all liens, statutory or otherwise, and

(2) any or all obligations under any bond or guaranty for payment furnished by or to said Owner, whether pursuant to agreement or requirement of law, and

(3) any and all other claims whatsoever, statutory or otherwise,

for any and all work, labor and materials furnished by or through said Contractor, its subcontractors and material suppliers for the entirety of said project.

The remittance of the Owner, identified as payment of said above invoice and endorsed by Contractor and marked "paid" or otherwise canceled by the bank against which said remittance was drawn shall constitute conclusive proof that said invoice was paid and the payment thereof was received by the Contractor, and thereupon, this final lien waiver shall become effective automatically and without requirement of any further act, acknowledgment or receipt of the part of said Contractor.

Contractor does further warrant that Contractor has not and will not assign its claims for payment nor its right to perfect a lien against said property and project, and the undersigned representative of the contractor has the right to execute this waiver and release thereof.

The undersigned representative of Contractor does hereby certify under oath that he is fully authorized and empowered to execute this instrument for and in behalf of said Contractor and to bind them hereto and does in fact so execute this final lien release.

Dated this _____ day of _____, 20__.

Contractor:

_____

By:

_____

Title:

_____

Subscribed and affirmed to before me, the undersigned Notary Public within and for the State of _____and the County of _____, this _____ day of _____, 20__, in the City of _____.

_____
Notary Public within and for said County and State

NON-NEGOTIABLE
BAILMENT RECEIPT

Receipt Number

BAILOR: Owner

BAILEE: Contractor/Supplier

PROJECT: _____

LOCATION OF STORAGE:

The goods and materials described below are held and stored pursuant to the Contract by and between Bailee, as Contractor/Supplier, and Bailer as Owner for Work to be performed at the above referenced Project location. Said goods and materials are to be transferred or delivered to the project site in conjunction with the performance of Bailee's contract referenced above or upon the direction of Bailor or the Architect and no other. The Bailee acknowledges that it has no ownership rights or title in, nor shall claim any lien or interest in or upon, said goods and materials.

QUANTITY	DESCRIPTION OF ITEM

Received and Acknowledged
Contractor/Supplier

DATED: _____ BY:

Authorized Signature

The undersigned representative of Contractor does hereby certify under oath that he is fully authorized and empowered to execute this instrument for and in behalf of said Contractor and to bind them hereto and does in face so execute this final lien release.

Dated this _____ day of _____, 20 ____.

Contractor:

_____

By:

_____

Title:

_____

Subscribed and affirmed to before me, the undersigned Notary Public within and for the State of

_____ and the County of _____, this _____ day of _____, 20 ____,

in the City of _____.

_____
Notary Public within and for said County and State

SECTION 01040 - COORDINATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Coordination.

B. Coordination Drawings.

C. Lockout/Tagout Procedures

D. General Installation Provisions

E. Cleaning and Protection

1.02 COORDINATION

A. Coordinate scheduling, submittals, and Work of the various sections of specifications to assure efficient and orderly sequence of the project.

B. Verify that utility requirements for the project have been properly installed and that such water, phone, and electrical hookup is compatible with other construction and demolition operations occurring at the site. Coordinate Work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements and installation of all Work including mechanical and electrical Work that is indicated diagrammatically on drawings prior to initiating Work on site. Bring discrepancies to the attention of the Architect in a timely manner, follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

E. The Contractor is to coordinate his Work with the Work of the Owner's Contractors.

F. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

G. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with contract documents, to minimize disruption of Owner's activities. This will include off-hour Work to avoid conflict with Owner's activities.

H. Coordinate construction activities included under various sections of these specifications to assure efficient, safe, and orderly installation of each part of the Work. Coordinate construction operations included under different sections of the specifications that are dependent upon each other for proper installation, connection, and operations.

1. Where installation of one part of the Work is dependent on installation of other components either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

I. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

J. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Conducting progress meetings.
5. Orchestrating pre-installation and quality assurance meetings.
6. Project closeout activities.

1.03 COORDINATION DRAWINGS (Include as specifically applicable to the project.)

A. Coordination Drawings: Prepare and submit coordination drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the interrelationship of components.
2. Indicate required installation sequences.
3. Comply with requirements contained in Section “Submittals”.
4. Refer to Division-15 Section “Basic Mechanical Requirements”, and Division-16 Section “Basic Electrical Requirements” for specific coordination drawing requirements for mechanical and electrical installations.
5. In addition to coordination drawings listed in the individual sections, prepare coordination drawings for:
   a. Mechanical equipment rooms.
   b. Electrical equipment rooms.
   c. Elevator equipment rooms.
   d. Roof plan with ALL penetrations, equipment supports, etc., including mechanical and electrical items.
   e. Ductwork, piping, electrical conduit.
6. Submit coordination drawings to the Architects as an “Informational Submittal”. The Architect will not take responsive action.

1.04 LOCKOUT/TAGOUT PROCEDURES

A. Comply with the most recent requirements of OSHA Regulations for the safety of the workers. All equipment shall be locked/tagged out to a zero energy state when new installation, replacement, repair, maintenance or servicing is done on machinery or equipment to protect against accidental or inadvertent operation when such operation could cause injury to personnel.

B. Contractors are required to lockout/tagout machinery and equipment prior to maintenance or service. Compliance with this policy/procedure is mandatory.

C. Contractor employees must be able to:

1. Prepare equipment for shut down
2. Shut down equipment
3. Isolate equipment
4. Apply lockout/tagout devices
5. Control any stored energy
6. Verify equipment isolation
7. Remove the lockout

D. When a lockout is placed on a piece of equipment or a system, it shall have a tag attached with a written warning from the person attaching the lockout.

E. If the energy source cannot be locked out, the tag should clearly state that there is no lockout on the equipment and that it has been de-energized for service.

F. Procedures:

1. Preparation

Contractor(s) performing lockouts must verify which switches, valves or other energy isolating devices apply to the equipment being services.

2. Shutdown

a) Notify any affected personnel (includes other contractors and/or district staff) of the equipment or machinery being locked/tagged out.
b) Shut the equipment down using its normal operating controls.

3. Isolation

a) Isolate the equipment or machinery from *every* power source.
b) Insure any secondary power is isolated from the equipment or machinery.

4. Application of Lockout/Tagout

a) Lockout the energy isolating device with an assigned lock. Only locks assigned for lockout purposes shall be used. General purpose locks shall not be utilized.

5. Stored Energy

a) Insure all moving parts are stopped.
b) Release any stored energy from the equipment or machinery. Spring pressure, elevated parts, rotating parts, hydraulics, air, gas, steam, water, etc., must be dissipated or restrained by other methods such as grounding, blocking or bleeding down.

6. Isolation & Verification

a) Insure no personnel are exposed to the equipment or machinery.
b) Operate the controls of the equipment or machinery to make sure the equipment or machinery will not operate.
c) Return the controls to the off position.
d) Electrical testing equipment shall be used to verify electrical isolation.

7. Restoring Equipment/Machinery to Operation

a) Upon completion of maintenance or service, verify the equipment/machinery is safe to operate.
b) Remove all tools from the work area.
c) Insure the system is fully assembled.
d) Be sure all personnel are clear of the equipment.
e) Inform everyone affected by the equipment or machinery that the lockout/tagout is being removed.
f) Remove the lockout/tagout devices. Devices are only to be removed by the person that put them on, except in the case of an emergency.

1.05 GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major Work component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in contract documents.

1. Where applicable, comply with manufacturer's instructions, including each step in sequence.
2. Should manufacturer's instructions with contract documents, request clarification from Architect before proceeding.
3. Installation must be performed to conform to the requirements of manufacturer's warranty.

C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.

F. Recheck measurements and dimensions, before starting each installation.

G. Install each component during weather conditions and project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

I. Mounting Heights: Where mounting heights are not indicated (install individual components at standard mounting heights recognized within the industry for the particular application indicated). Refer questionable mounting height decisions to the Architect for final decision.

1.06 CLEANING AND PROTECTION

A. Clean and maintain construction area as frequently as necessary throughout the project. Contractor to provide up to and have use of at least one dumpster during the course of the Work. The dumpster to be located as coordinated with the Owner. The Contractor shall be responsible for any damages and shall repair and/or replace grass sod, concrete curbing, sidewalks, paved surfaces or other items if damaged due to the Contractor's activities.

B. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Thermal shock.
5. Excessively high or low humidity.
6. Air contamination or pollution.
7. Water or ice.
8. Solvents.
9. Chemicals.
10. Light.
11. Radiation.
12. Puncture.
13. Abrasion.
14. Heavy traffic.
15. Soiling, staling and corrosion.
16. Bacteria.

17. Rodent and insect infestation.
18. Combustion.
19. Electrical current.
20. High speed operation.
21. Improper lubrication.
22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft.
30. Vandalism.

C. Comply with Environmental Protection Agency Standards for Lead Renovation, Repair, and Painting Program (RRP); 40 CFR Part 745 and Kansas Department of Health and Environment Regulations K.A.R. 28-72-1 to 28-72-54.

1. Conduct pre-renovation education and notification.
2. Supervise construction activities to ensure that lead safe work practices are performed and take proper precautions concerning presumed lead materials.
3. Prevent discharge, dispersal, release or escape of lead dust and debris.
4. Isolate work areas and ensure that renovation dust or debris does not spread beyond contract limits or the project work areas. If latent emissions occur, perform cleaning, recleaning, and subsequent cleaning verifications as necessary. The Contractor shall not leave lead dust hazards in Owner facilities. Lead dust hazard means surface dust that contains a dust-lead loading (area concentration of lead) at or exceeding the levels promulgated by State of Kansas and Federal regulations. The Contractor shall not impair the Owner's ability to occupy work areas under this contract beyond substantial completion dates by leaving lead dust hazards.
5. During construction the Contractor shall perform visual inspections and cleaning verifications and shall weigh and assess the risks presented by the actual or presumed presence of lead-based paint and/or lead-based paint hazards.
6. The Contractor shall comply with State of Kansas and Federal lead safe work practices to clean and reclean each work area for safe post renovation occupancy by unprotected workers, children, and other building occupants.
7. Comply with the US Occupational Safety and Health Administrations's Lead in Construction Rule, 29 CFR Park 1926 et al., 29 CFR Part 1910 et al.

    a. Communicate information concerning lead hazards according to the requirements of OSHA's Hazard Communication Standard for the construction industry, 29 CFR 1926.59.
    b. Employee notification: Prior to the commencement of work activities, make available to the affected parties information developed for the hazard communication standard for this purpose.
    c. The Contractor shall properly clean all areas where suspect or identified lead-based paint products are disturbed prior to project completion.
8. At the Pre-Construction Meeting the Contractor shall submit documents which indicate:

    d. Contractor and subcontractors are lead certified firms.
    e. That each firm employees at least one lead certified renovator who is specifically trained to supervise and direct lead safe work practices, post signage, and perform cleaning verifications.
    f. That individual workers are trained to use lead safe work practices.
9. Product Prohibition: Do not install lead-based paints or coatings. Do not install lead bearing materials. The Contractor shall not install lead or lead-bearing

products as defined by the US Consumer Product Safety Commission's Ban of Lead-Containing Paint and Certain Products Bearing Lead-Containing Paint 16 CFR 1303 et. Al.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01045 - CUTTING AND PATCHING

PART 1 GENERAL

1.01 SECTION INCLUDES:

A. Summary

B. Submittals

C. Quality Assurance

D. Products

E. Cleaning

F. Renovation Supplemental Project Procedures

1.02 SUMMARY

A. This section specifies administrative and procedural requirements for cutting and patching.

B. Refer to other sections for specific requirements and limitations applicable to cutting and patching individual parts of the work.

1. Requirements of this section apply to mechanical and electrical installations. Refer to Division-22 sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.03 SUBMITTALS

A. Cutting and Patching Description: Where approval of procedures for cutting and patching is required before proceeding, submit a description of the procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:

1. Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.
2. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
3. List products to be used and firms or entities that will perform work.
4. Indicate dates when cutting and patching is to be performed.
5. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
6. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations signed and sealed by a qualified professional engineer licensed in the State of Kansas to show how reinforcement is integrated with the original structure.
7. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of a part of the work found to be unsatisfactory.

1.04 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

1. Obtain approval of the cutting and patching description before cutting and patching the

following structural elements:

a. Foundation construction.
b. Bearing and retaining walls.
c. Structural concrete.
d. Structural steel.
e. Lintels.
f. Structural decking.
g. Miscellaneous structural metals.
h. Equipment supports.
i. Piping, ductwork, vessels and equipment.

B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increase maintenance, or decreased operational life or safety.

1. Obtain approval of the cutting and patching description before cutting and patching the following operating elements or safety related systems:

a. Primary operational systems and equipment.
b. Air or smoke barriers.
c. Water, moisture, or vapor barriers.
d. Membranes and flashings.
e. Fire protection systems.
f. Noise and vibration control elements and systems.
g. Control systems.
h. Communication systems.
i. Electrical wiring systems.

C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace work that has been cut and patched in a visually unsatisfactory manner.

1. If possible, retain the original installer or fabricator to cut and patch the following categories of exposed work; or if it is not possible to engage the original installer or fabricator, engage another recognized experience and specialized firm:

a. Processed concrete finishes.
b. Stonework.
c. Ornamental metal.
d. HVAC enclosures, cabinets or covers.

PART 2 PRODUCTS

2.01 MATERIALS

A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 EXECUTION

3.01 INSPECTION

A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

3.02 PREPARATION

A. Temporary Support: Provide temporary support of work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the project that might be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Take all precautions necessary to avid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.03 PERFORMANCE

A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible, review proposed procedures with the original installer; comply with the original installer's recommendations.

1. In general, where cutting is required, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
4. Comply with requirements of applicable sections of Division-2.
5. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

3.04 CLEANING

A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

3.04 RENOVATON SUPPLEMENTAL PROJECT PROCEDURES

A. Materials: As specified in Product Sections; match existing products and work for patching and extending work.

B. Close openings in exterior surfaces to protect existing work from weather and extremes of

temperature and humidity.

C. Remove, cut and patch work in a manner to minimize damage and to provide a means of restoring products and finishes to original condition.

D. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.

E. Where new work abuts or aligns with existing, perform a smooth and even transition. Patched work to match existing adjacent work in texture and appearance.

F. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.

G. Where a change of plane of ¼-inch or more occurs, submit recommendation for providing a smooth transition for Architect review.

H. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.

Finish surfaces as specified in individual product sections.

END OF SECTION

SECTION 01095 - REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Related documents

B. Definition

C. Specification Format and Content Explanation

D. Industry Standards

E. Governing Regulations/Authorities

F. Submittals

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to this section.

1.03 DEFINITIONS

A. Indicated: The term “indicated” refers to graphic representations, notes, or schedules on the drawings, other paragraphs or schedules in the specifications, and similar requirements in the contract documents. Where terms such as “shown”, “noted”, “scheduled”, and “specified” are used, it is to help the reader locate the reference; no limitation on locating is intended.

B. Directed: Terms such as “directed”, “requested”, “authorized”, “selected”, “approved”, “required”, and “permitted” mean “directed by the architect/consultant”, “requested by the architect/consultant”, and similar phrases.

C. Approve: The term “approved”, where used in conjunction with the architect/consultant’s action on the Contractor’s submittals, applications, and requests, is limited to the architect/consultant’s duties and responsibilities as stated in General, Supplementary, and Special Provisions.

D. Regulation: The term “Regulations” includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the asbestos removal, hazardous waste, and construction industries that control performance of the work.

E. Furnish: The term “furnish” is used to mean “supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations”.

F. Install: The term “install” is used to describe operations at project site including the actual “unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations”.

G. Provide: The term “provide” means “to furnish and install, complete and ready for the intended use”.

H. Installer: An “Installer” is the Contractor or an entity engaged by the Contractor, either as an employee, Subcontractor, or sub-subcontractor, for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

1. The term “experienced” when used with the term “Installer” means having a minimum of five previous projects similar in size and scope to this project, being familiar with the precautions required, and having complied with requirements of the authority having jurisdiction.
2. Trades: Use of titles such as “carpentry” is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as “carpenter”. It also does not imply that requirements specified apply exclusively to trades persons of the corresponding generic name.

I. Assignment of Specialists: Certain sections of the specifications require that specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility offer fulfilling contract requirements remains with the Contractor.

1. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

J. Project Site is the space available to the Contractor for performance of activities, either exclusively or in conjunction with others performing other work as part of the project. The extent of the Project Site is shown on the drawings and may or may not be identical with the description of the actual Project Site. All dimensions and locations should be field verified and noted by the Contractor.

K. Testing Laboratories: A “testing laboratory” is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.04 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: The specifications are organized into divisions and sections based somewhat on the Construction Inspection Institute’s 16-Division format and MASTER FORMAT numbering system.

B. Specification Content: This specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language: Language used in specifications and other contract documents is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the full context of the contract documents so indicates.
2. Imperative and streamlined language is used generally in the specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.

a. The words “shall be” shall be included by inference wherever a colon (:) is used within a sentence or phrase.

1.05 INDUSTRY STANDARDS

A. Applicability of Standards: Except where the contract documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the contract documents. Such standards are made a part of the contract documents by reference.

B. Publication Dates: Where the date of issue of a referenced standard is not specified, comply with the standard in effect as of date of contract documents.

C. Conflicting Requirements: Where compliance with two or more standards is specified, and the standards establish different or conflicting requirements for minimum quantities or quality levels,

refer requirements that are different, but apparently equal, and uncertainties to the architect and/or owner for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity level shown or specified shall be the minimum provided or performed. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for the context of the requirement. Refer uncertainties to the architect and/or owner for a decision before proceeding.

D. Copies of Standards: Each entity engaged in activities on the project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the contract documents.

1. Where copies of standards are needed for performance of a required activity, the Contractor shall obtain copies directly from the publication source.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the specifications or other contract documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations", published by Gale Research Co., available in most libraries.

1.06 GOVERNING REGULATIONS/AUTHORITIES

A. As applicable, the architect and/or engineer has contacted authorities having jurisdiction to obtain information necessary for preparation of contract documents. Contact authorities having jurisdiction directly for information and decisions having a bearing on the work.

1.07 SUBMITTALS

A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01200 - PROJECT MEETINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Related Documents

B. Summary

C. Pre-Construction Conference

D. Pre-Installation Conference

E. Progress Meetings

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division-1 specification sections, apply to this section.

1.03 SUMMARY

A. This section specifies administrative and procedural requirements for project meetings including, but not limited to:

1. Preconstruction conference.
2. Preinstallation conferences.
3. Coordination meetings.
4. Progress meetings.

B. Construction schedules are specified in another Division-1 section.

1.04 PRECONSTRUCTION CONFERENCE

A. The Contractor shall schedule a preconstruction conference and organizational meeting at the project site or other convenient location within fourteen (14) days of contract execution, and at least seven (7) days prior to commencement of any construction activities. The Contractor shall conduct the meeting to review responsibilities and personnel assignments.

B. Attendees: School District, the Architects/Consultants, the Contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the work.

C. Agenda: Discuss items of significance that could affect progress, including such topics as:

1. Tentative construction schedule.
2. Critical work sequencing.
3. Designation of responsible personnel.
4. Procedures for processing field decisions and change orders.
5. Procedures for processing applications for payment.
6. Distribution of contract documents.
7. Submittal of Shop Drawings, Product Data and Samples.
8. Preparation of record documents.
9. Use of the premises.
10. Office, work and storage areas.
11. Equipment deliveries and priorities.
12. Safety procedures and compliance with Lock Out/Tag Out procedures.

13. Lead safe work practices and lead hazard prevention procedures.
14. First aid.
15. Security.
16. Housekeeping.
17. Working hours.
18. Testing agencies and procedures.
19. Temporary utilities; water, electric, phone.
20. Temporary lavratory facilities.
21. Quality control.

D. The Contractor shall record meeting minutes and distribute copies to everyone in attendance and to others affected by decisions of actions resulting from the meeting.

1.05 PREINSTALLATION CONFERENCES

A. The General Contractor shall convene a preinstallation conference at the site before each construction activity that requires coordination with other construction. The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the architect and owner of scheduled meeting dates.

B. Review the progress of the construction activities and preparations for the particular activity under consideration at each preinstallation conference, including requirements for:

1. Contract documents.
2. Options.
3. Related Change Orders.
4. Purchases.
5. Deliveries.
6. Shop drawings, product data and quality control samples.
7. Possible conflicts.
8. Compatibility problems.
9. Time schedules.
10. Weather limitations.
11. Manufacturer’s recommendations.
12. Compatibility of materials.
13. Acceptability of subtrates.
14. Temporary facilities.
15. Space and access limitations.
16. Governing regulations.
17. Safety and application of associated Lock Out/Tag Out procedures.
18. Inspection and testing requirements.
19. Required performance results.
20. Recording requirements.
21. Protection.
22. Punchlist procedures and Architect/Engineer responsibilities limitations.

C. Notify architect and owner four days in advance of meeting date when their attendance is required by individual section.

D. The Contractor shall prepare agenda, preside at the conference and record significant discussions and agreements and disagreements of each conference, along with the approved schedule. The Contractor shall distribute the record of the meeting to everyone concerned, promptly, including the owner and architect.

E. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of work and reconvene the conference at the earliest feasible date.

1.06 PROGRESS MEETINGS

A. Conduct progress meetings at the Project Site at a minimum of bi-monthly intervals or as directed by the Architect. Notify the Owner and Architect of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.

B. Attendees: In addition to representatives of the Owner and Architect, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meeting by persons familiar with the Project and authorized to conclude matters relating to progress..

C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the project.

1. Contractor's Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's schedule, whether on time or ahead or behind schedule. Determine how operations behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed with the contract time.

2. Produce and review a two-week "look ahead" schedule outlining planned construction activities for the next two weeks (or the period of time until the next progress meeting).

3. Review the present and future needs of each entity present, including such items as:

a. Interface requirements.
b. Time.
c. Sequences.
d. Deliveries.
e. Off site fabrication status.
f. Access.
g. Site utilization.
h. Temporary facilities and services.
i. Hours of work.
j. Hazards and risks.
k. Housekeeping.
l. Quality and work standards.
m. Change orders.
n. Documentation of information for payment requests.
o. Outstanding items; submittals, proposal requests, RFIs.
p. Quality assurance.
q. Safety and application of necessary Lock Out/Tag Out procedures.
r. Performance of lead safe work practices.

D. Reporting: No later than three days after each progress meeting date, the Contractor is to distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and reports.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Related Documents.

B. Summary.

C. Submittal Procedures.

D. Contractor's Construction Schedules.

E. Submittal Schedule.

F. Daily Construction Reports.

G. Preexisting Conditions Video Survey.

H. Shop Drawings.

I. Product Data.

J. Samples.

K. Communications Facilitating Contract Administration.

L. Architect's Action.

M. Contractor's Action on Returned Submittals.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this section.

1.03 SUMMARY

A. This section specifies administrative and procedural requirements for submittals required for performance of the work, including:

1. Submittal procedures.
2. Contractor's construction schedule.
3. Submittal schedule.
4. Daily construction reports.
5. Construction photographs.
6. Shop drawings.
7. Product data.
8. Samples.
9. Informational submittals.
10. Communications.

B. Administrative Submittals: Refer to other Division-1 sections and other contract documents for requirements for administrative submittals. Such submittals include, but are not limited to:

1. Permits.
2. Applications for payment.
3. Performance, payment bonds, and statutory bond.
4. Insurance certificates.
5. List of subcontractors.

C. The “Schedule of Values” submittal is included in Division-1 Section “Applications for Payment.”

D. Inspection and test reports are included in Division-1 Section “Quality Control Services.”

E. The “Product List” submittal is included in Division-1 Section “Materials and Equipment.”

1.04 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related activities to avoid delay and to allow sufficient review time.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related elements of the work so processing will not be delayed by the need to review submittals concurrently for coordination.

   a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received. Such action shall not be grounds for an extension of time or delay by the Contractor.

3. The Architect may request submittals in addition to those indicated in the technical sections when deemed necessary to adequately describe the work covered in the respective section.

4. Units of weights and measurements used on all submittals shall be the same as used in the contract documents.

5. Processing: Allow sufficient review time so that the work will not be delayed as a result of the time required to process submittals, including time for resubmittals.

   The Architect shall be responsible for reviewing and certifying that submittals are in compliance with the contract requirements. The approving authority on submittals is the Architect unless otherwise specified for the specific submittal.

   a. Allow at least seven (7) working days in Architect’s office for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Architect will promptly advise the Contractor when a submittal being processed must be delayed for coordination with work by others.

b. If an intermediate submittal is necessary, process in the same manner as the initial submittal.
c. Allow at least four (4) working days for reprocessing each submittal.
d. No extension of contract time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the work to permit processing.

B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

1. Provide a space approximately 4" x 5" on the label or beside the title block on shop drawings, product data and samples to record the Contractor's review and approval markings and the action taken.
2. Include the following information on the label for processing and recording action taken:

a. Project name.
b. Date.
c. Name and address of Architect.
d. Name and address of Contractor.
e. Name and address of subcontractor.
f. Name and address of supplier.
g. Name of manufacturer.
h. Number and title of appropriate specification section.
i. Drawing number and detail references, as appropriate.

C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Architect including the information below. Submittals received by Architect from sources other than the Contractor will be returned without action.

1. Record relevant information and requests for data on the transmittal. On the form, or separate sheet, record deviations from contract document requirements, including minor variations and limitations. Include Contractor's signed certification that information complies with contract document requirements.
2. Submit to Architect at business address.

1.05 CONTRACTOR'S BAR CHART CONSTRUCTION SCHEDULES (Alternate to CPM Schedule)

A. The Contractor shall provide Critical Path Method (CPM) scheduling services, including planning, evaluating and reporting; subcontractors shall participate in scheduling.

1. Standards: Comply with procedures contained in "CPM in Construction-A Manual for General Contractors" published by The Associated General Contractors of America, Inc.

B. Interim Schedules: The Contractor, within ten (10) calendar days after execution of the contract, shall submit an interim construction schedule to the Owner's representative and Architect. The schedule shall be in the form of a bar chart or a Critical Path Method (CPM) schedule. The schedule shall include as many activities as necessary to sufficiently detail the work to be performed during the first thirty (30) working days of the construction. The interim schedule shall also detail, in general, the balance of the construction work past the first thirty (30) work days.

C. CPM Construction Schedule: The Contractor, within thirty (30) calendar days after execution of contract, shall submit a detailed construction schedule to the Owner's representative and Architect. The schedule shall be in the form of a Critical Path Method (CPM) schedule. The CPM shall be in the arrow diagram method where the activity and duration is represented on the arrow. The CPM schedule shall include logic drawings and corresponding computer printouts. The CPM schedule shall be updated monthly. A narrative report shall be submitted with each update. In addition, the Contractor will provide a time scaled summary chart.

D. Scope: The CPM schedule as a minimum, shall provide for 1) work sequence as identified in Section 01010 Summary of Work; 2) provisions for adverse weather as identified in the General Conditions; and, 3) the following:

1. Long lead time procurement activities.
2. Contractor phasing activities.
3. Activation and testing activities.
4. Milestone dates for contract phasing requirements.
5. Owner furnished equipment activities.
6. Logic restraints reflecting the flow of manpower.
7. Utility tie-in activities.
8. Clean-up and punchlist activities and Owner move-in activities.
9. Activity durations in working days.
10. The project shall be broken down into logical building areas by floor levels, elevations, functional spaces, and addition or renovation, and as required.
11. Work activities performed by subcontractors.
12. Concurrent work activities under separate contract.
13. Shop drawing, submittals and approval.
14. Weather constraints.
15. Change orders.

E. Logic Drawings: The CPM logic drawings shall be 30" x 42" and shall, as a minimum, include:

1. The activity description.
2. Activity duration.
3. Marked critical path.
4. Marked complete activities.
5. Highlighted milestone dates.
6. Update number and date.

F. Computer Printouts: The CPM computer printouts shall, as a minimum, include:

1. The activity I-J designation.
2. The activity description.
3. The activity duration (in working days).
4. Activity early state date.
5. Activity late start date.
6. Activity early finish date.
7. Activity late finish date.
8. Slack or total float.
9. Subcontract or trade designation.

G. Developing the Schedule. The Contractor shall meet jointly with the subcontractors, suppliers, and the Architect when developing the CPM schedule.

H. Owner's Review: Within five (5) working days after receipt of the Contractor's schedule, the Owner and Architect shall meet with the contractor for the final review of the schedule. Review of the schedule by the Owner does not relieve the Contractor's responsibility for the schedule's accuracy or the ability of the Contractor to meet the dates set forth therin, nor does such review constitute an acknowledgement or admission by the Owner of the reasonableness of durations or logic of the schedule.

I. Update Schedule Submittals: An updated schedule submittal, including a written schedule recovery statement if required, shall accompany the Contractor's Application for Payment. The Contractor's Application for Payment will not be processed until the update schedule has been received by the Owner.

J. Narrative Report: The Contractor shall prepare a narrative report as a part of each schedule update, in a form agreed upon by the Architect. The narrative report shall include a description of the current status of the work, problem areas, current and anticipated delaying factors and their estimated impact on performance of other activities and completion dates; and an explanation of corrective action taken or proposed.

K. Schedule Slippage: Whenever the current schedule update reflects that the project in five (5) or more working days behind schedule, the Contractor shall submit a written statement to the Architect describing the cause of the slippage and the actions being considered by the Contractor to recover the time slot. The written schedule recovery statement shall be submitted with the monthly schedule update.

L. The progress schedule shall indicate the monthly anticipate adverse weather days, if any, pursuant to the Supplemental and General Conditions and indicate the constraints of anticipated adverse weather on planned activities. Update submittals of the progress schedule shall indicate actual adverse weather days and their impact on planned activities.

M. Any adjustments in Contract Time executed by Change Order shall be included in the update submittals of the project schedule.

1.05 CONTRACTOR'S CPM CONSTRUCTION SCHEDULES

A. The Contractor shall provide a detailed bar chart or a Critical Path Method (CPM) schedule. The schedule shall include as many activities as necessary to sufficiently detail the work to be performed.

B. Scope: The schedule as a minimum, shall provide for 1) work sequence as identified in Section 01010 Summary of Work; 2) provisions for adverse weather as identified in the General Conditions; and, 3) the following:

1. Long lead time procurement activities.
2. Contractor phasing activities.
3. Activation and testing activities.
4. Milestone dates for contract phasing requirements.
5. Owner furnished equipment activities.
6. Utility tie-in activities.
7. Clean-up and punchlist activities and Owner move-in activities.

8. Activity durations in working days; including:

   a. Activity early state date.
   b. Activity late start date.
   c. Activity early finish date.
   d. ctivity late finish date.
   e. Slack or total float.

9. The project shall be broken down into logical building areas by floor levels, elevations, functional spaces, and addition or renovation, and as required.
10. Work activities performed by subcontractors.
11. Concurrent work activities under separate contract.
12. Shop drawing, submittals and approval.
13. Weather constraints.

C. Developing the Schedule: The Contractor shall meet jointly with the subcontrators, and suppliers, when developing the schedule.

D. Owner's Review: Within five (5) working days after receipt of the Contractor's schedule, the Owner and Architect shall meet with the Contractor for the final review of the schedule. Review of the schedule by the Owner does not relieve the Contractor's responsibility for the schedule's accuracy or the ability of the Contractor to meet the dates set forth therein, nor does such review constitute an acknowledgement or admission by the Owner of the reasonableness of durations or logic of the schedule.

E. Updated Schedule Submittals: An updated schedule submittal, including a written schedule recovery statement if required, shall accompany the Contractor's Application for Payment. The Contractor's Application for Payment will not be processed until the update schedule has been received by the Owner.

1. Schedule Slippage: Whenever the current schedule update reflects that the project is five (5) or more working days behind schedule, the Contractor shall submit a written statement to the Architect describing the cause of the slippage and the actions being considered by the Contractor to recover the time slot. The written schedule recovery statement shall be submitted with the monthly schedule update.

2. The progress schedule shall indicate the monthly anticipated adverse weather days, if any, pursuant to the Supplemental and General Conditions and indicate the constraints of anticipated adverse weather on planned activities. Update submittals of the progress schedule shall indicate actual adverse weather days and their impact on planned activities.

3. Any adjustments in Contract Time executed by Change Order shall be included in the update submittals of the project schedule.

1.06 SUBMITTAL SCHEDULE

A. After development and acceptance of the Contractor's schedule, prepare a complete schedule of submittals. Submit the schedule within ten (10) days of the date required for establishment of the Contractor's construction schedule.

1. Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as wells as the Contractor's Construction Schedule.

2. Prepare the schedule in chronological order; include submittals required during the construction. Provide the following information.

   a. Scheduled date for the first submittal.
   b. Related section number.
   c. Submittal category.
   d. Name of subcontractor.
   e. Description of the part of the work covered.
   f. Scheduled date for resubmittal.

B. Distribution: Following response to initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the project meeting room and field office.

1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in project activities.

C. Schedule Updating: Revise the submittal schedule after each meeting or activity, where revisions have been recognized or made relating to submittals. Issue the updated schedule concurrently with report of each such meeting.

1.07 DAILY CONSTRUCTION REPORTS

A. The Contractor's Superintendent shall prepare a daily construction report, recording the following information, in a narrative format, concerning events at the site; and submit original documents to the Architect and/or Owner upon request.

1. List of subcontractors at the site.
2. Approximate count of personnel at the site, identifying the number of workers and supervisors.
3. Lead safe work practices and cleaning verifications.
4. High and low temperatures, general weather conditions.
5. Accidents and unusual events.
6. Meetings and significant decisions.
7. Stoppages, delays, shortages, losses.
8. Emergency procedures.
9. Orders and requests of governing authorities.
10. Change orders received, implements.
11. Services connected, disconnected.
12. Equipment or system tests and start-ups.
13. Partial completions and occupancies.
14. Type and usage of major pieces of heavy equipment.

1.08 PRE-EXISTING CONDITIONS VIDEO SURVEY

A. Submit a pre-existing condition list and/or video with the initial application for payment. Specifically note any pre-existing conditions which may result in a potential dispute with the Owner.

1.09 SHOP DRAWINGS

A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the contract documents. Do not reproduce contract documents or copy standard information as the basis of shop drawings. Standard information prepared without specific reference to the project is not considered shop drawings. Shop drawings' quality is subject to approval.

B. Shop drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:

1. Dimensions.
2. Relationship to building grids or coordinates.
3. Interface with adjacent construction.
4. Identification of products and materials included.
5. Compliance with specified standards.
6. Notation of dimensions established by field measurement.

C. Sheet Size: Except for templates, patterns and similar full-size drawings, submit shop drawings on sheets 8½" x 11", 11" x 17", or 30" x 42". No other sizes will be accepted.

D. Submittal: Submit at least two blue-line prints. One of the blue-line prints will be retained by the Architect. The Contractor shall be responsible for making appropriate number of copies for distribution to other affected parties.

E. Do not use shop drawings without an appropriate final stamp indicating action taken in connection with construction.

1.10 PRODUCT DATA

A. Collect product data into a single submittal for each specified product. Product data includes printed information such as catalog cuts, Material Safety Data Sheets (MSDS), and other performance information.

1. Mark each copy to show applicable choices and options. Where printed product data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:

a. Manufacturer's printed recommendation.
b. Compliance with recognized trade association standards.
c. Compliance with recognized testing agency standards.
d. Application of testing agency labels and seals.
e. Notation of dimensions verified by field measurement.
f. Notation of coordination requirements.
g. Any limitations on warranty or guarantee of manufacturer.

2. Do not submit product data until compliance with requirements of the contract documents has been confirmed.

B. Submittals: Submit three (3) copies. Submit two (2) additional copies where required for maintenance manuals. The Architect will return one copy marked with action taken and corrections or modifications required.

1. Unless noncompliance with contract documents provisions is observed, the submittal may serve as the final submittal.

C. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal form.

1. Do not proceed with installation until a copy of the applicable product data is in the Installer's possession.
2. Provide copies for record documents described in Section 01700 – Project Closeout.

D. Do not permit use of unmarked copies of product data in connection with construction.

1.11 SAMPLES

A. Submit full-size, full fabricated samples cured and finished as specified (where applicable) and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or container of materials, color range sets, and swatches showing color, texture and pattern.

1. Mount, display, or package samples in the manner specified to facilitate review of qualities indicated.

   Prepare samples to match the Architect's sample. Include the following:

   a. General description of the sample.
   b. Sample sources
   c. Product name or name of manufacturer.
   d. Compliance with recognized standards.
   e. Availability and delivery time.

2. Submit samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.

   a. Where variation in color, pattern, texture or other characteristics are inherent in the material or product represented, submit multiple units (not less than three), that show approximate limits of the variations.
   b. Refer to other specification sections for requirements for samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
   c. Refer to other sections for sample to be returned to the Contractor for incorporation in the work. Such samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of sample submittals.

B. Submittals: Except for samples illustrating details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit three sets: One set will be returned with comments.

C. Maintain sets of samples, as returned, at the project site, for quality comparisons throughout the course of construction.

1. Unless non-compliance with contract documents provisions is observed, the submittal may serve as the final submittal.
2. Sample sets may be used to obtain final acceptance of the construction associated with each set.

D. Distribution of Samples: prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the work. Show distribution on transmittal forms.

E. Field Samples: Field samples specified in individual sections are special types of samples. Field samples are full-size samples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the work will be judges.

1. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.
2. Allow at least seven (7) days after completion and curing (where applicable) of field sample for Architect's review. Notify Architect in writing upon completion of field sample.
3. Where required, give Architect notice and an opportunity to observe field erection or application of field sample.

1.12 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

A. Except as otherwise provided in the contract documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate through the Architect. Communications by and with subcontractors and material suppliers shall be through the Contractor.

B. All requests for information regarding or clarification of the plans and specifications shall be made in writing referencing the specification section and statement requiring clarification. Deliver to Architect's business address.

1.13 ARCHITECT'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect will review each submittal, mark to indicate action taken, and return promptly.

1. Compliance with specified characteristics is the Contractor's responsibility.

B. Submittal Stamp: The Architect will stamp each submittal with a uniform, self-explanatory submittal stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

1. Action A – Reviewed: Where submittals are marked “Reviewed”, that part of the work covered by the submittal may proceed provided it complies with requirements of the contract documents.
2. Action B – Reviewed – Additional Information Required: Where submittals are marked “Reviewed – Additional Information Required”, the information submitted has been reviewed. However, additional information as noted and/or required by contract documents need to be submitted.
3. Action C – Furnish as Corrected: When submittal is marked “Furnish as Corrected”, that part of the work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the contract documents.
4. Action D – Revise and Resubmit: When submittal is marked “Revise and Resubmit”, do not proceed with that part of the work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.

    a. Do not permit submittals marked “Revise and Resubmit” to be used at the project site, or elsewhere where work is in progress.

5. Action E – Rejected: When submittal is marked “Rejected”, information submitted is not in compliance with contract documents. Resubmit submittal as required by contract documents.

D. Meaning of Architect’s Approval: Review is only for conformance with the design concept and for compliance with the information given in the contract documents. Approval does not authorize changes involving additional cost unless stated in separate change order or letter. Contractor is not relieved of responsibility for any deviations in submittals from requirements of the contract documents. Contractor is responsible for dimensions to be confirmed and correlated at the site; for information that pertains solely to the fabrication processes or to means, methods, techniques, sequences and procedures of construction; and for coordination of the work of all trades. Approval of a specific item does not indicate approval of an assembly of which the item is a component.

1.14 CONTRACTOR’S ACTION ON RETURNED SUBMITTALS

A. The Contractor shall coordinate distribution of all product data and samples for the project.

B. The Contractor is responsible to reproduce and distribute copies of stamped returned submittals as required for this use in abatement, or in corrections for resubmittal.

C. The Contractor is responsible to reproduce and distribute copies of stamped returned submittals as required for his use and subcontractor’s use in preparing and submitting other submittals such as, close-out, maintenance manuals, etc., Refer to other sections of the specifications for requirements.

1. The Contractor shall maintain a current set of abatement plans and specifications which shall be available to the Architect at the job site during the course of the work.

PART 2 -- PRODUCTS

Not applicable.

PART 3 -- EXCECUTION

Not applicable.

END OF SECTION

SECTION 01400 - QUALITY CONTROL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Contractor's Quality Control

B. Contractor's Quality Control Program

C. Pre-Installation Conferences

D. Initial and Follow-up Inspections

E. Mock Up

F. Field Samples

G. Manufacturer’s Field Services and Reports

H. References

I. Inspection and Testing Laboratory Services

J. Quality Assurance and Control of Installation

K. Safety

1.02 RELATED SECTIONS

A. Section 01040 - Coordination and Meetings

B. Section 01300 - Submittals

C. Section 01700 - Contract Closeout

1.03 CONTRACTOR'S QUALITY CONTROL

A. The quality of all work shall be the responsibility of the Contractor. Sufficient inspections and tests of all items of work, including that of subcontractors, to ensure conformance to applicable specifications and drawings with respect to the quality of materials, workmanship, construction finish, functional performance, and identification shall be performed on a continuing basis. The Contractor shall furnish qualified personnel, appropriate facilities, instruments and testing devices necessary for the performance of the quality control function. The controls shall be adequate to cover all construction operations both on and off site, shall be keyed to the proposed construction sequence and shall be correlated by the Contractor’s quality control personnel.

1.04 CONTRACTOR’S QUALITY CONTROL PROGRAM

A. The Contractor shall submit to the Architect a copy of the proposed written quality control program prior to submission of the Contractor’s first application and certificate for payment. The Contractor’s written quality control plan shall include as a minimum:

1. Identification of the project team for this project. Team members include, but are not necessarily limited to, the Owner’s Project Manager, Architect, Mechanical Consultant, Electrical Consultant, Site Engineer, Structural Consultant, General Contractor and major subcontractors. List company name, address, contact and telephone number.

2. Name and identification of the Contractor's Quality Control representative (may be the superintendent or other key contract representative). Provide a brief description of proposed duties and qualifications. The quality control representative must have the authority to make all decisions relating to quality control issues.
3. General summary and mission statement outlining general procedures for implementation of the program.
4. List by specification section the method of performing, documenting and enforcing quality control operations of both prime and subcontract work including proposed and required inspection and testing. Include preinstallation conferences, follow-up inspections, mockups, field samples and manufacturer's inspection, and lead safe work practices and cleaning verifications.
5. The Contractor's quality control program shall be submitted and accepted prior to consideration of the Contractor's first certificate and application for payment.

1.05 PREINSTALLATION CONFERENCES

A. Pre-installation conferences shall be performed prior to beginning each feature of work for any on-site construction work. Preparatory inspections for the applicable feature of work shall include: review of submittal requirements and all other contract requirements with the foreman or supervisors directly responsible for the performance of the work; check to assure that provisions have been made to provide required field control testing; examine the work area to ascertain that all preliminary work has been completed; verify all field dimensions and advise the project Architect of any discrepancies; and perform a physical examination of materials and equipment to assure that they conform to approved shop drawings or submittal data and that all materials and/or equipment are on hand; review special requirements, review shop drawings and sample construction mockups as appropriate.

B. The Contractor shall prepare agenda, preside at conference, record minutes, and distribute copies within five (5) days after conference to participants, with copies to the Architect and Owner.

1.06 INITIAL AND FOLLOW UP INSPECTIONS

A. An initial inspection shall be performed as soon as a representative portion of the particular feature of the work is complete and shall include examination of the quality of workmanship as well as a review of the work for compliance with contract requirements. The initial inspection shall be performed by the Contractor's Quality Control representative and results noted in the Contractor's daily reports. Any deviations from the contract requirements shall be brought to the immediate attention of the Architect.

1.07 MOCK UP

A. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals and finishes.

B. Where mock up is specified in individual sections to be removed, clear area after mock up has been accepted by the Architect.

1.08 FIELD SAMPLES

A. Install field samples at the site as required by individual specifications sections for review.

B. Acceptable samples represent a quality level for the work.

C. Where field sample is specified in individual sections to be removed, clear area after field sample has been accepted by the Architect.

1.09 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. Submit qualifications of observer to Architect thirty (30) days in advance of required observations. Observer subject to approval of Architect and Owner.

B. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start up of equipment, and test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.

C. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

D. Submit report within thirty (30) days of observation to the Architect for review.

1.10 REFERENCES

A. Conform to reference standard by date of issue or current date of contract documents.

B. Obtain copies of standards when required by contract documents.

C. Should specified reference standards conflict with contract documents, request clarification from Architect before proceeding.

D. The contractual relationship of the parties to the contract shall not be altered from the contract documents by mention or inference otherwise in any reference document.

1.11 INSPECTION AND TESTING LABORATORY SERVICES

A. Architect will appoint, employ, and pay for services of an independent firm to perform inspection and testing, except when a specification section specifically states that testing of that work be provided for by the Contractor.

B. The independent firm will perform inspections, tests, and other services specified in individual specification sections and as required by the Architect.

C. Reports will be submitted by the independent firm to the Architect, in duplicate, indicating observations and results of tests and indicating compliance or noncompliance with contract documents.

D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.

1. Notify Architect and independent firm forty-eight hours prior to expected time for operations requiring services.
2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

E. Retesting required because of nonconformance to specified requirements shall be performed by the same independent firm on instructions by the Architect. Payment for retesting will be charged to the Contractor by deducting inspection or testing charges from the contract sum.

1.12 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply fully with manufacturer's instructions, including each step in sequence.

C. Should manufacturer's instructions conflict with contract documents, request clarification from Architect before proceeding.

D. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce workmanship of specified quality. Work that properly should be done by skilled labor shall not be attempted with common laborers. The Contractor shall have on the job, at all times, ample equipment to carry on the work properly, including such tools as may be necessary to meet emergency requirements.

1.13 SAFETY

A. Contractors who perform any work under this contract will fully comply with the provisions of the Federal Occupational Safety and Health Act of 1970 and to the rules and regulations promulgated pursuant to this Act.

1. Contractor must submit a safety program to the Architect prior to starting work on the site. This program should indicate the Contractor's plan to comply with OSHA requirements for the various conditions of the project. The Contractor shall appoint a safety representative on site. The safety program and Contractor's representative names must both be posed.
2. The Architect will take no action on the Contractor's safety program, but will forward it to the Owner for information only. The Contractor is responsible for safety on the project site per the contract documents.

B. Hazardous Material: In the event the Contractor encounters material on the site, reasonably believe to be asbestos or polychlorinated biphenyl (PCB) that has not been rendered harmless, the Contractor shall immediately stop work and notify the Architect and Owner. Such notification shall be documented in writing.

C. Provide any and all measures of protection required by the applicable local municipality for the protection of the public and employees during excavation operations and at completion of work. Measures taken shall include, but not be limited to, sidewalks, barricades, warning lights and signs/ and shall comply with American Standard Safety Code and all local laws and ordinances. Maintain in good condition during operations.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Related Documents

B. Summary

C. Submittals

D. Quality Assurance

E. Project Conditions

F. Temporary Construction and Support Facilities

G. Security and Protection Facilities Installation

H. Operation, Termination, and Removal

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including general and supplementary conditions and other Division-1 Specification sections, apply to this section.

1.03 SUMMARY

A. This section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.

B. Temporary utilities that may be required include, but are not limited to:

1. Water service and distribution.
2. Temporary electric power and light.
3. Gas service.
4. Telephone service.
5. Storm sewer.

C. Temporary construction and support facilities that may be required include, but are not limited to:

1. Temporary heat.
2. Field offices and storage sheds.
3. Temporary roads and paving.
4. Sanitary facilities, including drinking water.
5. Dewatering facilities and drains.
6. Temporary enclosures.
7. Hoists and lifts.
8. Temporary project identification signs and bulletin boards.
9. Waste disposal services.
10. Rodent and pest control.
11. Construction aids and miscellaneous services and facilities.

D. Security and protection facilities required include, but are not limited to:

1. Temporary fire protection.

2. Barricades, warning signs, lights.
3. Environmental protection.

1.04 SUBMITTALS

A. Temporary Utilities: Submit reports of tests, inspections, meter readings and similar procedures performed on temporary utilities.

1.05 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:

1. Building Code requirements.
2. Health and safety regulations.
3. Utility company regulations.
4. Police, Fire Department and Rescue Squad rules.
5. Environmental protection regulations.

B. Standards: Comply with NFPA Code 241, “Building Construction and Demolition Operations:, ANSI-A10 Series standards for “Safety Requirements for Construction and Demolition”, and NECA Electrical Design Library “Temporary Electrical facilities.”

1. Refer to “Guidelines for Bid Conditions for Temporary Job Utilities and Services”, prepared jointly by AGC and ASC, for industry recommendations.
2. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA temporary electric service. Install service in compliance with National Electrical Code (NFPA 70).

C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.06 PROJECT CONDITIONS

A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of the permanent service.

B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

3.01 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES

A. Locate field offices, storage sheds, sanitary facilities and other temporary construction and support facilities of ready access within project limit lines.

1. Maintain temporary construction and support facilities until near substantial completion. Personnel remaining after substantial completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.

2. Location of all temporary buildings shall be subject to the approval of the Owner and the governing authority.

B. Provide incombustible construction for offices, shops and sheds located within the construction area, or within 30 feet of building lines. Comply with requirements of NFPA 241.

C. Temporary Heat: Provide temporary heat required by construction activities, for curing or drying of completed installations or protection if installed construction from adverse effect of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirement to produce the ambient condition required and minimize consumption of energy.

D. Heating Facilities: Except where use of the permanent system is authorized, provide vented self-contained LP gas or fuel oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open flame, or salamander type heating units is prohibited.

E. Field Offices: provide insulated, weather tight temporary offices of sufficient size to accommodate required office personnel at the project site. Keep the office clean and orderly for use of small progress meetings. Furnish and equip offices.

F. Storage Trailers: Place storage trailers, sized, furnished and equipped to accommodate materials and equipment involved, including temporary utility service. Trailers are to be fully enclosed and placed on the site with prior approval of the Owner.

G. Temporary Roads and/or Equipment Access Paths: Construct and maintain temporary roads and/or access paths to adequately support the construction activity, during the construction period. Locate temporary roads, storage areas and parking where the same permanent facilities will be located, if possible.

1. Coordinate temporary road and/or access path development with subgrade grading, compaction, installation and stabilization of subbase, and installation of base and finish courses of permanent paving.
2. Install temporary roads and/or access paths to minimize the need to rework the installations and to result in permanent roads and/or access paths and paved areas that are without damage or deterioration when occupied by the Owner.
3. Extend temporary roads and/or access paths in and around the construction area as necessary to accommodate building structure erection, delivery and storage of materials, equipment usage, administration and supervision.

H. Sanitary facilities include temporary toilets and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operations and maintenance of fixtures and facilities. All sanitary conveniences shall be satisfactory to the Owner and shall conform to the regulations of the City, County, and State Health Departments.
1. Install where facilities will best serve the project's needs, with prior owner approval.
2. Provide toilet tissue, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.

I. Toilets: Install well-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.

J. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual sections, comply with dewatering requirements of applicable Division-2 sections. Where feasible, utilize the same facilities. Maintain the site, excavations and construction free of water.

K. Temporary Enclosures: Provide temporary enclosure of protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities, and to provide security from vandalism and theft.

1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 square feet or less with plywood or similar materials.
3. Close openings through floor or roof decks and horizontal surfaces with load-bearing wood-framed construction.

L. Temporary Enclosures for Lead Safe Work Area Isolation.

1. Before beginning the renovation, the Contractor shall isolate the work area so that no dust or debris leaves the work area while the renovation is being performed. Prevent latent dust emissions. Protect other areas of the facility from contamination by fugitive dusts.
2. In addition, the Contractor shall maintain the integrity of the containment by ensuring that any plastic or other impermeable materials are not torn or displaced, and taking any other steps necessary to ensure that no dust or debris leaves the work area while the renovation is being performed.
3. The Contractor must also ensure that containment is installed in such a manner that it does not interfere with occupant and worker egress in an emergency.

M. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered “tools and equipment” and not temporary facilities.

N. Project Identification and Temporary Signs: The Contractor will not erect free-standing or post any signs on property under the control of the School District without prior approval by the Owner. This includes signs on construction trailers, portable sheds, etc., which might legitimately be temporarily parked on said property by and for the Contractor’s use as part of this project. The Owner may provide and erect one or more project signs as they deem necessary.

O. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven days during normal weather or three days when the temperature is expected to rise above 80 degrees. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.

P. Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished permanent stairs with a protective covering of plywood or similar material so finish will be undamaged at the time of acceptance.

3.02 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Architect.

B. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonable predictable and controllable fire losses. Comply with NFPA 10 “Standard for Portable Fire Extinguisher”, and NFPA 241 “Standard for Safeguarding Construction, Alterations and Demolition Operations.”

1. Locate fire extinguisher where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
2. Store combustible materials in containers in fire-safe locations.
3. Maintain unobstructed access to fire extinguisher, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.

4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.

C. Permanent Fire Protection: At the earliest feasible date in each area of the project, complete installation of the permanent fire protection facility, including connected services, and place into operations and use. Instruct key personnel on use of facilities.

D. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.

E. Enclosure Fence: Prior to demolition or excavation, install an enclosure fence with lockable entrance gates. Locate where indicated , or enclose the entire site or the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.

1. Provide an open mesh chain link construction fence and gates, minimum 6-’0” high, with galvanized steel pipe posts.
2. Utilize concrete block or pegged steel pipe stabilizer brackets where fence panels adjoin or end.
3. Upon removal of the fencing, repair any disturbed areas to restore to original condition.
4. Locate the construction fence and gates to facilitate all jurisdictional exit and entry requirements from existing buildings and new construction.
5. If requested by the owner, the gates shall be double locked (lock to lock) with the contractor’s lock and the owner’s lock to allow owner access.
6. Locate the fence and gates to facilitate owner operations that may be in progress during construction.
7. Maintain the fence and gates throughout construction.

F. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.

1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

G. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise making tools and equipment harmful to humans so as to minimize complaints from persons or firms near the site.

1. Contractor shall comply with all Federal, state and local laws and regulations relating to environmental protection. Daily clean up of adjacent streets, sidewalks, and public structures due to construction debris shall be required at Contractor’s expense.

3.03 OPERATION, TERMINATION AND REMOVAL

A. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.
2. Protection: Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

B. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or not later than substantial completion. Complete, or if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves the right to take possession of project identification signs.
2. At substantial completion, clean and renovate permanent facilities that have been used during the construction period, including but not limited to:

a. Replace air filters and clean inside of ductwork and housings.
b. Replace significantly worn parts and parts that have been subject to unusual operating conditions.
c. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

END OF SECTION

SECTION 01600 - MATERIALS AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES:

A. Related Documents

B. Summary

C. Definitions

D. Submittals

E. Quality Assurance

F. Product Requirements and Selection Procedures

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to this section.

1.03 SUMMARY

A. This section specifies administrative and procedural requirements governing the Contractor's selection of products for use on the project.

B. The Contractor's construction schedule and the schedule of submittals are included under Division 1 Section "Submittals."

C. Standards: Refer to Division 1 Section "Reference Standards and Definitions" for applicability of industry standards to products specified.

D. Administrative procedures for handling requests for substitutions made after award of the contract are included under Division 1 Section "Product Substitutions."

1.04 DEFINITIONS

A. Definitions used in this article are not intended to change the meaning of other terms used in the contract documents, such as "specialties," "systems," "structure," "accessories," and similar terms. Such terms such are self-explanatory and have well recognized meanings in the construction industry.

1. "Products" are items purchased of incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

a. "Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.

2. "Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or utilized to form a part of the Work.

3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

1.05 SUBMITTALS

A. Product List Schedule: Prepare a schedule showing products specified in a tabular form acceptable to the Architect. Include generic names of products required. Include the manufacturer's name and proprietary product names of each item listed.

1. Coordinate the product list schedule with the Contractor's Construction Schedule and the Schedule of Submittals.
2. Form: Prepare the product listing schedule with information of each item tabulated under the following column headings:

a. Related Specification Section Number.
b. Generic Name Used in Contract Documents.
c. Proprietary Name, Model Number and Similar Designations.
d. Manufacturer's Name and Address.
e. Supplier's Name and Address.
f. Installer's Name and Address.
g. Projected Delivery Date, or Time Span of Delivery Period.

3. Initial Submittal: Within twenty (20) days after date of commencement of the work, submit three (3) copies of an initial product list schedule. Provide a written explanation for omissions of data, and for known variations from contract requirements.
4. Architect's Action: The Architect will respond in writing to the Contractor within two weeks of receipt of the completed product list schedule. No response within this time period constitutes no objection to listed manufacturers or product, but does not constitute a waiver of the requirement that products comply with contract documents. The Architect's response will include the following:

a. A list of unacceptable product selections, containing a brief explanation of reasons for this action.

1.06 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.

B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the project, the product selected shall be compatible with products previously selected products that were also options.

C. Nameplates: Except for required labels and operating data, do not attached or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces or products which will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface or, where required of observation after installation, on an accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:

a. Name of product and manufacturer.
b. Model and serial number.
c. Capacity.
d. Speed.

e. Ratings.

1.07 PRODUCT REQUIREMENTS AND SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.

1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
2. Standard products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

B. Product Selection Procedures: Product selection is governed by the Contract Documents and government regulations, not be previous project experience. Procedures governing product selection include the following:

1. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted.
2. Semi-Proprietary Specification Requirements: Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted.
3. Non-Proprietary Specifications: When the specifications list products or manufacturers that are available and may be incorporated in the work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with contract requirements. Comply with contract document provisions concerning “substitutions” to obtain approval for use of an unnamed product.
4. Descriptive Specification Requirements: Where specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with contract requirements.
5. Performance Specification Requirements: Where specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.

    a. Manufacturer’s recommendations may be contained in published product literature, or by the manufacturer’s certification of performance.

END OF SECTION

SECTION 01631 - POST-BID PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Related Documents

B. Summary

C. Definition

D. Submittals

E. Substitution

1.02 RELATED DOCUMENTS

a. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to this section.

1.03 SUMMARY

A. This section specifies administrative and procedural requirements for handling requests for substitutions made after award for the contract.

1.Certain materials, products or systems are specified for which no substitutions are allowed. Refer to individual specification se

B. Refer to AIA Document A701 “Instructions to Bidders” for substitution requirements made prior to bid opening.

C. The Contractor’s construction schedule and the schedule of submittals are included under Division-1 Section “Submittals”.

D. Standards: Refer to Division-1 Section “Reference Standards and Definitions” for applicability of industry standards to products specified.

E. Procedural requirements governing the Contractor’s selection of products and product options are included under Division-1 Section “Materials and Equipment:

1.04 DEFINITIONS

A. Definitions used in the article are not intended to change or modify the meaning of other terms used in the contract documents.

B. Substitutions: Requests for changes in product, materials, equipment, and methods of constructing required by Contract Documents proposed by the Contractor after award of the contract are considered requests for post-bid product substitutions. The following are NOT considered substitutions:

1. Substitutions requested by Bidders during the bidding period, and accepted prior to award of contract, are considered as included in the contract documents and are not subject to requirements specified in this section for post-bid substitutions.
2. Revisions to contract documents requested by the Owner or Architect.
3. Specified options of products and construction methods included in Contract Documents.
4. The Contractor’s determination of and compliance with governing regulations and orders issued by governing authorities.

1.05 SUBMITTALS

A. Post Bid Substitution Request Submittal: Only one request for post bid substitution will be considered for each product.

1. Submit three (3) copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures stated herein. Use form depicted at end of this section. Contractor is responsible for reproduction of forms.
2. Identify the product, or the fabrication or installation method to be replaced in each request. Include related specification section and drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

a. Product data, including drawings and descriptions of products, fabrication and installation procedures.
b. Samples, where applicable or requested.
c. A detailed comparison of significant qualities of the proposed substitution with those of the work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect. Units of weights and measure shall be the same as used in the contract documents.
d. Coordination information, including a list of changes or modifications needed to other parts of the work and to construction performed by the Owner and separate Contractors that will become necessary to accommodate the proposed substitution.
e. A statement indicating the substitution's effect on the Contractor's Construction Schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall contract time.
f. Cost information, including a proposal of the net change, if any, in the Contract Sum.
g. Certification by the Contractor that the substitution proposed is equal to or better in every significant respect to that required by the contract documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.

3. Architect's Action: Within one week of receipt of the request for substitution, the Architect will request additional information or documentation necessary for evaluation of the request. Within two weeks of the receipt of the request, or one week of the receipt of the additional information or documentation, the Architect will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name.

PART 2 -- PRODUCTS

2.01 SUBSTITUTIONS

A. Conditions: The Contractor's post bid substitution request will be received and considered by the Architect when all of the following conditions 1, 2 and 3 and one or more of the following conditions 4, 5, 6, 7, 8 and 9 are satisfied, as determined by the Architect; otherwise requests will be returned without action except to record noncompliance with these requirements.

1. Extensive revisions to contract documents are not required.
2. Proposed changes are in keeping with the general intent of contract documents.
3. The request is timely, fully documented and properly submitted.
4. The specified product or method of construction cannot be provided within the contract time.
5. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
6. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Architect for redesign and evaluation services, increased cost of

other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.

7. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
8. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
9. The specified product or method of construction cannot provide a warrant required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warrant.

B. The Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or sample that related to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION

POST-BID SUBSTITUTION REQUEST FORM

ONE ITEM PER FORM
FILL IN ALL BLANKS

Project:_____ Date:_____

We hereby submit for your review the following post-bid substitution for the following specified material for the above project.

Section	Page	Paragraph	Specified Material
_____	____	_____	_____

PROPOSED POST-BID SUBSTITUTION:

Attach complete technical data, including laboratory tests, if applicable. Include complete information on changes to drawings and/or specifications which proposed substitution will require for its proper installation.

A. Does the substitution effect dimensions shown on drawings in any way?

B. Will the undersigned pay for any changes to the building design, including engineering and detailing costs caused by the requested substitution?

C. What effect does substitution have on schedule or other trades?

D. What effect does substitution have on cost?

E. Differences between proposed substitution and specified items are:
_____ Same _____ Different (Explain)

F. Contractor represents that he has investigated the proposed product and determined that it meets or exceeds the quality of the specified product.

SUBMITTED BY:

____ Accepted ____ Accepted as Noted
____ Not Accepted ____ Received Too Late

_____
(Firm)

_____ _____ _____
(Address) (By) (Date)

_____ _____
(Telephone) (Remarks)

_____ _____
(Signature)

SECTION 01650 - STARTING OF SYSTEMS

PART 1 – GENERAL

1.01 SECTION INCLUDES:

A. Starting systems.

B. Demonstration and instructions.

C. Testing, adjusting, and balancing.

1.02 RELATED SECTIONS

A. Section 01400 – Quality Control: Manufacturer's field reports.

B. Section 01700 – Contract Closeout: System operations and maintenance data and extra materials.

1.03 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect and Owner fourteen (14) days prior to start up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions that may cause damage.

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start up under supervision of responsible manufacturer's representative in accordance with manufacturer's instructions.

1.04 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of substantial completion. Contractor will prepare and distribute meeting minutes of each demonstration and associated instruction.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season as soon as practical prior to the season. Demonstration shall be performed under applicable seasonal conditions.

C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate start up, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at a scheduled agreed upon time, at designated location.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

F. The minimum amount of time required for instruction on each item of equipment and system may

be specified in individual sections. Reference individual sections for requirements.

1.05 TESTING, ADJUSTING AND BALANCING

A. Contractor will appoint, employ, and pay for services of an independent firm to perform testing, adjusting and balance.

B. The independent firm will perform services specified in Section 15950.

C. Reports will be submitted by the independent firm to the Architect indicating observations and results of tests and indicating compliance or noncompliance with specified requirements and with the requirements of the contract documents.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 01700 - PROJECT CLOSEOUT

PART 1 GENERAL

1.01 SECTION INCLUDES:

A. Related documents.

B. Summary.

C. Completion of a building and/or phase.

D. Final completion and final payment.

E. Record document submittals.

F. Starting systems.

G. Operating and maintenance instructions.

H. Final cleaning.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to this section.

B. Refer to Section 01020 for Final Lien Waiver.

1.03 SUMMARY

A. This section specifies administrative and procedural requirements for project closeout, including but not limited to:

1. Inspection procedures.
2. Project record document submittal.
3. Operating and maintenance manual submittal.
4. Submittal of warranties.
5. Final cleaning.
6. Record vellum drawings.

B. Closeout requirements for specific construction activities are included in the appropriate sections in Divisions-2 through 16.

C. Refer to Division-1 Section “Warranties and Bonds” for specific requirements.

1.04 SUBSTANTIAL COMPLETION

A. Substantial Completion:

1. The Contractor and each Subcontractor shall carefully and regularly check their work for conformance with the contract documents as the Work is being done. Unsatisfactory work shall be corrected as the Work progresses and not be permitted to remain and become a part of the punch list.
2. The Contractor shall conduct a pre-punch list inspection. The written pre-punch list shall

be distributed to affected subcontractors, for correction of noted items. The Contractor shall provide a copy of the pre-punchlist inspection and advise the Architect of the correction of the pre-punch list. This notification shall so serve to notify the Architect that the work is ready for the Architect's punch list inspection.

3. The Architect shall make arrangements for his punch list inspection at the earliest possible date following Contractor notification of correction of the pre-punch list. Transmittal of the Punch List to the Contractor shall set the date for a reinspection prior to issuance of a Certificate of Substantial Completion. Upon receipt of the Punch List, the Contractor shall, within seven (7) days, bring to the attention of the Architect, in writing, any questions that he or any of his subcontractors may have concerning the requirements of the Punch List.
4. When advised by the Contractor that the Punch List items have been completed, the Architect shall conduct a reinspection with the Contractor and any needed subcontractors (and the Owner's representative where applicable) to determine whether the Certificate of Substantial Completion can be issued. A Certificate of Substantial Completion will only be issued after codes administration authorities document approval and permit occupancy of the building or phase. Also note Paragraph 12 of this section.
5. When issued, the Certificate of Substantial Completion shall name the date, triggering the beginning of the warranty period (with any items to have a later starting date specifically noted). The certificate shall also have attached to it any uncompleted Punch List items, and shall name the date for their final completion. The Certificate of Substantial Completion shall also state the responsibilities of the Owner and the Contractor for maintenance, heat, air conditioning, utilities, insurance and building security.
6. Acknowledgement of the date of substantial completion by the signature of all parties on the certificate implies possession of the premises by the Owner. The subsequent completion of incomplete punch list items by the Contractor and the subcontractors shall occur at the Owner's convenience. The Owner shall cooperate in permitting the Contractor reasonable access to the work for the completion of punch list items.
7. A Certificate of Substantial Completion for the work, or portion of work as applicable, will only be issued after the requirements for the demonstration and instruction of operation and maintenance procedures as defined elsewhere by the Contract Documents, to the Owner's personnel have been satisfied by the Contractor.
8. A list of items required for submission at Substantial Completion is listed at the end of this section. This list may include specific maintenance agreements, maintenance manuals, tools, keys, spare parts, extra stock materials, operational instruction to Owner's operating personnel, etc. Any items not here-in specifically listed as required at Substantial Completion shall be submitted at Final Completion.
9. Substantial Completion Cleaning: At Substantial Completion for each project or portion of the project, clean the entire work area to a level acceptable to the Owner, for finish cleaning by the Owner's custodial personnel. Remove non-permanent protection and labels, polish glass, clean exposed finishes, touch-up minor finish damage, clean or replace filters of mechanical systems, remove debris and broom clean non-occupied spaces, sanitize plumbing/food service facilities, clean light fixtures and replace burned out/dimmed lamps, sweep and wash paved areas, police yards and grounds. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces. Mop VCT or seamless floor surfaces clean. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
10. Lead Safe Project Report: The Contractor shall furnish a single report documenting compliance with recordkeeping and reporting of requirements of 40 CFR Part 745.85 including documentation that a certified renovator was assigned to the project, that the certified renovator provided on-the-job training for workers used on the project, that the certified renovator performed or directed workers who performed all of the tasks described in Part 745.85, and that the certified renovator performed the post-renovation cleaning verification described in Part 745.85. If the renovation firm was unable to comply with all of the requirements of this rule due to an emergency as defined in Part 745.82, the Contractor shall document the nature of the emergency and the provisions of the rule that

were not followed. This documentation must include a copy of the certified renovator's training certificate, and a certification by the certified renovator assigned to that project that:

a. Training was provided to workers (topics must be identified for each worker).
b. Pre-renovation education and hazard communication was performed before and updated during the project.
c. Warning signs were posted at the entrances to the work area.
d. The work area was contained by:
   (1) Removing or covering all objects in the work area (interiors).
   (2) Closing and covering all HVAC ducts in the work area (interiors).
   (3) Closing all windows in the work area (interiors) or closing all windows in and within 20 feet of the work area (exteriors).
   (4) Closing and sealing all doors in the work area (interiors) or closing and sealing all doors in and within 20 feet of the work area (exteriors).
   (5) Covering doors in the work area that were being used to allow passage but prevent spread of dust.
   (6) Covering the floor surface, including installed carpet, with taped-down plastic sheeting or other impermeable material in the work area 6 feet beyond the perimeter of surfaces undergoing renovation or a sufficient distance to contain the dust, whichever is greater (interiors) or covering the ground with plastic sheeting or other disposable impermeable material anchored to the building extending 10 feet beyond the perimeter of surfaces undergoing renovation or a sufficient distance to collect falling paint debris, whichever is greater, unless the property line prevents 10 feet of such ground covering, weighted down by heavy objects (exteriors).
   (7) Installing (if necessary) vertical containment to prevent migration of dust and debris to adjacent property (exteriors).
e. Waste was contained on-site and while being transported off-site.
f. The work area was properly cleaned after the renovation by:
   (1) Picking up all chips and debris, misting protective sheeting, folding in dirty side inward, and taping it for removal.
   (2) Cleaning the work area surfaces and objects using a HEPA vacuum and/or wet clothes or mops (interiors).
g. The certified renovator performed the post-renovation cleaning verification (the results of which must be briefly described, including the number of wet and dry cloths used).

11. Substantial Completion Drain Clearing. At Substantial Completion for each project or portion of the project, perform drain clearing in each building area affected by new construction or renovation work. Clear drains of debris and/or construction materials using methods acceptable to the school district. Test all affected drains to ensure proper operation prior to turn-over to the district. As required, demonstrate proper operation.
12. The Owner has contracted with the Architect/Engineer to perform a limited number of punchlist inspections and reinspections. Typically, the Architect/Engineer is responsible for the initial punchlist inspection and one reinspection. If the Owner incurs additional cost from the Architect/Engineer for the performance of more than one initial punchlist inspection and one reinspection, costs for any necessary additional reinspection will be assessed to the Contractor in the way of a deductive cost change order.

B. Final Completion:

1. Submit executed warranties, workmanship bonds, remaining maintenance agreements, inspection certificates and similar required documentation for specific units of work, enabling Owner's unrestricted occupancy and use.
2. Submit maintenance manuals, tools, keys, spare parts, extra stock materials not required at substantial completion.
3. Complete instruction of Owner's operating personnel with start up of all systems, not

previously required at substantial completion.

4. Complete final cleaning and remove temporary facilities.

    a. Final Cleaning: At closeout time of each building, or applicable portion, reclean the work affected by punch list corrections. Remove non-permanent protection, polish glass, clean exposed finishes, touch-up minor finish damage, remove debris and broom clean non-occupied spaces, sanitize plumbing/food service facilities, clean light fixtures, sweep and wash paved areas, police yards and grounds, and perform similar clean up operations needed to produce a “clean” condition as judged by Architect and Owner.

5. All punch list work must be completed, reviewed and accepted by the Architect.

1.05 FINAL COMPLETION AND FINAL PAYMENT

A. Provide submittals to Architect that are required by governing or other authorities. Confirm that all submittals required by the construction documents have been transmitted.

B. Final Completion: For the purpose of determining a date at which the project is finished, final completion may be defined to include, but is not limited to:

1. Substantial completion.
2. Submission and acceptance by the Architect of project record drawings.
3. Operation and maintenance data (including all air and water balance reports).
4. All applicable Owner training sessions with meeting notes distributed (video tapes, if applicable).
5. Final cleaning.
6. Adjusting (hardware, HVAC, etc.)
7. Warranties submitted by General Contractor and accepted by Architect.
8. Spare parts and maintenance materials turned over to proper District personnel.
9. All Punch List work completed, reviewed and accepted by the Architect.

    a. All of the above items are as required by individual specification requirements as found in the contract documents. These individual requirements shall take precedence over this definition if any conflict should arise.

C. Upon written notice by the Contractor that the reinspection punch list items are completed, the Architect shall verify this by inspection and shall issue to the Owner a final certificate of payment stating that, to the best of their knowledge, information and belief, the work has been completed in accordance with the terms and conditions of the contract documents, and that the entire balance found to be due the Contractor, and noted in said final certificate of payment, is due and payable. The Owner shall endeavor to make final payment within thirty (30) days.

1.06 RECORD DOCUMENT SUBMITTAL

A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Architect’s reference during normal working hours.

B. Record Drawings: A set of blue- or black-line drawings of the original bidding documents will be provided by the Architect to the Contractor for the following use:

1. If the Contractor elects to vary the work from the Contract Documents, and secures prior approval from the Architect, he shall record in a neat, readable manner, all such variances on the blue- or black-line drawings furnished.
2. For plumbing; heating; ventilating; and air conditioning; electrical and fire protection work, record document drawings shall be maintained by the Contractor as the work progresses and as follows:

a. All deviations from the sizes, locations, and from all other features of all installations showing the contract documents shall be recorded.
b. In addition, it shall be possible, using these drawings, to correctly and easily locate, identify and establish sizes of piping, direction etc., as well as all other features of work that will be concealed.

1. Locations of underground work shall be established by dimensions to column lines or walls, by locating all turns, etc., and by properly referenced centerline or invert elevations and rates of fall.

2. For work concealed in the building, sufficient information shall be given so it can be located with reasonable accuracy and ease. In some cases this may be by dimension; in others, it may be sufficient to illustrate the work on the drawings in relation to the spaces in the building near which it was actually installed. Architect's decision in this matter shall be final.

3. Blue- or black-line record drawings shall be kept up to date during the entire course of the work and shall be available upon request for examination by the Architect.
4. The following requirements apply to all record document drawings:

a. They shall be maintained at the Contractor's expense.
b. All such drawings shall be done carefully and neatly by a competent draftsperson and in an approved form.
c. Additional drawings shall be provided as necessary for clarification.
d. The record document drawings (both blue- and black-line and reproducible) shall be returned to the Architect upon completion of the work and are subject to the approval of the Architect.
d. Delete Architect title block and seal from record document drawings.

C. Record Specifications: Maintain one complete copy of the project manual, including addenda, and one copy of other written construction documents such as change orders and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and product data.

1. Legibly mark and record at each product section description of actual products installed, including the following:

a. Manufacturer's product name and product model number.
b. Product substitutions or alternates utilized.
c. Changes made by addenda and modifications.

2. Upon completion of the work, submit record specifications to the Architect for the Owner's records.
3. Record project manual shall be maintained at the Contractor's expense.
4. Record project manual shall be maintained in a neat, readable manner. Contract work variations shall be recorded in the correct corresponding technical section of the project manual.
5. Delete Architect seal from record project manual.
6. Complete final cleaning and remove temporary facilities.

D. Record Shop Drawings: Maintain a clean, undamaged set of blue or black line white prints of shop drawings as finally approved. Mark the set to show the actual installation where the installation varies substantially from the work as originally shown. Mark drawings accurately; record a cross reference at the corresponding location on the contract drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the work.
2. Mark new information that is important to the Owner, but was not shown on shop drawings.
3. Note related change order numbers where applicable.

4. Organize record shop drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.

E. Record Product Data: Maintain one copy of each product data submittal. Mark these documents to show significant variations in actual work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instruction and recommendations. Give particular attention to concealed products and portions of the work that cannot otherwise be readily discerned later by direct observation. Note related change orders and mark up of record drawings and specifications.

1. Upon completion of mark ups, submit complete set of record product data to the Architect for the Owner's records.

F. Record Documents and Shop Drawings: Contractor to supply one complete set of approved shop drawings. Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to fine (main) floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenance, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenance concealed in construction, referenced to visible and accessible features of the work.
4. Field changes of dimension and detail.
5. Details not on original contract drawings.

G. Record Sample Submitted: Immediately prior to the date or dates of substantial completion, the Contractor will meet at the site with the Architect and the Owner's representative personnel to determine which of the submitted samples that have been maintained during progress of the work are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's sample storage area.

H. Miscellaneous Record Submittal: Refer to other specification sections for requirements of miscellaneous recordkeeping and submittal in connection with actual performance of the work. Immediately prior to the date or dates of substantial completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Architect for the Owner's records.

I. Maintenance Manuals: Organize operating and maintenance data into suitable sets of manageable size. Submit two sets prior to Substantial Coompletion or final inspection, as applicable. Bind properly indexed data in individual heavy-duty, three inch, three ring vinyl-covered binders, 8½ x 11 inch test page format, with pocket folders for folded sheet information.

1. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
2. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

3. Contents: Prepare a Table of Contents for each volume, with each product or system description identified.
4. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, subcontractors, and major equipment suppliers where they can be reached for emergency service at all times, including nights, weekends, and holidays.
5. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Identify the following:

a. Significant design criteria.
b. List of equipment.
c. Parts list for each component.
d. Operating instructions.
e. Maintenance instructions for equipment and systems.

f. Maintenance instructions
g. Emergency instructions.
h. Spare parts list.
i. Wiring diagrams.
j. Recommended “turn around” cycles.
k. Inspection procedures.

6. Part 3: Project documents and certificates, including the following:

a. Shop drawings and product data.
b. Air and water balance reports.
c. Certificates.
d. Photo copies of warranties and bonds.

7. Submit one copy of completed volumes in final form fifteen (15) days prior to the applicable submission requirement. This copy will be returned after review, with Architect comments. Revise content of documents as required prior to final submittal for the applicable submission requirement.
8. Submit final volumes revised, within ten (10) days after Architect review and comment.

J. Record reproducible vellum drawings. Contractor shall submit one copy of all record contract drawings to the Owner in the form of reproducible vellum sheets.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 -- EXECUTION

3.01 STARTING SYSTEMS

A. Coordinate schedule of start up of various equipment and systems.

B. Notify Architect and Owner seven (7) days prior to start up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions that may cause damage.

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start up under supervision of responsible manufacturer’s representative (Contractor’s personnel) in accordance with manufacturer’s instructions.

G. When specified in individual specification sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start up, and to supervise placing equipment or system in operation.

H. Submit a written report in accordance with Section 01400 that equipment or system has been properly installed and is functioning correctly.

3.02 OPERATING AND MAINTENANCE INSTRUCTIONS

A. General: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner’s personnel to provide instruction in proper operation and maintenance, if applicable. If Installers are not experienced in procedures, provide instruction by manufacturer’s representatives. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record documents.
3. Spare parts and materials.
4. Tools.
5. Lubricants.
6. Fuels.
7. Identification systems.
8. Control sequences.
9. Hazards.
10. Cleaning.
11. Warranties and bonds.
12. Maintenance agreements and similar continuing commitments.

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Start up.
2. Shutdown.
3. Emergency operations.
4. Noise and vibration adjustments.
5. Safety procedures.
6. Economy and efficiency adjustments.
7. Effective energy utilization.

END OF SECTION

SECTION 01710 - CONSTRUCTION HOUSEKEEPING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Related Documents

B. Summary

C. Submittals

D. Quality Assurance

E. Project Conditions

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including general and supplementary conditions and other Division-1 Specification sections, apply to this section.

1.03 SUMMARY

A. This section specifies requirements for maintaining housekeeping of the construction site and facilities during construction operations.

1.04 SUBMITTALS

A. Submit a written narrative outlining the operational plan that will be employed by the contractor and subcontractors to maintain the construction site and facilities in a clean, safe, and organized condition that is free from recognized hazards that can cause serious physical harm or death to employees or the public.

1.05 QUALITY ASSURANCE

A. Comply with Occupational Safety and Health Standards for the Construction Industry 29 CFR 1926.25.

B. Comply with standards of authorities having jurisdiction, including but not limited to:

1. Building Code requirements.
2. Health and safety regulations.
3. Police, Fire Department, and/or Rescue Squad requirements.

C. Comply with directives issued by the Architect-Engineer and/or Owner. Contractors failing to comply with Architect-Engineer and/or Owner directives to properly maintain construction housekeeping may be subject to the withholding of Payment Applications until proper housekeeping conditions are adhered and maintained.

1.06 PROJECT CONDITIONS

A. Keep construction areas free of the accumulation of dirt, debris, trash, water, liquids, and or hazards that deter from the safety of the construction site and facilities. Neatly organize and store materials so as to not co-mingle waste materials and construction materials, tools, and equipment.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

3.01 WORK PRACTICES

A. Housekeeping occurs constantly on the job, not just once a week or at the end of the project.

B. Everyone does housekeeping, not just laborers or certain trades.

C. Trained personnel shall use lead-safe work practices contained in EPA's renovation, repair, and painting rule as applicable.

D. Workers pick up anything they see lying around that can trip a person or fall on them.

E. Extension cords, lines, welding leads, hoses, etc. are coiled up when not in use.

F. Tools are returned to the gang box or tool room.

3.02 HAZARD IDENTIFICATION, REMOVAL, AND CLEANUP

A. Ensure that trained personnel perform lead safe work practices and take proper precautions concerning presumed lead bearing materials. If latent dust emissions occur, establish containment, post signage, and perform cleaning, recleaning, and subsequent cleaning verifications as necessary. Assess risks presented by the actual or presumed presence of lead-based paint and lead-based paint hazards. The Contractor shall not leave lead dust hazards in Owners facilities. Lead dust hazard means surface dust that contains a dust-lead loading (area concentration of lead) at or exceeding the levels promulgated by State of Kansas and Federal regulations. The Contractor shall not impair the Owner's ability to occupy work areas under this contract beyond substantial completion dates by leaving lead dust hazards.

B. Debris is cleaned from work surfaces, passages, and stairs.

C. Ground within 6 feet of a building under construction is free of irregularities.

D. Storage areas and walkways are reasonably free of dangerous depressions, obstructions, and debris.

E. All walking and working surfaces are reasonably dry and free from grease or oil.

F. Spills of oil, grease, and other liquids are removed at once, or covered with sand or other absorbent material until cleaned up.

G. Sufficient waste or trash containers are provided, used and emptied when appropriate.

H. Workers wear heavy gloves and heavy soled or safety shoes when handling scrap material.

I. All walking and working surfaces are free of protruding nails.

J. Nails or fasteners are removed when opening crates, cartons, kegs, or when stripping small forms.

K. Nails are bent down or removed before scrap material is discarded.

L. Scrap and debris are piled neatly.

M. Materials, waste, or tools are not thrown from buildings or structures to areas where workers may be located.

N. Any object protruding at head height has been removed or flagged.

O. Protective caps are used on exposed rebar.

P. Chutes are used to remove waste and/or debris from above grade floors.

Q. Hoses, power cords, welding leads, etc. are not laying in heavily traveled walkways or areas.

R. Structural openings are covered/protected adequately (i.e., sumps, shafts, floor openings, etc.).

3.03 BULK MATERIAL STORAGE

A. All piled or stacked material is stable and cannot fall, slip, or collapse.

B. The face of a pile of bags (containing cement or other material) more than 5 feet high is tapered back, or the sacks are tied in horizontal layers to prevent them from falling or collapsing.

C. Lumber piles are no more than 16’ high if handled manually or 20’ high if handled by equipment. Headpieces, crosspieces, or other means are used as needed to prevent slipping, tipping, or collapsing.

D. Piles of bricks, tiles, masonry blocks, and similar materials are stabilized by the use of headers at least every sixth layer.

E. Brick stacks are not over 7 feet high. Brick stacks over 4 feet high are tapered back.

F. Masonry stacks over 6 feet high are tapered back.

G. The way that material is going to be taken off the pile is planned at the time the material is first stored.

H. Workers and their equipment have room to move material off a pile.

I. Material is piled on surfaces that will hold its weight.

J. Material is piled on ground stable enough for a heavy load (not too near an excavation).

K. Pipe or rod is stored in racks if more than one layer high.

L. Surplus materials are returned to the stockpile.

M. Materials are at least 2m (5 ft.) from openings, roof edges, excavations or trenches.

3.04 HAZARDOUS MATERIAL STORAGE AND DISPOSAL

A. Flammable material is always stored in separate closed containers.

B. Incompatible chemical products (which may cause a hazardous reaction if they come in contact) are not stored together.

C. Flammable liquids are not stored near sources of ignition (sparks, electricity, flames, or hot objects).

D. Where more than 25 gallons of flammable liquids are present, they are kept in a storage cabinet approved by the National Fire Protection Association (NFPA).

E. Indoor storage areas for flammable liquids are ventilated and have one clear aisle, at least three feet wide.

F. Flammable liquids stored outdoors are at least 50 feet from the property line and 10 feet from any public way.

G. Outdoor flammable liquid storage areas are graded to divert spills away from buildings.

H. Flammable and combustible scrap, debris, and waste are removed promptly from buildings or structures.

I. Covered metal waste cans are available for oily and paint-soaked waste.

J. Appropriate cleanup materials are available for leaks or spills of flammables or other hazardous materials.

K. Leftover hazardous products and waste are properly stored, labeled, and disposed of according to the instructions on the product's Material Safety Data Sheet (MSDS).

3.05 SANITATION

A. Toilets and washing facilities are clean and sanitary. Toilets are design to ensure user privacy, and are supplied with toilet paper.

B. Sufficient toilets and washing facilities are available.

C. Adequate supplies of potable water are available.

D. Drinking water is stored and dispensed in clearly marked containers that are not used for any other purpose.

E. All pipes and containers for non-potable water have been clearly labeled, and only potable water is used for washing or drinking.

3.06 ENVIRONMENT

A. Lighting and ventilation are adequate.

B. Burned out lights are reported and replaced.

END OF SECTION

SECTION 01711 - CLEANING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description

B. Disposal Requirements

C. Materials

D. During Construction

E. Dust Control

F. Final Cleaning

1.02 DESCRIPTION

A. Contractor will be responsible to execute daily cleaning, during progress of the Work and at completion of the Work, as required by General Conditions. The Contractor is to daily, broom clean debris and remove all refuse, rubbish, scrap material caused by his operation. The Contractor shall remove all excess spoils.

1.03 CLEANING AND DISPOSAL REQUIREMENTS

A. Conduct cleaning and disposal operations to comply with Scope of Work Section 01710 Construction Housekeeping, codes, ordinances, regulations, and anti-pollution laws.

1.04 MATERIALS

A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.

B. Use only those cleaning materials and methods recommended by the manufacturer of the surface material to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

1.05 DURING CONSTRUCTION

A. Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations or his subcontractor's operations and ensure that building and grounds are maintained free from accumulations of waste materials and rubbish. Do not allow waste materials, rubbish and debris to accumulate and become an unsightly or hazardous condition.

B. Transport waste materials in a controlled manner with as few handling as possible; do not drop or throw materials from heights. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces. Sprinkle dusty debris with water.

C. Burning or burying of rubbish and waste materials on the project site is not permitted. Disposal of volatile fluid wastes (such as mineral spirits, oil, or paint thinner) in storm or sanitary sewer systems

is not permitted. Remove waste materials, rubbish and debris from the site and legally dispose of at public or private dumping areas off the Owner's property.

1.06 DUST CONTROL

A. Clean interior spaces prior to the start of finish painting and/or other applicable work, and continue cleaning on as as-needed basis until such work is finished.

B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.

C. Broom clean interior building areas when ready to receive finish painting and/or other applicable work, and continue cleaning on as-need basis until building is ready for acceptance or occupancy.

1.07 FINAL CLEANING

A. At completion of construction and just prior to acceptance or occupancy, the Contractor will conduct a final inspection of exposed interior and exterior surfaces. Perform final cleaning and maintain cleaning until building or portion thereof, is accepted by Owner.

B. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from interior and exterior surfaces. Repair, patch and touch-up marred surfaces to match adjacent finishes. Broom clean paved surfaces; rake clean other surfaces of grounds.

C. Clean all glass and all other finish surfaces, replace all broken and scratched glass; remove stains, spots marks and dirt from decorated work; clean all hardware; remove paint spots and smears from all surfaces, clean all fixtures and wash or vacuum all floors; leaving work in a clean and spotless condition.

D. Mechanical subcontractor shall replace air conditioning filters if units were operated during construction. Clean ducts, blowers and coils if air conditioning units were operated without filters during construction.

E. Remove all waste materials and rubbish from and about the Project as well as all tools, construction equipment, machinery and surplus materials.

F. Use experienced workmen or professional cleaners for final cleaning.

G. Comply with cleaning instructions contained in the Specifications. In absence of specific cleaning instructions, follow accepted cleaning practices or the recommendations of the manufacturer of the material to be cleaned.

END OF SECTION

SECTION 01732 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
(Architect to provide listing of items affected.)

B. Related Sections include the following:

1. Division 1 Section “Summary of Work” for use of the premises and phasing requirement.
2. Division 1 Section “Construction Facilities and Temporary Controls” for temporary construction and environmental-protection measures for selective demolition operations.
3. Division 1 Section “Cutting and Patching” for cutting and patching procedures for selective demolition operations.
4. Division 15 Sections for demolishing, cutting, patching, or relocating mechanical items.
5. Division 16 Sections for demolishing, cutting, patching, or relocation electrical items.

1.03 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.04 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner’s property, demolished materials shall become Contractor’s property and shall be removed from Project site.

B. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to owner that may be encountered during selective demolition remain Owner’s property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

1. Coordinate with Owner to establish special procedures for removal and salvage.

C. Specific items may be identified for salvage and turn-over to the Owner at the completion of the project. Any items so identified, are the property of the Owner but shall be protected and maintained by the Contractor for the duration of the construction project. Carefully remove and

salvage each item or object in a manner to prevent damage, and protect such items in a secure location for prompt delivery to the Owner at the conclusion of the project.

1.05 SUBMITTALS

A. Qualification Data: For firms and person specified in “Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

B. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.

C. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner’s on-site operations are uninterrupted.
2. Interruption of utility services.
3. Coordination for shutoff, capping and continuation of utility services.

D. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

E. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.06 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI A10.6 and NFPA 241.

C. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 1 Section “Project Meetings.” Review methods and procedures related to selective demolition including, but not limited to, the following:

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

1.07 PROJECT CONDITIONS

A. Owner will occupy portions of the site/building in and around the demolition area. Conduct selective demolition so Owner’s operations will not be disrupted. Provide not less than 72 hours’ notice to Owner of activities that will affect Owner’s operations.

B. Maintain access to existing access ways other occupied or used facilities.

1. Do not close or obstruct access way, or other occupied or used facilities without written permission from authorities having jurisdiction.

C. Owner assumes no responsibility for condition of areas to be selectively demolished.

1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

D. Hazardous Materials: It is expected that hazardous materials, other than lead bearing materials, will be encountered during the work.

1. Hazardous materials will be removed by Owner before start of the Work, except lead based paints and coatings. Contractor shall coordinate locations with owner for piping interconnections in sufficient time for abatement to occur to maintain project schedule.
2. If other non-lead containing materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Not-lead bearing hazardous materials will be removed by Owner under a separate contract.
3. The Contractor shall be fully and solely responsible for work involving lead bearing materials.

E. Storage or sale of removed items or materials on-site will not be permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire protection facilities in service during selective demolition operations.

PART 2 – PRODUCTS

A. Use repair materials identical to existing materials.

1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
2. Use materials whose installed performance equals or surpasses that of existing materials.

B. Comply with material and installed requirements specified

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.02 UTILITY SERVICES

A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.

B. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.

1. Provide at least 72 hours (3 working days) notice to Owner if shutdown of service is required during changeover.

C. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated utilities when requested by Contractor.
2. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of the building.
3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.03 PREPARATION

A. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

3.04 POLLUTION CONTROLS

A. Dust Control: Use suitable methods to limit spread of dust and dirt. Comply with governing environmental protection regulations.

1. Do not use water when it may create hazardous or objectionable conditions, such as ice, flooding, and pollution.

B. Disposal: Remove and transport debris in a manner that will prevent damage to adjacent surfaces and areas.

C. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.05 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically.
2. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces.
3. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire suppression devices during flame-cutting operations.
4. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off site.
5. Dispose of demolished items and materials promptly.
6. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.

B. Existing Facilities: Comply with Owner's requirements for using and protecting walkways, driveways, entries, and other facilities during selective demolition operations.

C. Removed and Salvaged Items: Comply with the following:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items: Comply with the following:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

F. Existing Items to be Abandoned in Place: Fill underground piping systems to be abandoned with sand as required to prevent future collapse.

G. Concrete: Demolish in small sections. Cut concrete to a depth of at least ¾ inch at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, but reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.

3.06 PATCHING AND REPAIRS

A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.

B. Patching: Comply with Division 1 Section "Cutting and Patching".

3.07 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on site.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION

SECTION 01740 - WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Related Documents

B. Summary

C. Definitions

D. Warranty Requirements

E. Submittals

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to this section.

1.03 SUMMARY

A. This section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers' standard warranties on products and special warranties.

1. Refer to the general conditions of the contract for construction of terms of Contractor's warranty of workmanship and materials.
2. General closeout requirements are included in Division-1, Section "Project Closeout".
3. Specific requirements for warranties for the work and products and installations that are specified to be warranted, are included in the individual sections of Divisions-2 through 16.
4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the work that incorporated the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.04 DEFINITIONS

A. Standard product warranties are reprinted written warranties published by individual manufacturers for particular product and are specifically endorsed by the manufacturer to the Owner.

B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.05 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and has been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the Owner has benefited from use of the work through a portion of its anticipated useful service life.

D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

E. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.06 SUBMITTAL

A. Submit written warranties to the Architect prior to the date certified for Substantial Completion If the Architect's certificate of substantial completion designates a commencement date for warranties other than the date of Substantial Completion of the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.

1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within fifteen (15) days of completion of that designated portion of the Work.
2. In all other instances, warranty periods will not begin prior to Substantial Completion, regardless of equipment use prior to dates of Substantial Completion.

B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for approval prior to final execution.

1. Refer to individual sections of Divisions-2 through 16 for specific content requirements, and particular requirements of submittal of special warranties.

C. Form of Submittal: At final completion, compile two copies of each required warranty and bond properly executed by the Contractor, or the Contractor, subcontractor, supplier or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the project manual.

D. Bind warranties and bonds in heavy-duty, commercial quality, durable three-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8½" x 11" paper.

1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
2. Identify each binder on the front and the spine with the typed or printed title 'WARRANTIES AND BONDS", the project title or name, and the name of the Contractor.
3. When operating and maintenance manuals are required for warranted constitution, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION

DIVISION 26
TABLE OF CONTENTS

SECTION 260010 – ELECTRICAL PROVISIONS

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. All contract documents including drawings, alternates, addenda and modifications and general provisions of the Contract, including General and Supplementary Conditions and all other Division Specification Sections, apply to work of this section. All preceding and following sections of this specification division are applicable to the Electrical Contractor, all sub-contractors, and all material suppliers.

1.2. SCOPE OF WORK

A. This DIVISION requires the furnishing and installing of complete functioning Electrical systems, and each element thereof, as specified or indicated on Drawings or reasonably inferred, including every article, device or accessory reasonably necessary to facilitate each system's functioning as indicated by the design and the equipment specified. Elements of the Work include materials, labor, supervision, supplies, equipment, transportation, and utilities.
B. In case of an inconsistency between the Drawings and Specifications or within either document, the better quality or the greater quantity of work shall be provided in accordance with the Architect or Engineer's interpretation.
C. Refer to Architectural, Structural and Mechanical Drawings and all other contract documents and to relevant equipment drawings and shop drawings to determine the extent of clear spaces and make all offsets required to clear equipment, beams and other structural members to facilitate concealing conduit in the manner anticipated in the design.

1.3. SPECIFICATION FORM AND DEFINITIONS

A. The Engineer indicated in these specifications is Pearson Kent McKinley Raaf Engineers LLC. 13300 W 98th Street, Lenexa, KS 66215, PHONE 913-492-2400, EMAIL admin@pkmreng.com.
B. Contractor, wherever used in these specifications, shall mean the Company that enters into contract with the Owner to perform this section of work.
C. When a word, such as "proper", "satisfactory", "equivalent", and "as directed", is used, it requires the Architect-Engineer's review.
D. "PROVIDE" means to supply, purchase, transport, place, erect, connect, test, and turn over to Owner, complete and ready for regular operation, the particular Work referred to.
E. "INSTALL" means to join, unite, fasten, link, attach, set up, or otherwise connect together before testing and turning over to Owner, complete and ready for regular operation, the particular Work referred to.
F. "FURNISH" means to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories, and all other items customarily required for the proper and complete application for the particular Work referred to.
G. "WIRING" means the inclusion of all raceways, fittings, conductors, connectors, tape, junction and outlet boxes, connections, splices, and all other items necessary and/or required in connection with such Work.
H. "CONDUIT" means the inclusion of all fittings, hangers, supports, sleeves, etc.
I. "AS DIRECTED" means as directed by the Architect/Engineer, or his representative.
J. "CONCEALED" means embedded in masonry or other construction, installed behind wall furring or within double partitions, or installed above hung ceilings.

1.4. QUALIFICATIONS

A. The contractors responsible for work under this section shall have completed a job of similar scope and magnitude within the last 3 years. The contractors shall employ an experienced, competent and adequate work force licensed in their specific trade and properly supervised at all times. Unlicensed workers and general laborers shall be adequately supervised to insure competent and quality work and workmanship required by this contract and all other regulations, codes and practices. At all times the contractors shall comply with all applicable local, state and federal guidelines, practices and regulations. Contractor may be required to submit a statement of qualifications upon request before any final approval and selection. Failure to be able to comply with these requirements is suitable reason for rejection of a bid.

1.5. LOCAL CONDITIONS

A. The contractor shall visit the site and determine the existing local conditions affecting the work required. Failure to determine site conditions or nature of existing or new construction will not be considered a basis for granting additional compensation.

1.6. CONTRACT CHANGES

A. Changes or deviations from the contract documents; including those for extra or additional work must be submitted in writing for review of Architect-Engineer. No verbal change orders will be recognized.

1.7. LOCATIONS AND INTERFERENCES

A. Locations of equipment, conduit and other electrical work are indicated diagrammatically by electrical drawings. Layout work from dimensions on Architectural and Structural Drawings. Verify equipment size from manufacturers shop drawings.

1. Contractor shall be responsible for confirming adequate working space (depth, width, and height) is maintained about all equipment as required per applicable sections of the NEC, including all entrance and egress requirements.
2. Coordinate with other trades to verify adequate Dedicated Equipment Space is maintained about all equipment as required per NEC.

B. Study and become familiar with contract drawings of other trades and in particular general construction drawings and details in order to obtain necessary information for figuring installation. Cooperate with other workmen and install work in such a way to avoid interference with their Work. Minor deviations, not affecting design characteristics, performance or space limitation may be permitted if reviewed prior to installation by Architect-Engineer.

C. Any conduit, apparatus, appliance or other electrical item interfering with proper placement of other work as indicated on drawings, specified, or required, shall be removed, relocated and reconnected without extra cost. Damage to other Work caused by this contractor, subcontractor, workers or any cause whatsoever, shall be restored as specified for new work.

D. Do not scale electrical drawings for dimensions. Accurately layout work from dimensions indicated on Architectural drawings unless they are found to be in error.

1.8. PERFORMANCE

A. Final acceptance of work shall be subject to the condition that all systems, equipment, apparatus and appliances operate satisfactorily as designed and intended. Work shall include required adjustment of systems and control equipment installed under this specification division.

B. The Contractor warrants to the Owner and Architect-Engineer the quality of materials, equipment, workmanship and operation of equipment provided under this specification division for a period of one year from and after completion of building and acceptance of mechanical systems by Owner.

1.9. WARRANTY

A. The Contractor warrants to the Owner and Architect-Engineer that upon notice from them within a one year warranty period following date of acceptance, that all defects that have appeared in materials and/or workmanship, will be promptly corrected to original condition required by contract documents at Contractor's expense.

B. The above warranty shall not supersede any separately stated warranty or other requirements required by law or by these specifications.

1.10. ALTERNATES

A. Refer to General Requirements for descriptions of any alternates that may be included.

1.11. MATERIALS, EQUIPMENT AND SUBSTITUTIONS

A. The intent of these specifications is to allow ample opportunity for the Contractor to use their ingenuity and abilities to perform the work to their and the Owner's best advantage, and to permit maximum competition in bidding on standards of materials and equipment required.

B. Material and equipment installed under this contract shall be first class quality, new, unused and without damage.

C. In general, these specifications identify required materials and equipment by naming one or more manufacturer's brand, model, catalog number and/or other identification. The first named manufacturer or product is used as the basis for design; other manufacturers named must furnish products consistent with specifications of first named product as determined by Engineer. Base bid proposal shall be based only on materials and equipment by manufacturers named, except as hereinafter provided.

D. Where materials or equipment are described but not named, provide required items of first quality, adequate in every respect for intended use. Such items shall be submitted to Architect-Engineer for review prior to procurement.

E. Materials and equipment proposed for substitutions shall be equal to or superior to that specified in construction, efficiency, utility, aesthetic design, and color as determined by Architect-Engineer whose decision shall be final and without further recourse. Physical size of substitute brand shall be no larger than space provided including allowances for access for installation and maintenance. Requests must be accompanied by two copies of complete descriptive and technical data including manufacturer's name, model and catalog number, photographs or cuts, physical dimensions, operating characteristics and any other information needed for comparison.

F. If the Contractor wishes to incorporate products other than those named in the Base Bid Specifications they shall submit a request for approval of equivalency in writing no later than (10) ten calendar days prior to bid date. Substitutions after this may be refused at Engineers option. Equivalents will ONLY be considered approved when listed by addendum.

1. In proposing a substitution prior to or subsequent to receipt of bids, include in such bid the cost of altering other elements of this project, including adjustments in mechanical or electrical service requirements necessary to accommodate such substitution.

G. Within 10 working days after bids are received, the apparent low bidder shall submit to the Architect-Engineer for approval, three copies of a list of all major items of equipment they intend to provide. Within 30 working days after award of Contract, Contractor shall submit shop drawings for equipment and materials to be incorporated in work, for Architect-Engineer review. Where 30-day limit is insufficient for preparation of detailed shop drawings on major equipment or assemblies, Contractor shall submit manufacturer's descriptive catalog data and indicate date such detailed shop drawings will be submitted along with manufacturer's certification that order was placed within 30 working day limit.

1.12. OPENINGS, ACCESS PANELS AND SLEEVES

A. This Contractor shall include the installation of all boxes, access panels and sleeves for openings required to install this work, except structural openings incorporated in the structural drawings. Sleeves shall be installed for all conduits passing through structural slabs and walls. Contractor shall set and verify the location of sleeves that pass through beams, as shown on structural plans. All floor and wall penetrations shall be sealed to meet fire-rating requirements.

B. All penetrations through interior or exterior and rated or non-rated walls and floors shall be appropriately sealed prevent entry and movement of rodents and insects. Contractor shall coordinate their work with all other trades.

1.13. ARCHITECTURAL VERIFICATION AND RELATED DOCUMENTS

A. Contractor shall consult all Architectural Drawings and specifications in their entirety incorporating and certifying all millwork, furniture, and equipment rough-in including utility characteristics such as voltage, phase, amperage, pipe sizes, duct sizes, including height, location and orientation. Shop drawings incorporating these requirements should be submitted to the Architect for approval prior to installation or rough in.

1.14. EXTENT OF CONTRACT WORK

A. Provide electrical systems indicated on drawings, specified or reasonably implied. Provide every device and accessory necessary for proper operation and completion of electrical systems. In no case will claims for "Extra Work" be allowed for work about which Electrical Contractor could have been informed before bids were taken.

B. Where specific information for devices, lights or equipment shown on the plans is missing, provide an allowance in the contract amount for furnishing a product reasonably implied by the level of other devices, lights and equipment provided in the contract documents.

C. Electrical Contractor shall be familiar with equipment provided by other Contractors that require electrical connections and control. Follow circuiting shown on drawings for lighting, power and equipment connections.

D. Make required electrical connections to equipment provided under Architectural and Mechanical divisions of this project. Receive and install electric control devices requiring field installation, wiring, and service connection. Equipment supplied by the automatic temperature control contractor shall be installed by the mechanical or automatic temperature control subcontractor. Make required internal field wiring modifications indicated on wiring diagrams of factory installed control systems for control sequence specified. These field modifications shall be limited to jumper connections and connection of internal wiring to alternate terminal block lugs. The cost for field modifications requiring rewiring of factory installed control systems for equipment provided by General or Mechanical Contractors shall be included in base bid of the respective contractor. All temperature control wiring shall be by a licensed electrician under the supervision of temperature control contractor.

E. Check electrical data and wiring diagrams received from Mechanical Contractor of compliance with project voltages, wiring, controls and protective devices shown on electrical drawings. Promptly bring discrepancies found to attention of Architect-Engineer for a decision.

F. Provide safety disconnect switches, contactors, and manual and magnetic motor starters for mechanical and electrical equipment requiring such devices. Omit these devices where included as part of factory installed prewired control systems provided with mechanical equipment. With exception of factory installed devices, provide safety disconnect switches, contacts and motor starters by one manufacturer to allow maximum interchangeability of repair parts and accessories for these devices.

G. To maximum extent possible electrical controls in boiler rooms, equipment rooms, and control rooms shall be grouped in accessible locations and arranged according to function. Where possible use group control panels and combination starters in lieu of individually enclosed devices.

1.15. CODES, ORDINANCES, RULES AND REGULATIONS

A. Provide work in accordance with applicable rules, codes, ordinances and regulations of Local, State, Federal

Governments, and other authorities having lawful jurisdiction.

B. Conform to latest editions and supplements of following codes, standards or recommended practices.

C. BUILDING CODES:

1. International Building Codes (Latest adopted version of applicable codes)

D. SAFETY CODES:

1. National Electrical Safety Code Handbook H30 - National Bureau of Standards
2. Occupational Safety and Health Standard (OSHA) Department of Labor
3. Safety Code for Elevators ANSI A17.1

E. NATIONAL FIRE CODES AND STANDARDS:

1. NFPA No. 70 National Electrical Code
2. NFPA No. 72 National Fire Alarm and Signaling Code
3. NFPA No. 90A Air Conditioning & Ventilation Systems
4. NFPA No. 101 Life Safety Code

F. UNDERWRITERS LABORATORIES INC.:

1. All materials, equipment and component parts of equipment shall bear UL labels whenever such devices are listed by UL.

G. MISCELLANEOUS CODES:

1. ANSI A117.1 - Handicapped Accessibility
2. Americans with Disabilities Act (ADA)

H. ENERGY EFFICIENCY REQUIREMENTS:

1. All electrical systems and components shall be manufactured and installed in compliance with ASHRAE 90.1 – 2007 and latest adopted version of IECC.

1.16. STANDARDS

A. Drawings and specifications indicate minimum construction standard, should any work indicated be sub-standard to any ordinances, laws, codes, rules or regulations bearing on work, Contractor shall promptly notify Architect/Engineer in writing before proceeding with work so that necessary changes can be made. However, if Electrical Contractor proceeds with work knowing it to be contrary to any ordinances, laws, rules, and regulations he shall thereby have assumed full responsibility for and shall bear all costs required to correct non-complying work.

1.17. PERMITS/FEES

A. Electrical Contractor shall secure and pay for necessary permits and certificates of inspection required by governmental ordinances, laws, rules or regulations. Keep a written record of all permits and inspection certificates and submit two copies to Architect/Engineer with request for final review.

B. Contractor shall include in bid any charges by local utility providers to establish new services to the structure. Coordinate with the utility suppliers to verify exact which part of the work is to be performed by whom.

PART 2 - PRODUCTS

A. Not Used

PART 3 - EXECUTION

3.1. SUBMITTALS

A. Contractor shall furnish submittals of all materials and equipment required by the specifications. Refer to each specification section for the submittals (if any) required for that section.

B. Submittal format shall be as indicated below. Submittals not meeting these requirements will be returned without action for re-submittal.

1. Submittals shall be furnished in an Adobe PDF format.
2. Submittals shall be per individual submittal section, as listed in the table of contents. All required submittals within that section shall be grouped together in a single submittal.

   a. Furnishing submittals by division or by individual item may result in delayed reviewing of the submittal(s) due to additional administrative time required to process the large size and/or quantity of files.

3. Submittals shall have a cover page containing the following information: The project name, the applicable

specification section and paragraph, the submittal date, and the Contractor's stamp (see below for requirements).
4. Mark each submitted item as applicable with scheduled mark, name, etc. corresponding to the plans.
5. Where generic catalog cuts are submitted for review, conspicuously mark or provide schedule of equipment, capacities, controls, fitting sizes, etc. that are to be provided. Each catalog sheet shall bear the equipment manufacturer's name and address.
6. Where equipment submitted does not appear in base specifications or specified equivalent, mark submittals with applicable alternate numbers, change order number or letters of authorization.
7. All submittals on materials and equipment listed by UL shall indicate UL approval on submittal.

C. Contractor review:

1. Contractor shall check all submittals to verify that they meet specifications and/or drawings requirements before forwarding submittals to the Architect-Engineer for their review. All submittals submitted to Architect-Engineer shall bear contractor's approval stamp that shall indicate that Contractor has reviewed submittals and that they meet specification and/or drawing requirements. Contractor's submittal review shall specifically check for but not be limited to the following: equipment capacities, physical size in relation to space allowed; electrical characteristics, provisions for supply, return and drainage connections to building systems. All submittals not meeting Contractor's approval shall be returned to their supplier for re-submittal.
2. No submittals will be considered for review by the Architect-Engineer without Contractor's approval stamp, or that have extensive changes made on the original submittal as a result of the Contractor's review.
3. Before submitting shop drawings and material lists, verify that all equipment submitted is mutually compatible and suitable for the intended use. Verify that all equipment will fit the available space and allow ample room for maintenance. If the size of equipment furnished makes necessary any change in location, or configuration, submit a shop drawing showing the proposed layout.

D. Review Schedule:

1. The shop drawing / submittal dates shall be at least as early as required to support the project schedule and shall also allow for two weeks Architect-Engineer review time plus a duplication of this time for re-submittal if required.
2. Submittal of all shop drawings as soon as possible after permitting approval but before construction starts is preferred.
3. Approval of shop drawings submitted prior to receipt of a permit for that respective scope of work should be considered conditional pending review/approval of the construction documents by the AHJ. Changes required to the submittal as a result of permitting comments received after architect's/engineer's review shall not be a justification for a change in price.
4. Any time delay caused by correcting and re-submitting submittals/shop drawings will be the Contractor's responsibility.

E. The Architect's-Engineer's checking and subsequent review of such drawings, schedules, literature, or illustrations shall not relieve the Contractor from responsibility for deviations from Drawings or Specifications unless he has, in writing, called the Architect's-Engineer's attention to such deviations at the time of submission, and secured their written approval; nor shall it relieve the contractor from responsibility for errors in dimensions, details, size of members, or omissions of components for fittings; or for coordinating items with actual building conditions and adjacent work.
F. Any corrections or modifications made by the Architect-Engineer shall be deemed acceptable to the Contractor at no change in price unless written notice is received by the Architect-Engineer prior to the performance of any work incorporating such corrections or modifications.
G. Submittals that require re-submission shall have the items that were revised "flagged" or in some other manner marked to call attention to what has been changed.
H. Coordination

1. After shop drawings have been reviewed and approved by all parties, transmit a set of submittals to each other trade (eg Plumbing, Mechanical, Electrical, Controls, etc) that will interface with installation. Each other contractor shall review the submittal for coordination and return a stamped submittal indicating they have reviewed the submittal for coordination purposes.

3.2. SHOP DRAWINGS

A. Shop drawings shall meet all of the above requirements for submittals.
B. Contractor shall submit Adobe PDF sets of all fabrication drawings. Cost of drawing preparation, printing and distribution shall be paid for by the contractor and included in his base bid.
C. No work shall be fabricated until Architect-Engineer's review has been obtained.
D. Electrical equipment location and conduit coordination shop drawings for conduit fabrication and electrical

equipment clearances shall be a minimum of 1/4" scale. Shop drawings shall not be a reproduction of the contract document and shall show details of the following: Fabrication, assembly, and installation, including plans, elevations above finished floor, sections, components, and attachments to other work.

3.3. OPERATING AND MAINTENANCE INSTRUCTIONS (O & M MANUALS)

A. Submit with shop drawings of equipment, three sets of operating and maintenance instructions and parts lists for all items of equipment provided. Instructions shall be prepared by equipment manufacturer.
B. Keep in safe place, keys and wrenches furnished with equipment under this contract. Present to Owner and obtain receipt for same upon completion of project.
C. Prepare a complete brochure, covering systems and equipment provided and installed under his contract. Submit brochures to Architect/Engineer for review before delivery to Owner. Contractor at his option may prepare this brochure or retain an individual to prepare it for him. Include cost of this service in bid. Brochures shall contain following:

1. Certified equipment drawings/or catalog data with equipment provided clearly marked as outlined under Section this specification.
2. Complete installation, operating, maintenance instructions and parts lists for each item of equipment.
3. Record copy of all submittals indicating actual equipment installed indicating options, characteristics. Copies of submittals shall bear the stamps of all parties that reviewed submittals.
4. Special emergency operating instructions with a list of service organizations (including addresses and telephone numbers) capable of rendering emergency service to various parts of system.
5. Record Set Drawings: The Contractor shall mark up a set of contract documents during construction noting all changes and deviations including change orders. These will be delivered to Architect at end of the project. After the originals are changed to reflect the blue line set, a copy shall be included in the brochure.
6. Provide brochure bound in black vinyl three-ring binders with metal hinge. Reinforce binding edge of each sheet of loose-leaf type brochure to prevent tearing from continued usage. Clearly print on label insert of each brochure:

   a. Project name and address.
   b. Section of work covered by brochure, i.e., Electrical.

3.4. RECORD DOCUMENTS

A. During construction, keep an accurate record of all deviations between the work as shown on Drawings and that which is actually installed. Keep this record set of prints at the job site for review by the Architect/Engineer.
B. Upon completion of the installation and acceptance by the owner, transfer all record drawing information to one neat and legible set of prints. Then deliver them to the Architect/Engineer for transmittal to the Owner.
C. Provide one copy of on high quality heavy weight presentation type paper. Blueprints or other media which fade shall not be used.
D. Provide one electronic scanned version of record documents in Adobe PDF format – PDFs may be submitted on electronic media (DVD, USB) or via an FTP or other file sharing site. Provide electronic copies in conjunction with hard copy documents.

3.5. PREMIUM TIME WORK

A. The following Work shall be performed at night or weekend other than holiday weekends as directed and coordinated with the Owner.

1. All tie-in, cut-over and modifications to the existing electrical system and other existing system requiring tie-ins or modifications shall be arranged and scheduled with the Owner to be done at a time as to maintain continuity of the service and not interfere with normal building operations.

3.6. CLEANING UP

A. Contractor shall take care to avoid accumulation of debris, boxes, crates, etc., resulting from the installation of his work. Contractor shall remove from the premises each day all debris, boxes, etc., and keep the premises clean.
B. Contractor shall clean up all fixtures and equipment at the completion of the project.
C. All switchboards, panelboards, wireways, trench ducts, cabinets and enclosures shall be thoroughly vacuumed clean prior to energizing equipment and at the completion of the project. Equipment shall be opened for observation by the Architect/Engineer as required.

3.7. WATERPROOFING

A. Avoid, if possible, the penetration of any waterproof membranes such as roofs, machine room floors, basement walls, and the like. If such penetration is necessary, perform it prior to the waterproofing and furnish all sleeves or pitch-pockets required. Advise the Architect/Engineer and obtain written permission before penetrating any

waterproof membrane, even where such penetration is shown on the Drawings.

B. If Contractor penetrates any walls or surfaces after they have been waterproofed, he shall restore the waterproof integrity of that surface as directed by the Architect/Engineer at his own expense

3.8. CUTTING AND PATCHING

A. Contractor shall do cutting and patching of building materials required for installation of work herein specified. Remove walls, ceilings and floors (or portions thereof) necessary to accomplish scope of work. Do not cut or drill through structural members including wall, floors, roofs, and supporting structure, without the Architect's and Structural Engineer's approval and in a manner approved by them.

B. Make openings in concrete with concrete hole saw or concrete drill. Use of star drill or air hammer for this work will not be permitted.

C. Patching shall be by the contractors of the particular trade involved, shall match the existing construction type, quality, finish and texture, and shall meet approval of Architect-Engineer. Damage to building finishes, caused by installation of electrical work shall be repaired at Contractor's expense to approval of Architect-Engineer.

3.9. SETTING, ADJUSTMENT AND EQUIPMENT SUPPORTS

A. Work shall include mounting, alignment and adjustment of systems and equipment. Set equipment level on adequate foundations and provide proper anchor bolts and isolation as shown or specified. Level, shim, and grout equipment bases as recommended by manufacturer. Mount motors, align and adjust drive shafts and belts according to manufacturer's instruction. Equipment failures resulting from improper installation or field alignment shall be repaired or replaced by Contractor at no cost to Owner.

B. Floor or pad mounted equipment shall not be held in place solely by its own dead weight. Include anchor fastening in all cases.

C. Provide electrical floor mounted equipment with 3-1/2" high concrete bases unless shown or specified otherwise. Electrical contractor shall size all pads. General contractor shall form all pads, provide and place all concrete for said pads. Individual concrete pad shall be no less than 4" wider and 4" longer than equipment, and shall extend no less than 2" from each side of equipment.

D. Provide each piece of equipment or apparatus suspended from ceiling or mounted above floor level with suitable structural support, platform or carrier in accordance with best recognized practice. Electrical contractor shall arrange for attachment to building structure, unless otherwise indicated on drawings or as specified. Provide hangers with vibration eliminators where required. Contractor shall verify that structural members of building are adequate to support equipment. Submit details of hangers, platforms and supports together with total weights of mounted equipment to Architect/Engineer for review before proceeding with fabrication or installation.

3.10. START-UP, CHANGEOVER, TRAINING AND OPERATION CHECK

A. Electrical Contractor shall be responsible for training Owner's operating personnel to operate and maintain systems and equipment installed. Keep a record of training provided to Owner's personnel listing the date, subject covered, instructor's name, names of Owner's personnel attending and total hours of instruction given each individual.

B. All owner-training sessions shall be orderly and well organized and shall be video recorded digitally. At the end of the owner training, the "training" session recording shall be transmitted to the owner via DVD and shall become property of the owner.

3.11. FINAL CONSTRUCTION REVIEW

A. At final construction review, Electrical Contractor and the major sub-contractors shall be present or shall be represented by a person of authority. Each Contractor shall demonstrate, as directed by Architect/Engineer, that the work complies with purpose and intent of plans and specifications. Respective Contractor shall provide labor, services, instruments or tools necessary for such demonstrations and tests.

END OF SECTION 260010

SECTION 260011 – BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Reference Section 260010.
B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1. NEUTRAL AND GROUND WIRES

A. Where individual circuit homeruns (hots, neutral, and ground as part of a single circuit) are indicated on the plans serving lighting and branch circuit receptacle loads, these shall be individual circuits with individual neutrals (no sharing of neutrals and/or grounds).
B. Where shared circuit homeruns (hots, neutral, and ground as part of separate circuits) are indicated on the plans, these shall be allowed to share one (common) ground for three (3) circuits from different phases occurring in one (1) conduit run. When additional circuits occur in conduit run, additional ground wires shall be installed. Conduit shall be upsized and conductors shall be de-rated based on NEC current carrying conductor tables, counting all hots and neutrals as current carrying conductors.

1. No sharing of neutral conductors is allowed in multi-wire branch circuit homeruns, unless the installation meets the requirements of 2014 NEC 210.4(B), and is specifically approved by the engineer of record.

3.2. TESTS RECORDING, REPORTING TESTS AND DATA

A. Record nameplate horsepower, amperes, volts, phase service factor and other necessary data on motors and other electrical equipment furnished and/or connected under this contract.
B. Record motor starter catalog number, size and rating and/or catalog number of thermal-overload units installed in all motor starters furnished and/or connected under this contract. See motor starter specification for instructions for proper sizing of thermal-overload units.
C. Record amperes-per-phase at normal or near-normal loading of each item of equipment furnished and/or connected.
D. Record correct readings of each feeder conductor after energized and normally loaded, and again after balancing of feeder loads as required by current readings.
E. Record voltage and ampere-per-phase readings taken at service entrance equipment after completion of project with building operating at normal electrical load.
F. Short-Circuit Calculations

1. Contractor shall contact utility company after utility company design is complete and determine exact available fault current in amperes at the point of utility connection (Service Point).
2. Contractor shall utilize the above available fault current to calculate the available fault current in amperes (RMS-SYM) at the service equipment.
3. The available fault current shall be labeled on the service equipment – refer to Section 260553.

G. Submit at least two (2) typewritten copies of data noted above to Architect-Engineer for review prior to final inspection.
H. Keep a record of all deviations made from routes, locations, circuiting, etc. shown on contract drawings. Prior to final inspection submit one new set of project drawings with all deviations and changes clearly indicated.

3.3. CLEANING AND PAINTING OF MATERIALS AND EQUIPMENT

A. Before energizing switchboards, transformers, panelboards, starters, variable frequency drive and other similar electrical equipment, Contractor shall thoroughly vacuum out all dirt, dust and debris from inside of equipment and shall thoroughly clean outside and inside of equipment.
B. Touch-up painting and refinishing of factory applied finishes shall be by Electrical Contractor. Contractor shall be responsible for obtaining proper type of painting materials and color from equipment manufacturer.
C. Unless specified otherwise factory built equipment shall be factory painted. Paint shall be applied over surfaces only after they have been properly cleaned and coated with a corrosion resistant primer.
D. After installation, damage to painted surfaces shall be properly prepared and primed with primers equal to factory materials. Finish coating shall be same color and type as factory finish.
E. Where extensive refinishing is required equipment shall be completely repainted.

3.4. EXCAVATION AND BACKFILL

A. Perform necessary excavation to receive work. Provide necessary sheathing, shoring, cribbing, tarpaulins, etc. for this operation, and remove at completion of work. Perform excavation in accordance with appropriate section of these specifications, and in compliance with OSHA Safety Standards.
B. Excavate trenches of sufficient width to allow ample working space, and no deeper than necessary for installation work.
C. Conduct excavations so no walls or footings are disturbed or injured.
D. Backfill excavations made under or adjacent to footing with selected earth or sand and tamp to compaction required by A/E.
E. Mechanically tamp backfill under concrete and pavings in 6" layers to 95% standard density, Reference Division 2.
F. Backfill trenches and excavations to required heights with allowance made for settlement.
G. Tamp fill material thoroughly and moistened as required for specified compaction density.
H. Dispose of excess earth, rubble and debris as directed by Architect.
I. When available, refer to test hole information on architectural drawings or specifications for types of soil to be encountered in excavations.

3.5. FIRE BARRIERS

A. Provide sleeves through all fire-rated walls and fill voids surrounding sleeves and interior to sleeves around piping with Nelson "Flameseal" fire stop putty with U.L. listed 3 hour rating installed as per manufacturers recommendations.
B. Equivalent by Dow, Chemelex, 3M.
C. All holes or voids created by the electrical contractor to extend conduit or wiring through fire rated floors and walls shall be sealed with an intumescent material capable of expanding up to 8 to 10 times when exposed to temperatures of 250 degrees F. It shall have ICBO, BOCAI and SBCCI (NRB 243) approved ratings to 3 hours per ASTM E-814 (UL 1479). Acceptable Material: 3M Fire Barrier Caulk, Putty, Strip and sheet forms.

3.6. TEMPORARY COVERINGS

A. Provide temporary covering over all electrical panels, distribution panelboards, outlet boxes and other equipment as required to keep same free from damage due to moisture, plaster, paint, concrete or other foreign materials. Any equipment with finish damaged by moisture, paint, plaster or other foreign materials shall be cleaned and refinished as directed by the Architect without additional cost to the Owner.
B. All temporary openings in conduits shall be covered with metal or plastic caps.

3.7. PROTECTIVE COVERS

A. Provide protective wire guards over all wall mounted and ceiling mounted devices subject to damage in areas such as gymnasiums, shops and similar occupancies.
B. Provide lockable covers over thermostats and similar wall mounted devices where items are located in public spaces but should not be operable by the general public.

3.8. SLEEVES

A. Provide proper type and size sleeves to General Contractor for electrical ducts, busses, conduits, etc. passing through building construction. Supervise installation to insure proper sleeve location. Unless indicated or approved install no sleeves in structural members.
B. Provide cast iron sleeves extending 1 inch above finished floor where sleeves pass through floors subject to flooding such as toilet rooms, bathrooms, equipment rooms and kitchen. Seal opening between pipe and sleeve with Thunderline Corp. Link Seal.
C. Unless specified otherwise provide 18 gauge galvanized sheet metal sleeves through floors and non-bearing walls. Where piping passes through exterior walls, equipment room walls, air plenum walls and walls between areas that must be isolated from occupied areas, seal space between sleeves and piping, air or water tight are required with Thunderline Corp. Link Seal.
D. Provide O-Z Electrical Manufacturing Co., Inc. Type "FSK" or "WSK" or equivalent thruwall and floor seals where conduits pass through concrete foundation walls below grade.
E. Provide Zurn Z-195 or equivalent flashing sleeve through walls and floors with waterproof membrane. Seal annular space between conduit and sleeve with Thunderline Link Seal or O-Z type CSM sealing bushing.

END OF SECTION 260011

SECTION 260013 – PROJECT COORDINATION

PART 1 GENERAL

1.1. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Coordination Drawings.
2. Administrative and supervisory personnel.
3. Project meetings.
4. Requests for Interpretation (RFIs).
5. Wiring of equipment furnished by others

B. Each related sub-contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.

1.3. COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Delivery and processing of submittals.
2. Progress meetings.
3. Preinstallation conferences.
4. Project closeout activities.
5. Startup and adjustment of systems.

1.4. SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:

a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
b. Indicate required installation sequences.
c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 40 inches. Format shall be PDF or other electronic format to facilitate multiple user commenting and sharing easily.
3. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including project managers, superintendent and other personnel in attendance at Project site to the General Contractor and other major subcontractors. Identify individuals and their duties and responsibilities; list email addresses and telephone numbers. Update the list as required during the project if personnel change.

1.5. COORDINATION

A. Certain materials will be provided by other trades. Examine the Contract Documents and reviewed record Submittals to ascertain these general requirements. Contract Documents reflect a basis of design and may not reflect actual equipment or items being utilized.
B. Carefully check space requirements with other trades and the physical confines of the area to insure that all material can be installed in the spaces allotted thereto including finished suspended ceilings and the spaces within the existing building. Make modifications thereto as required and approved.
C. Transmit to other trades all information required for work to be provided under their respective Sections in ample time for installation.
D. Wherever work interconnects with work of other trades, coordinate with other trades to insure that all trades have the information necessary so that they may properly install all the necessary connections and equipment. Identify all items of work that require access so that the ceiling trade will know where to install access doors and panels.
E. Obtain equipment submittal information for all pieces of equipment to be connected to from other trades that clearly indicates all connection requirements, locations, sizes, and similar requirements. Obtain this information in ample time to coordinate other trade submittals and equipment coordination. Where requirements differ from that on plans or differs from provisions made in the work, immediately notify the Architect/Engineer. Do not proceed with work that is incompatible with equipment provided.
F. Coordinate, project and schedule work with other trades in accordance with the construction sequence.
G. Coordinate with the local Utility Companies to their requirements for service connections and provide all necessary materials, labor and testing.
H. Coordinate with contractors for work under other Divisions of this specification for all work necessary to accomplish this contractor's work.
I. Conduct a coordination meeting after reviewing all other trade coordination drawings with other relevant trades. This meeting shall be held to prevent conflicts during construction. Each major relevant subcontractor shall attend this meeting. Report any potential conflicts or clearance problems to Architect/Engineer after meeting.
J. Adjust location of piping, ductwork, conduit, wiring, etc. to prevent interferences, both anticipated and encountered. Determine the exact route and location of each item prior to fabrication.

1. Right-of-Way:

a. Lines that pitch have the right-of-way over those that do not pitch. For example: steam, condensate, and plumbing drains normally have right-of way. Lines whose elevations cannot be changed to have right-of-way over lines whose elevations can be changed.
b. Make offsets, transitions and changes in direction in raceways as required to maintain proper headroom in pitch of sloping lines whether or not indicated on the Drawings.

1.6. DRAWINGS AND FILES.

A. The Drawings show only the general run of MEP systems, equipment, fixtures, piping and ductwork and other components as well as approximate location of items such as outlets, switches, diffusers, lights, and equipment connections, etc. Coordinate all exact locations of items with other trades, architectural elevations, equipment requirements, owner requirements, ceilings, access, serviceability, etc. All such modifications and coordination shall be made without additional cost to the Owner. Any significant changes in location of items necessary in order to meet field conditions shall be brought to the immediate attention of the Architect/Engineer and receive his approval before such alterations are made
B. Wherever the work is of sufficient complexity, additional Detail Drawings to scale similar to that of the bidding Drawings, prepared on tracing medium of the same size as Contract Drawings. With these layouts, coordinate the work with the work of other trades. Such detailed work to be clearly identified on the Drawings as to the area to which it applies. Submit for review Drawings clearly showing the work and its relation to the work of other trades before commencing shop fabrication or erection in the field. Attend meetings with other trades to review all documents.
C. When directed by the General Contractor for areas of necessary coordination provide 3D building modelling coordination files and documents with other trades. Transmit information electronically and attend meetings as directed by the G/C as well as take part in coordination activities and documentation. Contractor shall be required to generate their own electronic files for this process.

1.7. PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. The Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Possible conflicts.
i. Compatibility problems.
j. Time schedules.
k. Manufacturer's written recommendations.
l. Warranty requirements.
m. Compatibility of materials.
n. Space and access limitations.
o. Regulations of authorities having jurisdiction.
p. Testing and inspecting requirements.
q. Installation procedures.
r. Coordination with other work.
s. Required performance results.
t. Protection of adjacent work.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

C. Coordination Meetings: Conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contractor is on time, ahead or behind schedule, in relation to Construction Schedule. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time. Discuss impact of various contractor schedules upon other contractors and how to remedy impacts.
b. Review present and future needs of each contractor present, including the following:

i. Interface requirements.

ii. Sequence of operations.
iii. Status of submittals.
iv. Deliveries.
v. Off-site fabrication.
vi. Access.
vii. Quality and work standards.
viii. Change Orders.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.8. REQUESTS FOR INTERPRETATION (RFIs)

A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI.

1. Submit Contractor's suggested solution(s) to RFI. If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
2. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

3.1. EQUIPMENT FURNISHED BY OTHERS

A. Description:

1. Items furnished by other trades (mechanical or plumbing contractor, etc.) such as mechanical/plumbing equipment, line voltage actuators, VFDs (not by electrical contractor), etc.
2. Kitchen equipment (may be furnished by owner, owner's vendor, or separate sub-contractor)
3. Equipment furnished by general contractor
4. Equipment furnished by owner

B. General

1. Fully review manufacturer's installation instructions for equipment. Installation of all related electrical items noted below shall be per same.

a. Electrical contractor shall obtain same from others if not readily available.

C. Disconnecting Means

1. An approved disconnecting means shall be provided at all equipment and shall serve to disconnect power from same.
2. Disconnecting means may be a switch, circuit breaker, or a cord-and-plug type connection.
3. Disconnecting means shall be within sight of equipment, as defined by NEC.
4. Disconnect switches may be non-fused, unless specifically shown fused on the plans or otherwise required by code to be fused.

a. All disconnect switches serving elevator equipment shall be provided with an overcurrent protective device.

D. Wiring of Equipment

1. Wire sizes used shall be as directed on plans or installation instructions, whichever is greater. Contractor shall notify engineer of any deviations from wire sizes listed on construction documents.
2. Wiring shall include a neutral conductor where shown on plans or required by installation instructions.

a. If a neutral conductor is shown on the plans but not required by installation instructions, verify removal of neutral wire with engineer via RFI prior to proceeding.

3. Wiring of elevators and other such equipment shall account for voltage drop limitations of equipment.

END OF SECTION 260013

SECTION 260505 – ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Reference Section 260010.
B. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2. SCOPE

A. Demolition work to be performed whether shown or not on the drawings. Disconnect and remove any lights, equipment, conduit, wiring, devices, etc. not required to remain and/or required to be removed to accommodate new construction.

1.3. SUMMARY

A. This Section requires the selective removal and subsequent offsite disposal of the following:

a. Mechanical and electrical equipment, devices, piping, conduits, ductwork, insulation, lighting, etc in existing building as required to accommodate new construction.
b. Removal of MEP items in interior partitions.
c. Removal and protection of existing fixtures, materials, and equipment items to be removed, salvaged, relocated, reinstalled, etc.

1.4. SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
B. Schedule indicating proposed sequence of operations for selective demolition work to Architect for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.

1. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
2. Coordinate with Owner's continuing occupation of portions of existing building and with Owner's partial occupancy of completed remodeled areas.

C. Photographs of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Architect prior to start of work.

1.5. JOB CONDITIONS

A. Occupancy: Owner will occupy portions of the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in such a manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities that will affect Owner's normal operations.
B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished. Conditions existing at time of Contractor's inspection for bidding purposes will be maintained by Owner insofar as practicable. However, minor variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.
C. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed. Storage or sale of removed items on site will not be permitted.
D. Protections: Provide temporary barricades and other forms of protection to protect Owner's personnel and general public from injury due to selective demolition work.

a. Provide protective measures as necessary and required to provide free and safe passage of Owner's personnel and general public to any occupied portions of building.
b. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities or work to remain.
c. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
d. Construct temporary insulated dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks.
e. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
f. Remove protections at completion of work.

2. Damages: Promptly repair damages caused to adjacent facilities by demolition work.
3. Traffic: Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close, block, or otherwise obstruct streets, walks, or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

E. Flame Cutting:

1. Do not use cutting torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.

F. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.

1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

G. Maintain fire protection services during selective demolition operations.
H. Environmental Controls:

a. Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing and/or approved regulations pertaining to environmental protection. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1. PREPARATION

A. General: Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.
B. Cease operations and notify Architect immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
C. Provide all necessary temporary supports of items and systems to remain that were supported from or otherwise affected by removal of other building components. Maintain integrity of all systems to remain and protect during the construction process.
D. Erect and maintain dust-proof partitions and closures as required to prevent spread of dust or fumes to any occupied portions of the building.

a. Where selective demolition occurs immediately adjacent to any occupied portions of the building, construct dust-proof partitions of minimum 4-inch studs, 5/8-inch drywall (joints taped) on occupied side, 1/2-inch fire-retardant plywood on demolition side. Fill partition cavity with sound-deadening insulation as required by Architect.
b. Provide weatherproof closures for exterior openings resulting from demolition work.

E. Locate, identify, stub off, and disconnect utility services that are not indicated to remain. Provide bypass connections as necessary to maintain continuity of service to any occupied areas of building. Provide minimum of 72 hours advance notice to Architect if shutdown of service is necessary during changeover.

3.2. DEMOLITION

A. General: Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.

1. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.
2. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.
3. Provide services for effective air and water pollution controls as required.
4. Completely fill below-grade areas and voids resulting from demolition work. Provide fill consisting of approved earth, gravel, or sand, free of trash and debris, stones over 6 inches in diameter, roots, or other organic matter.

B. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to architect in written

accurate detail. Pending receipt of directive from Architect, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

3.3. SALVAGED MATERIALS

A. Salvaged Items: Where indicated on Drawings as "Salvage - Deliver to Owner," carefully remove indicated items, clean, store, and turn over to Owner and obtain a receipt.

3.4. DISPOSAL OF DEMOLISHED MATERIALS

A. Remove debris, rubbish, and other materials resulting from demolition operations from building site. Transport and legally dispose off site.
B. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.
C. Burning of removed materials is not permitted on Project site.

3.5. CLEANUP AND REPAIR

A. General: Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave interior areas broom clean. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION 260505

SECTION 260519 – WIRE AND CABLE

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

1.3. SUBMITTALS

A. Product Data: For each type of product indicated.
B. Qualification Data: For testing agency.
C. Field quality-control test reports.

1.4. QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
B. Comply with NFPA 70.

1.5. COORDINATION

A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1. CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Southwire Company.
2. General Cable Corporation.
3. Encore Wire Corporation.
4. AFC Cable Systems, Inc. (Multiconductor cable only)

B. Copper Conductors: Comply with NEMA WC 70.
C. Aluminum Conductors: Comply with NEMA WC 70.

a. Same shall be compacted aluminum (Stabiloy)

D. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN-2.

1. Provide consistent color coding of all circuits as follows:

	Distribution System	
Phase	**120/208**	**277/480**
A	Black	Brown
B	Red	Orange
C	Blue	Yellow
N	White	Gray
Ground	Green	Green w/ Stripe [1]

Notes:

1) Stripe shall be white or yellow in color.

E. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC with ground wire.

2.2. CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cable manufacturers listed above under 2.1, Item A.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.

4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1. CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

1. Aluminum conductors acceptable only when specifically shown/scheduled on drawings.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

1. Aluminum conductors are not permitted for branch circuit wiring.

3.2. CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Provide insulation / cable types for conductors as follows:

Application	Insulation / Cable Type		
	THHN/THWN-2 [1]	XHHW-2 [1]	MC Cable [3]
Service Entrance	X [2]	X	
Feeders:			
Exposed, Exterior	X [2]	X	
Exposed, Interior	X		
Concealed in Ceilings, Walls, Partitions, and Crawlspaces	X		
Concealed in Concrete, below Slabs-on-Grade, and Underground	X [2]	X	
Branch Circuits:			
Exposed, Exterior	X [2]	X	
Exposed, Interior - Including Crawlspaces	X		
Concealed in Ceilings, Walls, and Partitions	X		X
Concealed in Concrete, below Slabs-on-Grade, and Underground	X [2]	X	

Notes:

1) Single conductors in raceway. Refer to Section 260533 - Raceway & Boxes for acceptable raceway types/applications.
2) THHN/THWN-2 is acceptable for these installations at contractor's discretion.
3) Metal Clad (MC) cable installations shall be in accordance with the following:
   (i) MC cable shall not be used for homeruns.
   (ii) MC cable may be used for light fixture and equipment whips in lengths no longer than 6'-0". The use of MC cable from lighting fixture to lighting fixture shall not be allowed.
   (iii) MC cable shall not be installed in exposed locations for lighting purposes. MC cable may be exposed in mechanical spaces for equipment whips.

B. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
C. Class 1 Control Circuits: Type THHN-THWN-2, in raceway.
D. Class 2 Control Circuits: Type THHN-THWN-2, in raceway or Power-limited cable, concealed in building finishes.

3.3. INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables per National Electrical Code requirements.
F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.4. CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5. FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.
B. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
2. Test Reports: Prepare a written report to record the following:

a. Test procedures used.
b. Test results that comply with requirements.
c. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

C. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

SECTION 260526 – GROUNDING

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Reference Section 260010.
B. Reference Section 260519 for general requirements of all conductors.
C. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2. DESCRIPTION OF WORK

A. Provide grounding electrodes, conductors, connections and equipment to provide a solidly grounded electrical system.

1.3. STANDARDS

A. Except as modified by governing codes and by the Contract Documents, comply with the latest applicable provisions and latest recommendations of the following:

1. Underwriters Laboratory Standard No. U.L. 467.
2. ANSI C-1 1978.
3. IEEE Standards No. 142-1982, 1100-1992 and No. 80.
4. National Electrical Safety Code.
5. NFPA.

1.4. SUBMITTALS

A. For each type of product data listed.
B. Submit test reports certifying resistance values for buried or driven grounds and water pipe grounds.

PART 2 - PRODUCTS

2.1. CONDUCTORS

A. Grounding conductor sizes shall be as shown on plans or if not specifically shown shall be no smaller than that required by the NEC.
B. Insulated Conductors: Annealed tinned copper wire. Size as indicated on Drawings; insulation to conform with requirements of Section 260519.
C. Bare Copper Conductors:

1. Stranded Conductors: ASTM B 8.
2. Tinned Conductors: ASTM B 33.

D. Grounding Bus: Rectangular bars of annealed copper, 1/4" by 2” in cross section, unless otherwise indicated; with insulators.

2.2. GROUNDING ELECTRODES

A. Ground Rods:

1. Copper-clad steel fabricated by molten welding process.
2. Diameter: 5/8 Inch. Use 3/4" for rocky soil.
3. Length: 8 feet.

2.3. CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

PART 3 - EXECUTION

3.1. APPLICATIONS

A. General:

1. Where metal raceways, cable trays, cable armor, cable sheath, enclosures, frames, fittings, and other metal non-current-carrying parts are indicated to serve as grounding conductors, same shall be effectively bonded where necessary to assure electrical continuity and the capacity to safely conduct and fault current likely to be imposed on them.

    a. Any non-conductive paint, enamel, or similar coating shall be removed at threads, contact points, and contact surfaces or be connected by means of fittings so designed as to make such removal unnecessary.

B. Underground Grounding Conductors: Install bare tinned copper conductor, #2/0 AWG minimum.

1. Bury at least 24” below grade.

C. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Bolted or Welded connectors.
3. Connections to Structural Steel: Bolted or Welded connectors.

D. Grounding Bus: Install in electrical service rooms, data rooms, and elsewhere as indicated.

1. Install bus on insulated spacers a minimum of 1” from wall and 6” above finished floor, unless otherwise indicated.

3.2. EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

1. Provide low voltage distribution system with a separate green insulated equipment grounding conductor for each single or three-phase feeder.
2. Branch circuits shall consist of phase and neutral conductors as shown/indicated and a green ground conductor installed in common raceway which shall serve as the equipment grounding conductor.

    a. Equipment grounding conductors for branch circuit home runs shown on the drawings shall indicate an individual and separate ground conductor for that homerun which shall be terminated at the branch circuit panelboard, switchboard, or other distribution equipment. No sharing of equipment grounding conductors sized according to the size of the overcurrent device and NEC Table 250-122 shall be allowed.

3. Where ground cable is installed in metallic conduit, bond cable to conduit at both ends.
4. Connect ground conductors in cables and in conduit to appropriate ground buses (as in switchgear, motor control centers, and distribution panelboards) or directly to metallic enclosure if no ground bus is provided.
5. Required equipment grounding conductors and straps shall be sized in compliance with N.E.C. Table 250-122.
6. Equipment grounding conductors shall be provided with green type TW 600 volt insulation. Related feeder and branch circuit grounding conductors shall be connected to ground bus with approved pressure connectors.
7. Provide feeder servicing several panelboards with a continuous grounding conductor connected to each related panelboard ground bus. Installation shall include necessary precautions regarding terminations with dissimilar metals.
8. Where parallel feeders are installed in more than one raceway, each raceway shall have a green insulated equipment grounding conductor.

B. Separately Derived Systems

1. Equipment grounding conductors shall be provided for separately derived systems and shall be grounded to building steel, cold water pipes, etc., or an alternate grounding means.

C. Conduit Attachment to Electrical Equipment:

1. Ground conduits to metal framework of electrical equipment with double locknuts or grounding bushings and bonding jumpers unless otherwise noted.
2. Install bonding jumpers at all electrical equipment to provide continuous ground return path through conduit.
3. Install bonding jumpers across expansion fittings between conduit sections for ground path continuity.
4. Provide grounding type bushings for conduits terminated through multiple concentric knockouts not fully knocked out, on inside of electrical enclosures. Install bonding jumper between ground bushing and enclosure.

D. Receptacles:

1. Install bonding jumpers between outlet box and receptacle grounding terminal except where contact device or yoke is provided for grounding purposes.

E. Switches

1. Where required, provide grounding clip on each toggle switch. Mount over device mounting strap such that contact is made between mounting strap, screw, faceplate and outlet box.
2. Provide devices with ground screw and bond to switch box.

F. Wireways:

1. Install grounding jumpers for bonding between wireway and other panelboards, conduit, switchgear, motor control centers, and at any other point where solid connection would otherwise not provided in supporting system to insure continuous ground.

G. Pull Boxes, Junction Boxes and Enclosures:

1. Connect all equipment grounding conductors together and connect to the box.

H. Dry-Type Transformers:

1. Perform grounding in accordance with N.E.C.
2. Install bonding jumper across flexible conduit from transformer housing to rigid conduit.

I. Coordination with Other Trades:

1. Where low-voltage cabling for tele/data, security systems, A/V systems, etc. is not otherwise part of the scope of work indicated herein, electrical contractor shall coordinate required grounding/bonding of these components with the owner's vendor or other subcontractor.
2. Each system of continuous metallic piping and ductwork shall be grounding in accordance with the requirements of the National Electrical Code.
    a. Portions of these systems which are isolated by flexible connections, insulated couplings, etc. shall be bonded to the equipment ground with a flexible bonding jumper.
3. Mechanical equipment shall be bonded to the building equipment grounding system. This shall include, but not be limited to: fans, pumps, chillers, etc.

3.3. GROUNDING ELECTRODE SYSTEM

A. General:

1. The system neutral shall be grounded at the service entrance only and kept isolated for grounding systems throughout the building.
2. The grounding electrode system shall include all of the following grounding methods at minimum, where available:
    a. The metal frame of the building, where effectively grounded.
    b. A metal underground water piping system used for grounding shall be in direct contact with the earth for ten feet or more and shall be electrically continuous. Provide bonding jumpers at water meter and at insulated joints.
    c. All bonding jumpers for the above grounding systems shall be sized in accordance with National Electrical Code.

B. Service Ground

1. Connect system neutral ground and equipment ground system to common ground bus.
2. Ground secondary services at supply side of each individual secondary disconnecting means and at related transformers in accordance with National Electric Code.
3. Provide each service disconnect enclosure with neutral disconnecting means which interconnects with insulated neutral and uninsulated equipment ground sub to establish system common ground point.
4. Neutral disconnecting links shall be located so that low voltage neutral bar with interior secondary neutrals can be isolated from common ground bus and service entrance conductors.

3.4. INSTALLATION

A. Grounding Electrode Conductors: route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
B. Ground Rods: Drive rods until tops are 2" below finished floor or final grade, unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating (if any).

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

D. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Make connections with clamp type fitting; do not damage water pipe.
3. Bond ground conductor and its conduit to water pipe.

3.5. FIELD QUALITY CONTROL

A. Resistance Values for System and Equipment Grounds: for each ground rod and ground grid.

1. Acceptable Testing Equipment: Vibroground by Associated Research, Inc.; or Megger Earth Tester by James G. Biddle Co.
2. Method: Three (3) electrode fall of potential as prescribed by instrument manufacturer.
3. Drive additional ground rods spaced eight feet apart, if necessary, until total resistance of system is measured at five ohms or less.

END OF SECTION 260526

SECTION 260529 – HANGERS & SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

B. Related Sections include the following:

1. Division 26 Section "Vibration And Seismic Controls For Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.3. DEFINITIONS

A. EMT: Electrical metallic tubing.
B. IMC: Intermediate metal conduit.
C. RMC: Rigid metal conduit.

1.4. PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.5. QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
B. Comply with NFPA 70.

1.6. COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 PRODUCTS

2.1. SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. ERICO International Corporation.
d. GS Metals Corp.
e. Thomas & Betts Corporation.
f. Unistrut; Tyco International, Ltd.
g. Wesanco, Inc.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
5. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

i. Hilti Inc.
ii. ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
iii. MKT Fastening, LLC.
iv. Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, [zinc-coated] steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

i. Cooper B-Line, Inc.; a division of Cooper Industries.
ii. Empire Tool and Manufacturing Co., Inc.
iii. Hilti Inc.
iv. ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
v. MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.2. FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 EXECUTION

3.1. APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
B. Support raceways at intervals no greater than ten (10) feet and with one support within three (3) feet of each coupling, box, fitting, or outlet box. Provide one support within three (3) feet of each elbow or bend.
C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 20 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports.

E. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.
F. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
G. Use one or two-hole saddle-type clamps where single conduits are exposed below 6’-0” AFF.

3.2. SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
6. To Steel:
    a. Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts
    b. Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69
    c. Spring-tension clamps].
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3. INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.
B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4. CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03."
C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

END OF SECTION 260529

SECTION 260533 – RACEWAYS AND BOXES

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Reference Section 260010.
B. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2. DESCRIPTION OF WORK

A. Provide complete raceways systems, boxes and fittings for all required electrical systems.

1.3. STANDARDS

A. Except as modified by governing codes and by the Contract Documents, comply with the latest applicable provisions and latest recommendations of the following:

1. Rigid Steel Conduit
    a. U.L. Standard UL-6
    b. A.N.S.I. C80-1
    c. Federal Specification WW-C-581E
2. Intermediate Metallic Conduit
    a. U.L. Standard UL-1242
    b. Federal Specification WW-C-581E
3. Electrical Metallic Tubing
    a. U.L. Standard UL-797
    b. A.N.S.I. C80-3
    c. Federal Specification WW-C-563
4. Flexible Steel Conduit
    a. U.L. Standard UL-1
5. Liquid Tight Flexible Conduit
    a. U.L. Standard UL-360
6. Non-Metallic Conduit
    a. U.L. Standard UL-651
    b. A.N.S.I. Standard F512
    c. N.E.M.A. Standard TC-2
    d. Federal Specifications GSA-FSS and W-C-1094-A
7. Wireways and Auxiliary Gutters
    a. U.L. Standard UL-870

1.4. SUBMITTALS

A. Provide manufacturer's catalog cuts of fittings.
B. Where wireways and/or auxiliary gutters are employed full erection drawings must be submitted. Drawings to include plan views, elevations, size of wireways, type and quantity of conductors proposed to be installed therein, etc.
C. Indicate duct banks or multi-trade coordinated shop drawings.
D. Submit shop drawings or catalog descriptive data on boxes exceeding twenty-four (24")inches for any one dimension.
E. Submit shop drawings or catalog descriptive for floor boxes and accessories.

PART 2 - PRODUCTS

2.1. RACEWAY TYPES

A. Standard Threaded Rigid Steel Conduit.

1. Rigid conduit heavy wall galvanized.
2. Threaded type fittings: "Erickson" couplings where threaded cannot be used.

B. Intermediate Metallic Conduit

1. Light weight rigid steel conduit.
2. Threaded type fittings: "Erickson" couplings where threaded cannot be used.

C. Electrical Metallic Tubing

1. Continuous, seamless tubing, galvanized or sheradized on the exterior, coated on the interior with a smooth hard finish of lacquer, varnish, or enamel.
2. Couplings and connectors:
    a. Indoor and two (2") inches in size and smaller, shall be steel set-screw type fittings.
    b. 2-1/2 inch size and larger must employ steel compression gland fittings.
    c. Outdoor shall be raintight steel compression gland fittings.
3. Indent type fittings shall not be used.
4. All connectors shall have insulated throat.
5. Where installed in slab or concrete work, provide approved concrete tight fittings.

D. Flexible Steel Conduit

1. Single strip, continuous, flexible interlocked, double-wrapped steel, galvanized inside and outside, forming smooth internal wiring channel.
2. Maximum length: (six 6) feet.
3. Each section of raceway must contain an equipment grounding wire bonded at each end and sized as required. Provide connectors with insulating bushings.
4. Steel squeeze-type or steel set screw type fittings.

E. Liquid Tight Flexible Electrical Conduit

1. Same as flexible steel conduit except with tough, insert water-tight plastic outer jacket.
2. Cast malleable iron body and gland nut, cadmium plated with one-piece brass grounding bushings which thread to interior of conduit. Spiral molded vinyl sealing ring between gland nut and bushing and nylon insulated throat.

F. Non-Metallic Raceway

1. Composed of polyvinyl chloride suitable for 90 degrees C. Provide rigid polyvinyl chloride (PVC) type EPC 40 heavy wall plastic conduit meeting current NEMA Standard TC-2. Conduit shall be listed UL 651 for underground and exposed use.
2. Raceway, fittings, and cement must be produced by the same manufacturer who must have had a minimum of ten (10) years experience in manufacturing the products.
3. Materials must have a tensile strength of 7,000-7,200 psi at 73.4 degrees F., flexural strength of 12,000 psi and compressive strength of 9,000 psi.
4. All joints shall be solvent cemented in accordance with the recommendations of the manufacturer.

G. Wireways and Auxiliary Gutters

1. Painted steel or galvanized steel.
2. Of sizes and shapes indicated on the Drawings and as required.
3. Provide all necessary elbows, tees, connectors, adapters, etc.
4. Wire retainers not less than twelve (12") inches on center.

H. Aluminum Conduit

1. Do not use aluminum conduit unless specifically indicated on the drawings for special purposes.

2.2. LOCKNUTS AND BUSHINGS

A. Locknuts shall be steel. Die cast locknuts shall not be used.
B. All bushings shall be insulated. Use nylon insulated metallic bushings for sizes 1" and larger. Plastic bushings may be used in 1/2" and 3/4" sizes.

2.3. OUTLET BOXES

A. General

1. Recessed wall boxes shall be 2-1/2" deep.
2. Surface-mounted wall boxes shall be 1-1/2” or 2-1/2" deep as required.
3. Lighting Fixture Box
    a. Four (4") inch octagon with 3/8" fixture stud.

b. For suspended ceiling work, four (4") inch octagon with removable backplate where required, and two (2) parallel bars for securing to the cross-furring channels and extend flexible conduit to each fixture.

4. Plug any open knockouts not utilized.

B. Cast Type Conduit Boxes, Outlet Bodies and Fittings

1. Use Ferrous Alloy boxes and conduit bodies with Rigid Steel or IMC.
2. Use Ferrous Alloy or cast aluminum boxes and conduit bodies with Electrical Metallic Tubing.
3. Covers: Cast or sheet metal unless otherwise required.
4. Tapered threads for hubs.

C. Masonry Outlet Boxes

1. Use for all devices recessed in concrete or masonry.
2. Galvanized steel construction.

D. Drawn Steel Boxes

1. Use for all interior exposed devices (where not required or indicated to be cast type).
2. Drawn construction, minimum 0.625” thick galvanized steel.
3. Raised ground connection.
4. Provide with raised, drawn galvanized steel covers.

E. Welded Steel Boxes

1. May be used for recessed devices only, or as a junction box where located above ceiling or on walls where same is located above 6’-0” A.F.F.
2. Minimum 1/16” thick steel construction.

F. Weatherproof Boxes

1. Use for all exterior exposed devices.
2. Cast aluminum construction.
3. Internal hub threads.
4. NEMA 3R listed.

2.4. JUNCTION AND PULL BOXES

A. Outlet boxes as listed above may be used as junction boxes where provided as a 2-gang box minimum.
B. Steel Boxes

1. No. 12 USS gauge sheet steel for boxes with maximum side less than forty (40") inches, and maximum area not exceeding 1,000 square inches; riveted or welded 3/4 inch flanges at exterior corners.
2. No. 10 USS gauge sheet steel for boxes with maximum side forty (40") to sixty (60") inches, and maximum area 1,000 to 1,500 square inches; riveted or welded 3/4 inch flanges at exterior corners.
3. No. 10 USS gauge sheet steel riveted or welded to 1-1/2 by 1-1/2" by 1/4" welded angle iron framework for boxes with a maximum side exceeding sixty (60") inches and more than 1,500 square inches in area.
4. Covers

a. Same gauge steel as box.
b. Subdivided single covers so no section of cover exceeds fifty (50) pounds.
c. Machine bolts, machine screws threaded into tapped holes, or sheet metal screws as required; maximum spacing twelve (12") inches.

5. Finish: Galvanized steel or paint with rust inhibiting primer and ANSI No. 61 light gray finish coat.
6. Where size of box is not indicated, size to permit pulling, racking and splicing of cables.
7. For Boxes over 600 Volts

a. Provide insulated cable supports and removable steel barriers to isolate each feeder. Stencil cable voltage class in red letters on the front cover of the box.
b. Braze a ground connector suitable for copper cables to the inside of the box.

C. Exterior Pull / Junction boxes

1. NEMA 3R or 4X rated.
2. Stainless steel or reinforced non-metallic construction.

D. In-Grade Pull Boxes (Quazite or similar)

1. Polymer concrete box. Removable cover with stainless steel bolts.
2. Box shall be traffic-rated where located in pavement or other areas subject to vehicle traffic.

PART 3 - EXECUTION

3.1. APPLICATION OF RACEWAYS

A. The following applications must be adhered to except as otherwise required by Code. Raceways not conforming to this listing must be removed by the Contractor and replaced with the specified material at the Contractor's expense.

1. Rigid Steel - Application: Where exposed to mechanical injury, where specifically required, exterior exposed locations, and where required by codes and for all circuits in excess of 600 volts.
2. I.M.C. - Application: Same as standard threaded rigid steel conduit.
3. E.M.T. - Applications: Use in every instance except where another material is specified. EMT shall not be used underground or in slab on grade.
4. Flexible Steel - Applications: Use in dry areas for connections to lighting fixtures in hung ceilings, connections to equipment installed in removable panels of hung ceilings at bus duct takeoffs, at all transformer or equipment raceway connections where sound and vibration isolation is required.
5. Liquid-Tight Flexible Conduit - Applications: Use in areas subject to moisture where flexible steel is unacceptable at connections to all motors, and all raised floor areas.
6. Non-Metallic Conduit - Application: Schedule 40 - Where specifically indicated on the drawings and for raceways in slab or below grade. All bends shall be made with steel elbows and wrapped unless the bend is encased in concrete.
7. Wireways and Auxiliary Gutters - Application: Where indicated on the Drawings and as otherwise specifically approved.

3.2. RACEWAY SYSTEMS IN GENERAL

A. Provide raceways for all wiring systems, including security, data transmission, paging, low voltage et. al. Where non-metallic raceways are utilized, provide sizes as required with the grounding conductor considered as an insulated additional conductor. Wiring of each type and system must be kept independent and installed in separate raceways – including, but not limited to:

1. Wiring of different voltages (480/277V vs. 208/120V)
2. Emergency / Normal Wiring (except as permitted by NEC 700)

B. Install capped bushings on raceways as soon as installed and remove only when wires are pulled. Securely tie embedded raceway in place prior to embedment. Lay out the work in advance to avoid excessive concentrations of multiple raceway runs.

C. Locate raceways so that the strength of structural members is unaffected and they do not conflict with the services of other trades. Install one (1") inch or larger raceways, in or through structural members (beams, slabs, etc.) only when and in the manner accepted by the Architect/Engineer. Draw up couplings and fittings full and tight.

D. Install no conduits or other raceways sized smaller than permitted in applicable NEC Tables. Where conduit sizes shown on drawings are smaller than permitted by code, Contractor shall include cost for proper size conduit in his base bid. In no case reduce conduit sizes indicated on drawings or specified without written approval of Architect-Engineer. Minimum conduit size shall be 3/4".

E. Above-grade raceways to comply with the following:

1. Install raceways concealed except at surface cabinets and for motor and equipment connection in electrical and mechanical rooms. Install a minimum of six (6") inches from flues, steam pipes, or other heated lines. Provide flashing and counter-flashing for waterproofing of raceways, outlets, fittings, etc., which penetrate the roof. Route exposed raceways parallel or perpendicular to building lines with right-angle turns and symmetrical bends. Run concealed raceways in a direct line and, where possible, with long sweep bends and offsets. Provide sleeves in forms for new concrete walls, floor slabs, and partitions for passage of raceways. Waterproof sleeved raceways where required.
2. Raceways shall not be run on roofs or exposed on the outside of the buildings unless specifically noted as exposed on the drawings or approved by the Architect/Engineer.
3. Provide raceway expansion joints for exposed and concealed raceways with necessary bonding conductor at building expansion joints and between buildings or structures and where required to compensate for raceway or building thermal expansion and contraction. Provide expansion fittings every 200 feet on outdoor conduit.
4. Provide one (1) empty 3/4 inch raceway for each three (3) spare unused poles or spaces of each flush-mounted panelboard. Terminate empty 3/4 inch conduit in a junction box, which after completion, is accessible to facilitate future branch circuit extension.
5. Provide raceway installation (with appropriate seal-offs, explosion-proof fittings, etc.) in special occupancy area, as required. Provide conduit seal-offs where portions of an interior raceway system pass through walls, ceiling, or floors which separate adjacent rooms having substantially different maintained temperatures, as in refrigeration or cold storage rooms.

6. Provide pull string in spare or empty raceways. Allow five (5) feet of slack at each end and in each pull box. Tie each end of the string to a washer or equivalent that does not fit into the conduit. Tag both ends of string denoting opposite end termination location.

F. Below Grade

1. Below grade raceways to comply to the following:
   a. Do not penetrate waterproof membranes unless proper seal is provided.
2. Protect steel raceway in earth or fill with two (2) coats of asphalt base paint. Touch up abrasions and wrench marks after conduit is in place.
3. In lieu of the above, protect steel raceways with a minimum of ten (10) mil tape approved for the purpose and overlapped a minimum of one-half tape width to provide a minimum twenty (20) mil thickness.

G. No raceway may be installed in a concrete slab or members except with the permission of the Structural Engineer and with the written consent of the Owner.

1. Conduits embedded in structural concrete slabs shall have an outside diameter less than one third of the thickness of the concrete slab and shall be installed entirely within the center one third of the concrete slab.
2. Raceways embedded in concrete slabs shall be spaced not less than eight (8") inches on centers and as widely spaced as possible where they converge at panels or junction boxes.
3. In no case will installation of raceways be permitted to interfere with the proper placement of principal reinforcement.
4. Raceways running parallel to slab supports, such as beams, columns, and structural walls, shall be installed not less than twelve (12") inches from such supporting elements.
5. To prevent displacement during concrete pour of lift slab, saddle supports for conduit, outlet boxes, junction boxes, inserts, etc., shall be secured with suitable adhesives.

H. Non-metallic raceway installation shall conform to the following:

1. All joints are to be made by the solvent cementing method using the material recommended by the raceway manufacturer. To insure good joints, components shall be cleaned prior to assembly.
2. Raceway cut-offs shall be square and made by handsaw or other approved means which does not deform the conduit. Raceway shall be reamed prior to solvent cementing to couplings, adapters, or fittings.
3. Electrical devices which are served by PVC raceways shall be grounded by means of a ground wire pulled in the raceway.
4. Bends shall be made by methods that do not deform or damage the conduit. The radii of field bends shall not be less than those established by the N.E.C.
5. Raceway expansion fittings shall be provided where necessary. The position of the expansion fitting shall be adjusted proportional to the temperature at installation.
6. Raceway supports shall be installed, in such a manner, to allow the PVC conduit to slide through the supports as the temperature changes.
7. Elbows must be galvanized rigid steel, intermediate metallic conduit or concrete encased. Plastic conduit may only be used for exterior underground applications or circuits beneath slabs on grade. Provide galvanized rigid steel (GRS) radius bends and risers as conduits rise above grade or above floor slab.
8. Provide exterior underground conduit with metal detection strip.
9. Provide matching plastic fittings. Fittings shall meet the same standards and specifications as the conduit on which it is installed.
10. Joining and bending of conduit and installation of fittings shall be done only by methods recommended.
11. Provide conduit support spacing as recommended for the highest ambient temperature expected.
12. Provide interlocking conduit spacers for multiple runs of underground conduits installed in same trench.
13. Provide expansion couplings on long runs regardless of ambient temperatures. Determine amount of conduit expansion and contraction from published charts or tables.
14. Test workmanship by conducting a low-pressure air (3.0-5.0 psi) test after system is installed and cemented joints are set. Plug and block ends to prevent movement prior to pressurization. Check for leaks at all joints with a soap solution. Even low-pressure air can cause high thrust loads and caution must be observed. The test shall be observed by the architect, engineer or owner's representative, prior to backfill. All below grade conduit that could potentially drain water into electrical equipment (ie. Main electrical service located in basement below utility transformer) must be watertight.

I. Raceways in hung ceiling shall be run on and secured to slab or primary structural members of ceiling, not to lathing channels or T-bars, Z-bars, or other elements which are the direct supports of the ceiling panels. Secure conduit firmly to steel by clips and fittings designed for that purpose. Install as high as possible, but not less than 1'-0" above hung ceilings.

J. Exposed raceways shall be run parallel or at right angles with building lines.

K. Clear raceway of all obstructions and dirt prior to pulling in wires or cables. This shall be done with ball mandrel (diameter approximately 85% of conduit inside diameter) followed by close fitting wire brush and wad of felt, or similar material. This assembly may be pulled in together with, but ahead of, the cable being installed. All empty raceways shall be similarly cleaned. Clear any raceway which rejects ball mandrel.

3.3. OUTLET BOXES

A. Fit outlet boxes in finished ceilings or walls with appropriate covers, set flush with the finished surface. Where more than one switch or device is located at one point, use gang boxes and covers unless otherwise indicated. Sectional switch boxes or utility boxes will not be permitted. Provide Series "GW" (Steel City) tile box, or as accepted, or a four (4") inch square box with tile ring in masonry walls, which will not be plastered or furred. Where drywall material is utilized, provide plaster ring.

1. Provide outlet boxes of the type and size suitable for the specific application.
2. Where outlet boxes contain two (2) or more 277 volt devices, or where devices occur of different applied voltages, or where normal and emergency devices occur in same box, provide suitable barrier.
3. Install all wall mounted switch and receptacle boxes with bracing between two adjacent studs where rigid conduit is not used for circuiting. Box and receptacle shall not deflect on operation or insertion of plugs.

B. Install boxes and covers for wiring devices so that the wiring devices will be installed with a vertical orientation unless otherwise noted on the drawings.

C. The exact location of outlets and equipment is governed by structural conditions and obstructions, or other equipment items. When necessary, relocate outlets so that when fixtures or equipment are installed, they will be symmetrically located according to the room layout and will not interfere with other work or equipment. Verify final location of outlets, panels equipment, etc., with Architect.

D. Back-to-back outlets in the same wall, or "thru-wall" type boxes not permitted. Provide twelve (12") inch (minimum) spacing for outlets shown on opposite sides of a common wall to minimize sound transmission.

E. Provide twenty four (24") inch (minimum) horizontal spacing for outlets shown on opposite sides of a fire rated wall.

1. Provide listed fire putty pads around the each box to maintain fire rating, where aggregate area of boxes in wall exceeds maximum per code.

F. Install top of switch outlet boxes 48” above floor unless otherwise called for or required by wainscot, counter, etc. Install bottom of receptacle outlet boxes 16” above floor unless otherwise called for on drawings.

1. Adjust mounting heights to nearest masonry joint for minimum cutting in case of flush outlets.

3.4. JUNCTION AND PULL BOXES

A. Provide junction and pull boxes as indicated on the drawings and as required for the complete installation of the various electrical systems, and to facilitate proper pulling of wires and cables.

1. J-boxes and pull boxes shall be sized per electrical code minimum.
2. Boxes on empty conduit systems shall be sized as if containing conductors of #4 AWG.
3. Wiring systems required to have separate/independent raceways (See Section 3.2 above) shall also be provided with separate junction and pull boxes. These wiring systems may occupy the same outlet box only if a divider is installed between the wiring that is listed for this purpose.

B. Pull Box Spacing

1. Provide pull boxes so no individual conduit run contains more than the equivalent of four (4) quarter bends (360 degrees total).
2. Conduit Sizes 1-1/4" and Larger.
   a. Provide boxes to prevent cable or wire from being excessively twisted, stretched, or flexed during installation.
   b. Provide boxes for medium voltage cables so that maximum pulling tensions do not exceed cable manufacturer's recommendations.
   c. Provide support racks for boxes with multiple sets of conductors do not rest on any metal work inside box.
3. Conduit Sizes one (1") inch and smaller, low voltage wire and cable (maximum distances)
   a. 200 feet straight runs.
   b. 150 feet runs with one 90 degree bend or equivalent.
   c. 125 feet runs with two 90 degree bends or equivalent.
   d. 100 feet runs with three or four 90 degree bends or equivalent.

END OF SECTION 260533

SECTION 260553 – ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Reference Section 260010.
B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2. DESCRIPTION OF WORK

A. A. Provide identification on all equipment, raceways, boxes and conductors.

PART 2 - PRODUCTS

2.1. NAMEPLATES

A. Nameplates shall be lamacoid plates with engraved upper-case letters and beveled edges.
    1. Stamped or embossed metal tags are not considered acceptable for this purpose.
B. Color:
    1. Normal-power equipment shall have white nameplates with black letters, enclosed by a black border.
    2. Equipment fed from the emergency electrical system, or otherwise designated on the plans for emergency use, shall have red nameplates with white letters, enclosed by a white border.
    3. Nameplates for short circuit ratings and calculations shall be yellow with black letters, enclosed by black border.
C. All nameplates shall be engraved and must be secured with rivets, brass or cadmium plate screws. The use of Dymo tape or the like is unacceptable.
D. Nameplate inscriptions shall bear the name and number of equipment to which they are attached as indicated on the Drawings. The engineer reserves the right to make modifications in the inscriptions as necessary.
    1. Inscription letters shall be 1/2” in size.

2.2. CABLE TAGS AND WIRE IDENTIFICATION LABELS

A. Cable tags shall be flameproof secured with nylon ties.
B. Wire markers shall be preprinted cloth tape type or approved equivalent.

2.3. IDENTIFICATION LABELS

A. Acceptable Manufacturers
    1. W.H. Brady Company (Style A)
    2. Thomas & Betts Company (T&B), Style A.
    3. Seaton
B. Plasticized Cloth
    1. Non-conductive.
    2. Waterproof.
    3. Capable of withstanding continuous temperatures of 235 degrees F and intermittent temperatures to 300 degrees F.
    4. Overcoating for protection against oil, solvents, chemicals, moisture, abrasion and dirt.
C. Heavy, thermo-resistant industrial grade adhesive, for adhesion of label to any surface without curling, peeling or falling off.
D. Label Designations, Nominal System Voltages Applied to the covers of all medium and low voltage pull, splice and junction boxes.
E. Machine printed.
    1. Letters shall be 3/8” in size.

PART 3 - EXECUTION

3.1. INSTALLATION

A. Service Entrance Equipment
    1. Where electrical equipment (switchboard, panelboard, disconnect switch, etc.) is installed as service entrance equipment, contractor shall furnish and install a nameplate listing the following:

a. Equipment Short-Circuit Current Rating in amperes (RMS SYM), as indicated on the drawings.
b. Whether or not the equipment is fully or series-rated.
c. Available Fault Current in amperes. Contractor shall perform available fault current calculation (as outlined in Section 260011) to obtain available fault at Service Equipment.
d. Date fault current calculations were performed.

i. Example:

EQUIPMENT FULLY-RATED AT 65,000 AMPERES RMS SYM
AVAILABLE FAULT CURRENT: 45,203 AMPERES
DATE CALCULATED: 2/24/2022

2. Contractor shall furnish and install another nameplate (in addition to above) at *each* service overcurrent protective device listing the following per NEC Article 110:

a. Service Disconnect #
b. Nominal system voltage
c. Available Fault Current in amperes (see item 'c' above).
d. Clearing time of service overcurrent protective device based on the aforementioned fault current
e. Date the label was applied.

i. Example:

SERVICE DISCONNECT 1 of 4
NOMINAL SYSTEM VOLTAGE: 208V
AVAILABLE FAULT CURRENT: 45,203 AMPERES
CLEARING TIME OF THIS DEVICE: 0.3S
DATE CALCULATED: 2/24/2022

B. Switchboards/ Distribution Panelboards.

1. Furnish and install a nameplate for each switchboard or distribution panelboard. Nameplate shall be engraved with the following information:

a. Top Line: Equipment identification as indicated on the Drawings.
b. Middle Line: Specific device or equipment where feeder originates.
c. Bottom Line: Equipment voltage, size, and phase as indicated on the drawings.
d. Example:

SWITCHBOARD SWDP1
FED FROM UTILITY COMPANY TRANSFORMER
208/120V, 1200A, 3-PHASE

2. Nameplate shall be mounted at the top of the incoming section.
3. Each switch / circuit breaker shall be provided with an identifying nameplate.

a. Main devices shall be identified as such. Where multiple mains are employed each switch shall be numbered. Inscription shall be "MAIN SWITCH" or "MAIN SWITCH NO. 1" et al.
b. Branch/feeder devices shall be identified with either the load served or a number corresponding to the furnished circuit directory.

C. Panelboards and Load Centers.

1. Furnish and install a nameplate for each panelboard and load center. Nameplate shall be engraved with the following information:

a. Top Line: Equipment identification as indicated on the Drawings.
b. Middle Line: Specific device or equipment where feeder originates.
c. Bottom Line: Equipment voltage, size, and phase as indicated on the drawings.
d. Example:

PANELBOARD LN1
FED FROM SWITCHBOARD SWDP1 IN ROOM #332
208/120V, 200A, 3-PHASE

2. Nameplate shall be mounted at the top of the panel.
3. After installations are complete, provide and mount under sturdy transparent shield in the directory frame of each panel door, a neat, accurate, and carefully typed directory properly identifying the lighting, receptacles, outlets, and equipment each overcurrent device controls.

    a. Include on directory the panel or load center identification, the cable and raceway size of panel feeder, and the feeder origination point.

D. Disconnect Switches.

1. Furnish and install a nameplate for each disconnect switch engraved with the equipment designation which the disconnect serves and the panel and circuit the switch is fed from.

E. Disconnect Switches.

1. Furnish and install a nameplate for each disconnect switch engraved with the equipment designation which the disconnect serves.

    a. Example:

AHU – 1
FED FROM PANEL LP-1 – 32

2. Nameplate shall be mounted at the top of the disconnect.

F. Feeder Switches.

1. Furnish and install for each feeder switch including, but not limited to those in switchboards, switch and fuse panelboards, take-offs at bus ducts, motor control centers, multiple meter centers, etc., two (2) nameplates as follows:

    a. The first nameplate must be white background with red lettering. Engrave with the words "REPLACE ONLY WITH _____ FUSE." Engrave with proper fuse trade name and ampere rating (i.e. Bussman LPS-R 100).
    b. The second nameplate shall indicate the load served, the size and type of cable and raceway example:

        i. LP-4, LP-5, LP-6
        ii. 4#500 KCMILS-THW-CU-3-1/2"C

G. Remote Smoke Detector Lamps and Test Stations.

1. Furnish and install a nameplate on each remote smoke detector lamp and/or test station.
2. Engraving must indicate the location of the device to which the lamp is connected, as approved by the Engineer.

H. Pullboxes, Enclosures, and Cable Terminations.

1. Circuits rated over 40 Amp and all cables over 600V:

    a. Provide identification label with circuit numbers on enclosure cover.
    b. Furnish and install cable tags on each cable that enters a pullbox, enclosure, switchboard, and at terminations. Mark tags with type written inscription noting the load served, type and size of cable, and the overcurrent device protecting the cable.

I. Branch circuits:

1. Provide identification label with panel and circuit numbers on enclosure cover.
2. Identify each circuit with wire markers when enclosure label and wire colors do not provide enough information to identify each circuit without tracing.
3. Provide feeders and branch circuit home runs with plasticized wire marker indicating circuit number and power source. Provide feeders phase identification letter at each terminal point in addition to its circuit number.
4. 4 square box covers hidden above lay-in ceilings may be marked with indelible ink marker in lieu of using printed labels.

J. Warning Signs

1. Provide electrical equipment and accessible wiring enclosures operating at voltage above 240 volts with self-sticking polyester sign with wording and size conforming to ANSI Standard Z35.1-1964 and OSHA 19.0.144iii(2) Specifications “Danger High Voltage” warning sign and voltage marker applied to front door

or cover of device or enclosure.

2. Provide large equipment such as transformers and main distribution equipment with self-sticking polyester sign with wording and size conforming to ANSI Standard Z35.1-1964 and OSHA 19.0.144iii(2) Specifications indicating all electrical characteristics.

K. Boxes

1. Provide identification labels for all low voltage and medium voltage pull, splice and junction boxes in main feeder and subfeeder runs, indicating nominal system voltage.
2. Apply labels after painting of boxes, conduits, and surrounding areas have been completed.
3. Clean surfaces before applying labels; clean aluminum surfaces with solvent wipe.
4. Apply labels on cover and minimum of one (1) fixed side; one (1) label visible from floor where boxes are Installed exposed.

END OF SECTION 260553

SECTION 262213 – GENERAL DISTRIBUTION TRANSFORMERS

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Reference Section 260010.
B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2. SUBMITTALS

A. Shop Drawings: Submit shop drawings and manufacturer's data for each type and size dry-type transformer as indicated on the Drawings

PART 2 - PRODUCTS

2.1. GENERAL

A. Provide as indicated on the plans, dry-type transformers type General Distribution transformers as noted by a single manufacturer.
B. Manufacturers:

1. ACME
2. Eaton (Cutler-Hammer)
3. GE
4. Siemens
5. Square D

2.2. PRODUCT

A. GENERAL DISTRIBUTION TRANSFORMERS

1. Transformer coils shall be of the continuous wound construction and shall be impregnated with nonhygroscopic, thermosetting varnish.
2. Transformers 15kVA and larger shall be 150 deg. C temperature rise above 40 deg. C ambient.
3. Transformers 25kVA and larger shall have a minimum of 4-2 ½% full capacity primary taps. Exact voltages and taps to be as designated on the plans or the transformer schedule.
4. All cores to be constructed of high grade, non-aging silicon steel with high magnetic permeability and low hysteresis and eddy current losses. Magnetic flux densities are to be kept well below the saturation point. The core laminations above 112.5kVA shall be miter cut at the core corners to reduce hot spots, core loss, excitation current and sound level. The core laminations shall be clamped together with steel angles. Cores for transformers greater than 300kVA shall be clamped utilizing insulated bolts through the core laminations to provide proper pressure throughout the length of the core. The completed core and coil shall then be bolted to the base of the enclosure but isolated therefore by means of rubber, vibration- absorbing mounts. There shall be no metal-to-metal contact between the core and coil and the enclosure. Sound isolation systems requiring the complete removal of all fastening devices will not be acceptable.
5. Transformers shall not rely on fan cooling for capacity rating and shall be capable of dissipating heat through the ventilated enclosure in accordance with ANSI standards for non-fan assisted cooling maximum heat rise. Transformers utilizing fan assisted cooling shall be acceptable ONLY when de-rated to 2/3 of nameplate capacity.
6. Transformers shall be capable of carrying a 15% continuous overload without exceeding a 150 degrees C rise in a 40 degrees C ambient.
7. The core of the transformer shall be visibly grounded to the enclosure by means of a flexible grounding conductor sized in accordance with applicable UL and NEC standards.
8. The transformer enclosures shall be ventilated and be fabricated of heavy gauge, sheet steel construction. The entire enclosure shall be finished utilizing a continuous process consisting of degreasing, cleaning and phosphatizing, followed by electrostatic deposition of a polymer polyester powder coating and baking cycle to provide uniform coating of all edges and surfaces. The coating shall be UL recognized for outdoor use. The coating color shall be ANSI 49.
9. The maximum temperature of the top of the enclosure shall not exceed 50 deg. C rise above a 40 deg. C ambient.
10. All insulating materials are to be in accordance with NEMA ST20 Standards for 220 deg. C UL component recognized insulation system. Transformers are to be manufactured and tested in accordance with ANSI Standards C57.12.01 and C57.12.91.
11. Transformers of 500kVA or smaller shall be listed by Underwriters Laboratory.
12. Provide weathershields, wall mounting brackets, or ceiling mounting brackets as required for mounting

as called for on plans.

13. Sound levels shall be warranted by the manufacturer not to exceed the following:

ALLOWABLE SOUND LEVELS	
15 to 50kVA - 45db	501 to 700kVA - 62db
51 to 150kVA - 50db	701 to 1000kVA - 64db
151 to 300kVA - 55db	1001 to 1500kVA - 65db
301 to 500kVA - 60db	1501 to 2000kVA - 66db

PART 3 - INSTALLATION

3.1. GENERAL

A. Where indicated or as otherwise required and/or approved, resiliently suspend each dry type transformer on double deflection neoprene in the shear hanger rod isolator assemblies, capable of providing minimum 3/8 inch static deflection.
B. Where transformers are to be floor mounted install on 3-1/2" high concrete housekeeping pads. Provide neoprene pads between transformer stand and housekeeping pad.
C. Provide grounding conductor from transformer secondary to nearest building ground for each separately derived system. Grounding electrode conductor shall be sized in accordance with NEC Section 250-94 for the derived phase conductors.
D. Flexible conduit shall be used for all conduit connections to transformers; provide external bonding wire.
E. Install wall-mounting transformers level and plumb with wall brackets fabricated by transformer manufacturer.

3.2. FIELD QUALITY CONTROL

A. Perform tests and inspections.

3.3. ADJUSTING

A. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.
B. Connect buck-boost transformers to provide nameplate voltage of equipment being served, plus or minus 5 percent, at secondary terminals.
C. Output Settings Report: Prepare a written report recording output voltages and tap settings.

END OF SECTION 262213

SECTION 262413 – DISTRIBUTION SWITCHBOARD

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Reference Section 260010.
B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2. SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: For each switchboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings.
2. Include time-current coordination curves for each type and rating of overcurrent protective device included in switchboards.
3. Include schematic and wiring diagrams for power, signal, and control wiring.

C. Field quality-control reports.
D. Operation and maintenance data.

1.3. 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. Comply with NEMA PB 2.
C. Comply with NFPA 70.
D. Comply with UL 891.

1.4. WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1. GENERAL

A. Provide dead front type, metal enclosed, indoor switchboards as indicated by the schedules and where shown on the plans. Switchboards shall be equipped with fusible switches or thermal-magnetic, molded case circuit breakers as indicated on the schedules.

2.2. MANUFACTURERS

A. Equivalents by Square D, G.E., Eaton, and ITE Siemens.

2.3. PRODUCT

A. Switchboards shall be designed and tested in accordance with current applicable IEEE, ANSI Standards and equipped with the devices built in accordance with latest UL, NEC and NEMA standards. Mount switchboard on 3-1/2” high concrete base. Each switchboard, as a complete unit, shall be given a single short circuit current integrated equipment rating (IER) by the manufacturer. Such ratings shall be established by the actual tests by the manufacture, in accordance with UL specifications, on equipment constructed similarly to the subject switchboard. Integrated equipment ratings shall be as indicated on the schedules.
B. Switchboard shall be free standing construction with front accessibility required. Provide the appropriate number of vertical sections bolted together to form one metal enclosed rigid switchboard with sides, top and rear be covered with removable screw-on code gauge steel panels. Steel base channels shall be bolted to the frame to rigidly support the entire shipping section for moving on rollers and floor mounting. Provide wiring gutter space in accordance with NEC. Top and bottom conduit areas shall be clearly indicated on shop drawings.
C. The switchboard bussing shall be of sufficient cross-sectional area to meet UL Standard 891 temperature rise. Vertical and horizontal through bus shall be tin-plated copper. The through bus supports, connections and joints are to be bolted with hex-head bolts and Belleville washers to minimize maintenance requirements and shall have provisions for the addition of future sections. Bus bar connection to branch circuit shall be “Phase Sequenced” type designed and assembled so that branch circuit devices can be removed without disturbing adjacent devices or removing main bus. Wire lugs for main bus shall be solderless, anti-turn, front removable type suitable for copper conductors. Provide each panel with grounding bus sized per UL 891, grounded to box

and grounding system. Also provide full capacity neutral bus insulated from switchboard.

2.4. OVERCURRENT PROTECTIVE DEVICES

A. Main Overcurrent Protection Device

1. The main device shall be an Electronic trip molded case full function 100% rated circuit breaker.

B. Ground Fault Protection Systems

1. The ground fault system shall require no external power to trip the device. The ground fault sensing system shall be suitable for use on grounded systems. The ground fault sensing system shall be suitable for use on three-phase, three-wire circuits where the system neutral is grounded but not carried through the system or on three-phase, four-wire systems. Ground fault pickup current setting and time delay shall be field adjustable. A switch shall be provided for setting ground fault pickup point. A means to seal the pickup and delay adjustments shall be provided. The ground fault sensing system shall include a Ground Fault memory circuit to sum the time increments of intermittent arcing ground faults above the pickup point. A means of testing the ground fault system to meet the on-site testing requirements of NEC Section 230-95© shall be provided. Local visual ground fault trip indication shall be provided.

C. Arc Energy Reduction Systems

1. Manufacturer shall provide an approved means of Arc Energy Reduction on all overcurrent protective devices rated 1200A or higher, or demonstrate the overcurrent protective device has a clearing time of 0.07 seconds or less at the available arcing current.
2. Manufacturer shall provide documentation showing the method chosen [above] is set to operate at a value below the available arcing current.

D. Circuit Breaker Branch Circuit Devices

1. Branch circuit devices rated 800A and above shall be Electronic trip molded case standard function 80% rated circuit breaker(s) unless otherwise noted on the plans.
2. Branch circuit devices rated 600A and below shall be Thermal magnetic molded case circuit breaker(s) unless otherwise noted on the plans.

E. Thermal-Magnetic Circuit Breakers

1. Circuit breakers shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole. Thermal trip elements shall be factory preset and sealed. Circuit breakers shall be true rms sensing and thermally responsive to protect circuit conductor(s) in a 40° C ambient temperature.

F. Electronic Trip Circuit Breakers

1. Circuit breaker trip system shall be a microprocessor-based true rms sensing design with sensing accuracy through the thirteenth harmonic. Sensor ampere ratings shall be as indicated on the schedules and drawings. The integral trip system shall be independent of any external power source and shall contain no less than industrial grade electronic components. The ampere rating of the circuit breaker shall be determined by the combination of an interchangeable rating plug, the sensor size and the long-time pickup adjustment on the circuit breaker. The sensor size, rating plug and adjustment positions shall be clearly marked on the face of the circuit breaker. Circuit breakers shall be UL Listed to carry 80-100% of their ampere rating continuously as specified.
2. The following time/current response adjustments shall be provided. Each adjustment shall have discrete settings and shall be independent of all other adjustments.
    a. Long Time Pickup
    b. Instantaneous Pickup
    c. Long Time Delay
    d. Short Time Pickup
    e. Short Time Delay
    f. Ground Fault Pickup
    g. Ground Fault Delay
3. A means to seal the trip unit adjustments in accordance with NEC Section 240-6(b) shall be provided.
4. Local visual trip indication for overload, short circuit and ground fault trip occurrences shall be provided.

PART 3 EXECUTION

3.1. EXAMINATION

A. Examine switchboards before installation. Reject switchboards that are moisture damaged or physically damaged.

B. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance of the Work.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2. INSTALLATION

A. Store, handle, and install switchboards and accessories per manufacturer's recommendations.
B. Secure the assembly in place.
C. Provide 3 ½" housekeeping pad for mounting of switchboard.
D. Install overcurrent protective devices and controllers not already factory installed.
E. Install filler plates in unused spaces.
F. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from switchboard units and components.

3.3. IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
B. Switchboard Nameplates: Label each switchboard compartment with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
C. Device Nameplates: Label each disconnecting and overcurrent protective device and each meter and control device mounted in compartment doors with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

3.4. FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Prepare test and inspection reports, including a certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5. ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
B. Set field-adjustable circuit-breaker trip ranges as indicated in the coordination study.

3.6. LOAD BALANCE

A. 30 days after occupancy provide record ampacity loads for each switchboard by phase.
B. Adjust circuit and phase loading so that each phase is within 25% of other phases if possible.
C. Update circuit directory with new typewritten directory with any circuit changes for balance of loads.
D. Update any labels on equipment, receptacles etc to any circuit changes due to balancing.

3.7. TOUCH UP AND CLEANING

A. Vacuum all backboxes clean of debris after installation and prior to contract closeout.
B. Touch up scratch marks, etc. with matching paint.

3.8. DEMONSTRATION

A. The Contractor shall provide a training session for the owner's representatives.
B. A manufacturer's qualified representative shall conduct the training session. The training program shall consist of instruction on the operation of the assembly, circuit breakers, fused switches, meters, and major components within the assembly.

END OF SECTION 262413

SECTION 262416 – PANELBOARDS

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Reference Section 260010.
B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2. SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types and details for types other than NEMA 250, Type 1.
3. Detail bus configuration, current, and voltage ratings.
4. Short-circuit current rating of panelboards and overcurrent protective devices.
5. Include evidence of NRTL listing for series rating of installed devices.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards.

C. Field quality-control reports.
D. Operation and maintenance data.

1.3. 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. Comply with NEMA PB 1.
C. Comply with NFPA 70.

1.4. WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1. GENERAL

A. Provide panelboards as indicated in the panelboard schedule and where shown on the plans. Panelboards shall be equipped with fusible switches or thermal-magnetic, molded case circuit breakers as indicated on the schedules.

2.2. MANUFACTURERS

A. Equivalents by Eaton (Cutler-Hammer), Square D, GE, or ITE Siemens.

1. Equivalent Panelboards to those specified on the plans shall be considered as follows:

Cutler Hammer	Square D	GE	Siemens
Pow-R-Line 1A	NQOD	AQ	P1
Pow-R-Line 2A	NQOD	AE	P2
Pow-R-Line 3A	NF* / I-Line	AE* / Spectra	P3
Pow-R-Line 4B	I-Line	Spectra	P4

* Submitted equipment must be able to accommodate ALL breakers shown in panelboard schedules as branch-mounted devices. If unable to do so, provide distribution panelboard as noted.

2.3. PANELBOARDS

A. Bussing Assembly and Temperature Rise:

1. Panelboard bus structure and main lugs or main breaker shall have current ratings as shown on the panelboard schedule. Such ratings shall be established by heat rise tests with maximum hot spot temperature on any connector or bus bar not to exceed 50 degrees C rise above ambient. Heat rise tests shall be conducted in accordance with Underwriters Laboratories Standard UL 67.
2. Provide tin-finished copper bars full length of panel with rating listed in schedule. Bus bar connection to branch circuit breakers shall be “Phase Sequence” type designed and assembled so circuit breakers can be replaced without disturbing adjacent breakers or removing main bus or branch circuit connectors. Provide bus bars with wire lugs suitable for copper or aluminum conductors. Provide each panel with equipment tin finished copper grounding bus grounded to box and tin finished copper neutral bus insulated from box.

B. Integrated Equipment Short Circuit Rating

1. Each panelboard, as a complete unit, shall have a short circuit current rating equal to or greater than the integrated equipment rating as indicated in the schedules. This rating shall be established by testing with the overcurrent devices mounted in the panelboard. The short circuit tests on the overcurrent devices and on the panelboard structure shall be made simultaneously by connecting the fault to each overcurrent device with the panelboard connected to its rated voltage source. Method of testing shall be per Underwriters Laboratories Standard UL 67. The source shall be capable of supplying the specified panelboard short circuit current or greater. Panelboards shall be marked with their maximum short circuit current rating at the supply voltage and shall be UL listed.

C. Cabinet

1. Panelboard assembly shall be enclosed in a steel cabinet. The rigidity and gauge of steel to be as specified in UL Standard 50 for cabinets. The size of wiring gutters shall be in accordance with UL Standard 67. Provide branch circuit panelboard cabinets with latch and tumbler-type lock on door of trim. Doors over 48” long shall be equipped with three-point latch and vault lock. All locks shall be keyed alike. Endwalls shall be removable. Fronts shall be of code gauge steel. Gray baked enamel finish electrodeposited over cleaned phosphatized steel. Fusible panelboards and large distribution circuit breaker panelboards shall not be provided with doors.

D. Safety Barriers

a. The panelboard interior assembly shall be dead front type with panelboard front removed. Main lugs or main breakers shall have barriers on five sides. The barrier in front of the main lugs shall be hinged to a fixed part of the interior. The end of the bus structure opposite the mains shall have barriers.

E. Ul Listing

a. Panelboards shall be listed by Underwriters Laboratories and shall bear the UL label. When required, panelboards shall be suitable for use as service equipment.

2.4. OVERCURRENT PROTECTIVE DEVICES

A. Main Overcurrent Protection Device

1. The main device shall be an Electronic trip molded case standard function 80% rated circuit breaker(s)

B. Arc Energy Reduction Systems

1. Manufacturer shall provide an approved means of Arc Energy Reduction on all overcurrent protective devices rated 1200A or higher, or demonstrate the overcurrent protective device has a clearing time of 0.07 seconds or less at the available arcing current.
2. Manufacturer shall provide documentation showing the method chosen [above] is set to operate at a value below the available arcing current.

C. Ground Fault Protection Systems

1. The ground fault system shall require no external power to trip the device. The ground fault sensing system shall be suitable for use on grounded systems. The ground fault sensing system shall be suitable for use on three-phase, three-wire circuits where the system neutral is grounded but not carried through the system or on three-phase, four-wire systems. Ground fault pickup current setting and time delay shall be field adjustable. A switch shall be provided for setting ground fault pickup point. A means to seal the pickup and delay adjustments shall be provided. The ground fault sensing system shall include a Ground Fault memory circuit to sum the time increments of intermittent arcing ground faults above the pickup point. A means of testing the ground fault system to meet the on-site testing requirements of NEC Section 230-95© shall be provided. Local visual ground fault trip indication shall be provided.

D. Branch Circuit Breakers

1. Branch circuit breakers shall be quick-make, quick-break with trip indication. Circuit breakers shall operate both manually for normal switch functions and automatically under overload and short circuit conditions. They shall provide circuit and self-protection when applied within their rating. Operating mechanisms shall be entirely trip free so that contacts cannot be held closed against a short circuit. Operating handle of circuit breaker shall open and close all poles of a multipole breaker simultaneously. Conforming to NEMA Standards Publications No. AB1-1964 and be approved by UL. Circuit breaker shall have a thermal magnetic trip unit for each pole for inverse time delayed overload protection and an instantaneous magnetic element for short circuit protection. Multiple pole trip elements shall operate a common internally connected trip bar to open all poles in case of overload or short circuit through any one pole.
2. Provide arc-fault protection circuit breakers for all sleeping rooms and other areas required by code.

PART 3 EXECUTION

3.1. EXAMINATION

A. Examine panelboards before installation. Reject panelboards that are moisture damaged or physically damaged.
B. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2. INSTALLATION

A. Store, handle, and install panelboards and accessories per manufacturer's recommendations.
B. Secure the assembly in place.
C. Provide 3½" housekeeping pad where two or more conduits penetrate floor or when equipment is floor/ground mounted.

1. Provide one (1) empty 3/4 inch raceway for each three (3) spare unused poles or spaces of each panelboard. Terminate empty 3/4 inch conduit in a junction box, which after completion, is accessible to facilitate future branch circuit extension. Cap and mark below grade spare conduits.

D. Wall-mounted equipment:

1. Mount bottom of trim a minimum of 24" above finish floor. Maintain accessibility to overcurrent devices per NEC. Where both conditions cannot be met, consult with engineer on mounting height of equipment.
2. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
3. Where flushed mounted, the fire integrity of the wall in which it is installed must be maintained.
4. Where flush mounted provide (2)2" conduits from the can to above an accessible ceiling and terminate with a minimum 8"x8" junction box located in a concealed manner.

E. Neatly arrange branch circuit wires and tie together in each gutter with Thomas & Betts nylon "Ty-Raps", or approved equal at minimum 4 inch intervals.
F. Plug all knockouts removed and not utilized.
G. Install overcurrent protective devices and controllers not already factory installed.
H. Install filler plates in unused spaces.

3.3. IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
B. Panelboard Nameplates: Label each panelboard compartment with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
C. Device Nameplates: Label each disconnecting and overcurrent protective device in distribution panelboards with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
D. For panelboards (and distribution panelboards where labeling of individual breakers is not possible or practical), provide a typed circuit directory for same as follows:

1. Panels shall have branch circuit directory holders with clear plastic cover.
2. Provide neatly typed list of branch circuit loads corresponding to branch circuit numbers. Handwritten directories are not acceptable.
3. For remodel work or changes, trace circuits to determine loads and provide new updated directory.

3.4. FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, and feeder.
2. Test continuity of each circuit.

C. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5. ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
B. Set field-adjustable circuit-breaker trip ranges as indicated in the coordination study.

3.6. LOAD BALANCE

A. 30 days after occupancy provide record ampacity loads for each panelboard by phase.
B. Adjust circuit and phase loading so that each phase is within 25% of other phases if possible.
C. Update circuit directory with new typewritten directory with any circuit changes for balance of loads.
D. Update any labels on equipment, receptacles etc to any circuit changes due to balancing.

3.7. TOUCH UP AND CLEANING

A. Vacuum all backboxes clean of debris after installation and prior to contract closeout.
B. Touch up scratch marks, etc. with matching paint.

3.8. OBSERVATIONS

A. All panel fronts shall be removed by the Contractor for observation of the panel interiors by the Engineers.
B. Panel fronts shall be removed when directed by the Engineer/Architect for observation and reinstalled immediately after the observations.

END OF SECTION 262416

SECTION 262726 – WIRING DEVICES

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Reference Section 260010.
B. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2. SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.
C. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.3. QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
B. Comply with NFPA 70.

PART 2 PRODUCTS

2.1. GENERAL

A. Manufacturers

1. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

a. Eaton Wiring Devices; (may be listed below and/or submitted as Eaton, Cooper, Arrow Hart, or Crouse-Hinds).
b. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
c. Leviton Mfg. Company Inc. (Leviton).
d. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

2. All devices shall be from the same manufacturer.

B. Finishes

1. Color: Wiring device catalog numbers in Section Text do not designate device color.

a. Wiring Devices Connected to Normal Power System: Gray, unless otherwise indicated or required by NFPA 70 or device listing.

i. Color shall be coordinated and verified with Architect and owner.

2.2. STRAIGHT BLADE RECEPTACLES

A. General Requirements for Convenience Receptacles

1. Unless otherwise modified below, all receptacles shall comply with the following:
2. Commercial / Common Areas: 125 V, 20 A
3. Residential / Dwelling Unit Areas: 125 V, 15 A
4. Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
5. Multiple types of receptacles may be required of a single device (Ex.: a Hospital-Grade GFCI receptacle), as indicated on the plans and in the execution section below. Where such a device is required, it shall meet the requirements of all applicable sections below.
6. Products: Subject to compliance with requirements, provide one of the following:

a. Refer to list of approved manufacturers in general section.
b. Receptacle model/series(all manufacturers): 5361 (single), 5362 (duplex).

B. GFCI Receptacles

1. Straight blade, feed or non-feed-through type.
2. Include indicator light that is lighted when device is tripped.
3. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; SGF20.
b. Hubbell; GFRST20.

c. Leviton; G5362.
d. Pass & Seymour; 2097.

4. Where devices are shown labeled as GFI on drawings provide GFCI receptacle (feed-through devices are not acceptable unless otherwise noted, or with written permission from the engineer).

a. Devices labeled as GFIP on the drawings may be protected as a feed-through device.

C. Weather-Resistant Receptacles

1. Receptacles shall UL-listed as weather-resistant.
2. Receptacles shall be identified with an “WR” on the receptacle face.
3. Products: Refer to General Requirements for Convenience Receptacles. WR receptacles shall be of same series.

2.3. SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.
B. Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Catalog numbers in subparagraphs below are for 20-A devices; revise catalog numbers if 15-A devices are desired.
b. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).
c. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
d. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
e. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).

2.4. SPECIAL PURPOSE DEVICES

A. Provide where indicated, specified or as required other appropriate NEMA configured devices appropriate for such equipment as thru-wall units manufactured by the same manufactures.

2.5. WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: 0.035-inch-thick, satin-finished stainless steel.
3. Material for Unfinished Spaces: Galvanized steel.
4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant, die-cast aluminum with lockable in-use cover.
C. Damp-Location, Damp Location Cover Plates: NEMA 250, springl loaded and gasketed, die-cast aluminum.
D. Emergency Devices

1. Coverplates for devices fed from emergency power shall be denoted as such with a device plate engraved with the word “EMERGENCY” in red capital letters.

PART 3 EXECUTION

3.1. INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or

nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
    a. Cut back and pigtail, or replace all damaged conductors.
    b. Straighten conductors that remain and remove corrosion and foreign matter.
    c. Pigtailing existing conductors is permitted provided the outlet box is large enough.

D. Receptacle Types:

1. The following receptacle types shall be furnished in lieu of “standard” 120V, 15 or 20 amp receptacles at all of the following locations, regardless of plan designation:
    a. Refer to the National Electrical Code (NEC), for definitions of all locations listed below.
2. GFCI Receptacles:
    a. Bathrooms / Locker Rooms
    b. Kitchens (unless circuit is provided with GFCI protection at the circuit breaker)
    c. Rooftops
    d. Outdoors
    e. Where located within 6’-0” of a sink.
    f. Garages, Service Bays, etc.
    g. Unfinished areas.
3. Weather-Resistant Receptacles:
    a. In all damp or wet locations.

E. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.
10. Wall plates shall not support wiring devices. Provide wiring device with accessories as required to properly install devices and wall plates.
11. All devices shall be flush-mounted except as otherwise noted on the drawings.
12. Locations
    a. Comply with layout drawings for general location; contact Owner's Representative for questions about locations and mounting methods.
    b. Relocate outlets obviously placed in a location or manner not suitable to the room finish.
    c. Avoid placing outlets behind open doors.
    d. Align devices vertically and horizontally. Device plates shall be aligned vertically with tolerance of 1/16". All four edges of device plates shall be in contact with the wall surface.
13. Mounting Heights as indicated on the Drawings and according to ADA requirements.
14. Ganging of Switches - provide barriers between ganged 277 volt switches of different phases.
15. Power Outlets - install power outlets complete with back boxes, where installed in existing buildings or extensions of existing buildings. Coordinate phase connections for rotating equipment with connections in existing building.
16. Install device plates on all outlet boxes. Provide blank plates for all empty, spare and boxes for future devices.
17. Caulk around edges of outdoor device plates and boxes when rough wall surfaces prevent a raintight seal. Use caulking material as approved by the Architect/Engineer.
18. Emergency/normal power devices and/or 277V/120V devices are not to occupy the same box. Where same are shown on plans to be ganged, provide separate boxes immediately adjacent to each other.

F. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up.

G. Device Plates:

1. Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
2. Provide matching blank wall plates to cover outlet or junction boxes intended for future devices.
3. Provide matching blank wall plates with 4 port knock outs at all telephone, data, and tele/data outlet locations. Also provide with matching blankouts in each port.
4. Where wall plates for special devices are available only from manufacturer of device, provide designs and finishes equivalent to above specification.
5. Verify with Architect finish of any plate where it may be apparent a special finish or color should have been specified.

H. Switches

1. Where switches are indicated to be installed near doors, corner walls, etc., mount same not less than 2 inches and not more than 18 inches from trim. Verify exact locations with the Architect.
2. Carefully coordinate the location of switches to insure locations at the strike side of doors.
3. Furnish and install an engraved legend for each switch that controls exhaust fans, motors, equipment systems, etc., not located within sight of the controlling switch.

I. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multi-gang wall plates.

3.2. IDENTIFICATION

A. Comply with Division 26 Section "Identification for Electrical Systems."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.
2. Switches: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.3. FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Test Instruments: Use instruments that comply with UL 1436.

B. Tests for Convenience Receptacles:

1. Test for correct wire terminations (no open ground, neutral, or hot).
2. Test for correct polarity (no hot/ground reverse or hot/neutral reverse).
3. Verify GFCI devices are operating properly.
4. Using the test plug, verify that the device and its outlet box are securely mounted.

END OF SECTION 262726

SECTION 262813 – FUSES

PART 1 GENERAL

1.1. SUBMITTALS

A. First paragraph below is defined in Division 01 Section "Submittal Procedures" as an "Action Submittal."
B. Product Data: For each type of product indicated.
C. Paragraph below is defined in Division 01 Section "Submittal Procedures" as an "Informational Submittal."
D. Operation and maintenance data.

1.2. 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. Comply with NEMA FU 1 for cartridge fuses.
C. Comply with NFPA 70.

PART 2 PRODUCTS

2.1. FUSES

A. PRODUCT

1. Provide fuses by Bussman or Gould Shawmut.
2. Provide fuses of same characteristics as scheduled to insure selective coordination of power system.
3. Fuses 601 amp and larger shall be U/L Class L with minimum four (4) seconds time delay at 500% rating.
4. Fuses 600 amp and below shall be U/L Class J, RK-1 or RK-5 as scheduled time delay sized as shown on drawings or schedules.
5. Special temperature conditions, motors, motor loads or other conditions requiring other types or sizes of fuses must be reviewed by the Contracting Officer. Fuse reducers are not permitted.

PART 3 EXECUTION

3.1. INSTALLATION

A. Install fuses only after installation is complete and final tests and inspections have been made. Label fuses, switches and other fused devices with warning labels affixed in prominent location indicating type and size of fuse installed and fuse manufacturer’s catalog number.
B. Furnish Owner with spare fuses of each size and type installed on job as follows:

1. 601 Amps or Larger - three (3) of each size and type
2. 600 Amps or Less - 10% with minimum of three (3) of each size and type

C. For fuse types and ampacities, see plans.
D. Provide spare fuse cabinet with three shelves.
E. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

END OF SECTION 262813

SECTION 262816 – ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Reference Section 260010.
B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2. SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated.
B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

C. Field quality-control reports.
D. Operation and maintenance data.

1.3. 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. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1. DISCONNECT SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton (Cutler-Hammer)
2. General Electric Company
3. Siemens
4. Square D

B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Lugs: Suitable for number, size, and conductor material.
4. Service-Rated Switches: Labeled for use as service equipment.

2.2. FUSIBLE SWITCHES

A. Refer to disconnect switches for all requirements in addition to the following.
B. Switches shall be furnished with clips or bolt pads to accommodate indicated fuses.
C. Fuse holders shall be completely accessible from front of switch and fuses shall be installed so that the label may be easily read from the front and without removing the fuse.
D. Accessories:

1. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.

2.3. ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 3R.
3. Kitchen and Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
4. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

PART 3 EXECUTION

3.1. INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
B. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
D. Install fuses in fusible devices.
E. Comply with NECA 1.

3.2. IDENTIFICATION

A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.3. FIELD QUALITY CONTROL

A. Perform tests and inspections.
B. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
E. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION 262816

SECTION 264300 – SURGE PROTECTION DEVICES

PART 1 GENERAL

1.1. SCOPE

A. The Contractor shall furnish and install the Surge Protective Device (SPD) equipment having the electrical characteristics, ratings, and modifications as specified herein and as shown on the contract drawings. To maximize performance and reliability and to obtain the lowest possible let-through voltages, the ac surge protection shall be integrated into electrical distribution equipment such as switchgear, switchboards, panelboards, busway (integrated within bus plug), or motor control centers. Refer to related sections for surge requirements in:

1.2. RELATED SECTIONS

A. Reference Section 260010.
B. Section 262413 – Switchboards
C. Section 262416 – Panelboards

1.3. SUBMITTALS

A. The following information shall be submitted to the Engineer:

1. Provide verification that the SPD complies with the required ANSI/UL 1449 3rd Edition listing by Underwriters Laboratories (UL) or other Nationally Recognized Testing Laboratory (NRTL). Compliance may be in the form of a file number that can be verified on UL's website or on any other NRTL's website, as long as the website contains the following information at a minimum: model number, SPD Type, system voltage, phases, modes of protection, Voltage Protection Rating (VPR), and Nominal Discharge Current (I_n).
2. For sidemount mounting applications (SPD mounted external to electrical assembly), electrical/mechanical drawings showing unit dimensions, weights, installation instruction details, and wiring configuration.

B. Where applicable the following additional information shall be submitted to the engineer:

1. Descriptive bulletins
2. Product sheets

C. The following information shall be submitted for record purposes:

1. Final as-built drawings and information for items listed in Section 1.04 and shall incorporate all changes made during the manufacturing process

1.4. 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 SPD shall be compliant with the Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC.
E. SPD units and all components shall be designed, manufactured, and tested in accordance with the latest applicable UL standard (ANSI/UL 1449 3rd Edition).

1.5. DELIVERY, STORAGE AND HANDLING

A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of manufacturer's instructions shall be included with the equipment at time of shipment.

1.6. OPERATION AND MAINTENANCE MANUALS

A. Operation and maintenance manuals shall be provided with each SPD shipped.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. 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. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the Engineer ten (10) days prior to bid date.

B. Furnish Integral SPDs by one of the following:

1. Eaton / Cutler-Hammer products
2. Siemens
3. Square D
4. GE

C. External SPDs may be furnished by the gear manufacturer (listed above) or by one of the following:

1. Erico
2. SSI (Surg Suppression LLC)

2.2. VOLTAGE SURGE SUPPRESSION – GENERAL

A. Electrical Requirements

1. Unit Operating Voltage – Refer to drawings for operating voltage and unit configuration.
2. Maximum Continuous Operating Voltage (MCOV) – The MCOV shall not be less than 115% of the nominal system operating voltage.
3. The suppression system shall incorporate thermally protected metal-oxide varistors (MOVs) as the core surge suppression component for the service entrance and all other distribution levels. The system shall not utilize silicon avalanche diodes, selenium cells, air gaps, or other components that may crowbar the system voltage leading to system upset or create any environmental hazards.
4. Protection Modes – The SPD must protect all modes of the electrical system being utilized. The required protection modes are indicated by bullets in the following table:

	Protection Modes			
Configuration	L-N	L-G	L-L	N-G
Wye	●	●	●	●
Delta	N/A	●	●	N/A
Single Split Phase	●	●	●	●
High Leg Delta	●	●	●	●

5. Nominal Discharge Current (I_n) – All SPDs applied to the distribution system shall have a 20kA I_n rating regardless of their SPD Type (includes Types 1 and 2) or operating voltage. SPDs having an I_n less than 20kA shall be rejected.
6. ANSI/UL 1449 3rd Edition Voltage Protection Rating (VPR) – The maximum ANSI/UL 1449 3rd Edition VPR for the device shall not exceed the following:

Modes	208Y/120	480Y/277	600Y/347
L-N; L-G; N-G	700	1200	1500
L-L	1200	2000	3000

B. SPD Design

1. Maintenance Free Design – The SPD shall be maintenance free and shall not require any user intervention throughout its life. SPDs containing items such as replaceable modules, replaceable fuses, or replaceable batteries shall not be accepted. SPDs requiring any maintenance of any sort such as periodic tightening of connections shall not be accepted. SPDs requiring user intervention to test the unit via a diagnostic test kit or similar device shall not be accepted.
2. Balanced Suppression Platform – The surge current shall be equally distributed to all MOV components to ensure equal stressing and maximum performance. The surge suppression platform must provide equal impedance paths to each matched MOV. Designs incorporating replaceable SPD modules shall not be accepted.
3. Electrical Noise Filter – Each unit shall include a high-performance EMI/RFI noise rejection filter. Noise attenuation for electric line noise shall be up to 50 dB from 10 kHz to 100 MHz using the MIL-STD-220A insertion loss test method. Products unable able to meet this specification shall not be accepted.
4. Internal Connections – No plug-in component modules or printed circuit boards shall be used as surge current conductors. All internal components shall be soldered, hardwired with connections utilizing low impedance conductors.
5. Monitoring Diagnostics – Each SPD shall provide the following integral monitoring options:

   a. Protection Status Indicators - Each unit shall have a green / red solid-state indicator light that reports the status of the protection on each phase.

i. For wye configured units, the indicator lights must report the status of all protection elements and circuitry in the L-N and L-G modes. Wye configured units shall also contain an additional green / red solid-state indicator light that reports the status of the protection elements and circuitry in the N-G mode. SPDs that indicate only the status of the L-N and L-G modes shall not be accepted.
ii. For delta configured units, the indicator lights must report the status of all protection elements and circuitry in the L-G and L-L modes.
iii. The absence of a green light and the presence of a red light shall indicate that damage has occurred on the respective phase or mode. All protection status indicators must indicate the actual status of the protection on each phase or mode. If power is removed from any one phase, the indicator lights must continue to indicate the status of the protection on all other phases and protection modes. Diagnostics packages that simply indicate whether power is present on a particular phase shall not be accepted.

b. Remote Status Monitor – The SPD must include Form C dry contacts (one NO and one NC) for remote annunciation of its status. Both the NO and NC contacts shall change state under any fault condition.
c. Audible Alarm and Silence Button – The SPD shall contain an audible alarm that will be activated under any fault condition. There shall also be an audible alarm silence button used to silence the audible alarm after it has been activated.
d. Surge Counter – The SPD shall be equipped with an LCD display that indicates to the user how many surges have occurred at the location. The surge counter shall trigger each time a surge event with a peak current magnitude of a minimum of 50 ± 20A occurs. A reset pushbutton shall also be standard, allowing the surge counter to be zeroed. The reset button shall contain a mechanism to prevent accidental resetting of the counter via a single, short-duration button press. In order to prevent accidental resetting, the surge counter reset button shall be depressed for a minimum of 2 seconds in order to clear the surge count total.

i. The ongoing surge count shall be stored in non-volatile memory. If power to the SPD is completely interrupted, the ongoing count indicated on the surge counter's display prior to the interruption shall be stored in non-volatile memory and displayed after power is restored. The surge counter's memory shall not require a backup battery in order to achieve this functionality.

6. SPD Mounting – refer to plans and panelboard schedules indicating where SPDs are required to be mounted integral to panelboards and where they may be side-mounted.
7. Overcurrent Protection

a. The unit shall contain thermally protected MOVs. These thermally protected MOVs shall have a thermal protection element packaged together with the MOV in order to achieve overcurrent protection of the MOV. The thermal protection element shall disconnect the MOV(s) from the system in a fail-safe manner should a condition occur that would cause them to enter a thermal runaway condition.

8. Fully Integrated Component Design – All of the SPD's components and diagnostics shall be contained within one discrete assembly. SPDs or individual SPD modules that must be ganged together in order to achieve higher surge current ratings or other functionality shall not be accepted.
9. Safety Requirements

a. The SPD shall minimize potential arc flash hazards by containing no user serviceable / replaceable parts and shall be maintenance free. SPDs containing items such as replaceable modules, replaceable fuses, or replaceable batteries shall not be accepted. SPDs requiring any maintenance of any sort such as periodic tightening of connections shall not be accepted. SPDs requiring user intervention to test the unit via a diagnostic test kit or similar device shall not be accepted.
b. SPDs designed to interface with the electrical assembly via conductors shall require no user contact with the inside of the unit. Such units shall have any required conductors be factory installed.
c. Sidemount SPDs shall be factory sealed in order to prevent access to the inside of the unit. Sidemount SPDs shall have factory installed phase, neutral, ground and remote status contact conductors factory installed and shall have a pigtail of conductors protruding outside of the enclosure for field installation.

2.3. SYSTEM APPLICATION

A. The SPD applications covered under this section include distribution and branch panel locations, busway, motor control centers (MCC), switchgear, and switchboard assemblies. All SPDs shall be tested and demonstrate

suitability for application within ANSI/IEEE C62.41 Category C, B, and A environments.

B. Surge Current Capacity – The minimum surge current capacity the device is capable of withstanding shall be as shown in the following table:

Minimum surge current capacity based on ANSI / IEEE C62.41 location category			
Category	Application	Per Phase	Per Mode
C	Service Entrance Locations (Switchboards, Switchgear, MCC, Main Entrance)	250 kA	125 kA
B	High Exposure Locations (Distribution Panelboards)	160 kA	80 kA
A	Branch Locations (Panelboards, MCCs, Busway)	120 kA	60 kA

C. SPD Type – all SPDs installed on the line side of the service entrance disconnect shall be Type 1 SPDs. All SPDs installed on the load side of the service entrance disconnect shall be Type 1 or Type 2 SPDs.

2.4. LIGHTING AND DISTRIBUTION PANELBOARD REQUIREMENTS

A. The SPD application covered under this section includes lighting and distribution panelboards. The SPD units shall be tested and demonstrate suitability for application within ANSI/IEEE C62.41 Category B environments.

1. The SPD shall be included and mounted within the panelboard by the manufacturer of the panelboard.
2. The SPD shall be of the same manufacturer as the panelboard.
3. The SPD shall not limit the use of through-feed lugs, sub-feed lugs, and sub-feed breaker options.
4. SPDs shall be installed immediately following the load side of the main breaker. SPDs installed in main lug only panelboards shall be installed immediately following the incoming main lugs.
5. The panelboard shall be capable of re-energizing upon removal of the SPD.
6. The SPD shall be interfaced to the panelboard via a direct bus bar connection. Alternately, an SPD connected to a 30A circuit breaker for disconnecting purposes may be installed using short lengths of conductors as long as the conductors originate integrally to the SPD. The SPD shall be located directly adjacent to the 30A circuit breaker.
7. The complete panelboard including the SPD shall be UL67 listed.

B. Sidemount Mounting Applications Installation (SPD mounted external to electrical assembly)

1. Lead length between the breaker and suppressor shall be kept as short as possible to ensure optimum performance. Any excess conductor length shall be trimmed in order to minimize let-through voltage. The installer shall comply with the manufacturer's recommended installation and wiring practices.

2.5. SWITCHGEAR, SWITCHBOARD, MCC AND BUSWAY REQUIREMENTS

A. The SPD application covered under this section is for switchgear, switchboard, MCC, and busway locations. Service entrance located SPDs shall be tested and demonstrate suitability for application within ANSI/IEEE C62.41 Category C environments.

1. The SPD shall be of the same manufacturer as the switchgear, switchboard, MCC, and busway
2. The SPD shall be factory installed inside the switchgear, switchboard, MCC, and/or bus plug at the assembly point by the original equipment manufacturer
3. Locate the SPD on the load side of the main disconnect device, as close as possible to the phase conductors and the ground/neutral bar.
4. The SPD shall be connected through a disconnect (30A circuit breaker). The disconnect shall be located in immediate proximity to the SPD. Connection shall be made via bus, conductors, or other connections originating in the SPD and shall be kept as short as possible.
5. All monitoring and diagnostic features shall be visible from the front of the equipment.

B. Sidemount Mounting Applications Installation (SPD mounted external to electrical assembly)

1. Lead length between the breaker and suppressor shall be kept as short as possible to ensure optimum performance. Any excess conductor length shall be trimmed in order to minimize let-through voltage. The installer shall comply with the manufacturer's recommended installation and wiring practices.

2.6. ENCLOSURES

A. All enclosed equipment shall have NEMA 1 general purpose enclosures, unless otherwise noted. Provide enclosures suitable for locations as indicated on the drawings and as described below:

1. NEMA 1 – Constructed of a polymer (units integrated within electrical assemblies) or steel (sidemount

units only), intended for indoor use to provide a degree of protection to personal access to hazardous parts and provide a degree of protection against the ingress of solid foreign objects (falling dirt).

2. NEMA 4 – Constructed of steel intended for either indoor or outdoor use to provide a degree of protection against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (dirt and windblown dust); to provide a degree of protection with respect to the harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); and that will be undamaged by the external formation of ice on the enclosure. (sidemount units only)
3. NEMA 4X – Constructed of stainless steel providing the same level of protection as the NEMA 4 enclosure with the addition of corrosion protection. (sidemount units only)

PART 3 EXECUTION

3.1. FACTORY TESTING

A. Standard factory tests shall be performed on the equipment under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.

3.2. INSTALLATION

A. The Contractor shall install all equipment per the manufacturer's recommendations and the contract drawings.

3.3. WARRANTY

A. The manufacturer shall provide a full ten (10) year warranty from the date of shipment against any SPD part failure when installed in compliance with manufacturer's written instructions and any applicable national or local code.

END OF SECTION 264300

END OF DIVISION 260000

ELECTRICAL SYMBOL LEGEND

SOME SYMBOLS AND ABBREVIATIONS ON THIS LEGEND MAY NOT BE USED

CIRCUITING

- HOME RUN (2#12 1#12G UNO)
- INDICATES 2 PHASE, 1 N, & 1 GRD CONDUCTOR
- HOME RUN: INDICATES SHARED CIRCUIT
- HOME RUN: INDICATES #10 CONDUCTORS ENTIRELY

UTILITIES

- UGE — UNDERGROUND ELECTRICAL
- OHE — OVERHEAD ELECTRICAL
- TELE — TELECOMMUNICATIONS CONDUIT
- UGT — UNDERGROUND TELECOMMUNICATIONS CONDUIT

LIGHTING

- GRID-MOUNTED TROFFER LIGHT FIXTURE
- STRIP LIGHT FIXTURE
- SURFACE/RECESSED LIGHT FIXTURE
- WALL-MOUNTED LIGHT FIXTURE
- POLE-MOUNTED LIGHT FIXTURE
- EXIT LIGHT
- BATTERY-OPERATED EMERGENCY LIGHT (WALL MTD)
- BATTERY-OPERATED EMERGENCY LIGHT (CEILING MTD)
- WALL-MOUNTED COMBINATION EXIT LIGHT/ BATTERY-OPERATED EMERGENCY LIGHT
- $ — LIGHT SWITCH – SINGLE POLE
- $_3$ — LIGHT SWITCH – 3-WAY
- $_4$ — LIGHT SWITCH – 4-WAY
- $_K$ — LIGHT SWITCH – KEY
- $_D$ — LIGHT SWITCH – DIMMER
- $_{PL}$ — LIGHT SWITCH – PILOT LIGHT
- $_{2P}$ — LIGHT SWITCH – 2 POLE
- $_3^D$ — LIGHT SWITCH – 3-WAY DIMMER
- $_M$ — WALL-MOUNTED MOTION SWITCH
- (M) — CEILING-MOUNTED MOTION SWITCH

POWER DEVICES

- DUPLEX RECEPTACLE.
- LINE THRU DEVICE INDICATES ABOVE COUNTER
- GFI — SPECIAL DUPLEX RECEPTACLE (GFCI, ISOLATED GROUND, ETC.)
- QUADPLEX RECEPTACLE
- 5-50R — SIMPLEX RECEPTACLE W/NEMA CONFIG AS NOTED
- 5-50R — MULTI-POLE RECEPTACLE W/NEMA CONFIG AS NOTED
- CEILING MOUNTED RECEPTACLE
- RECEPTACLE/DEVICE MOUNTED IN "TOMBSTONE"
- POKE-THRU WITH POWER
- POKE-THRU WITH TELECOMMUNICATIONS
- POKE-THRU W/POWER AND TELECOM
- FB — FLOOR BOX
- DIVIDED POWER POLE
- C — CLOCK RECEPTACLE
- PLUG MOLD / WIRE MOLD AS SPECIFIED
- J — JUNCTION BOX
- T — THERMOSTAT – ELECTRIC
- PUSH BUTTON
- MOTOR

EQUIPMENT

- DISCONNECT SWITCH. RE: PLANS FOR INFORMATION.
- MAGNETIC MOTOR STARTER
- COMBINATION DISCONNECT SWITCH / MOTOR STARTER
- TOGGLE-TYPE DISCONNECT. FURNISH WITH THERMAL MOTOR PROTECTION WHERE SERVING FANS/PUMPS.
- SURFACE PANELBOARD
- RECESSED PANELBOARD
- DISTRIBUTION PANELBOARD
- SWITCHBOARD. FEEDER/MAIN CIRCUIT BREAKER SECTION AND DISTRIBUTION SECTION.

GENERAL SYMBOLS

- INDICATES CONNECT TO EXISTING
- INDICATES ELEVATION

FIRE ALARM

- F — MANUAL PULL STATION
- D — CEILING SMOKE DETECTOR
- D — DUCT SMOKE DETECTOR
- H — HEAT DETECTOR
- WF — WATERFLOW SWITCH
- TS — TAMPER SWITCH
- 75 — WALL-MOUNTED FA STROBE WITH CANDELA RATING. 15cd RATING UNLESS OTHERWISE NOTED ON PLANS.
- WALL-MOUNTED FA HORN
- WALL-MOUNTED FA SPEAKER
- 30 — WALL-MOUNTED FA HORN/STROBE WITH CANDELA RATING. 15cd UNLESS OTHERWISE NOTED ON PLANS.
- 30 — WALL-MOUNTED FA SPEAKER/STROBE WITH CANDELA RATING. 15cd UNLESS OTHERWISE NOTED ON PLANS.
- 75 — CEILING-MOUNTED FA STROBE WITH CANDELA RATING. MINIMUM OF 15cd RATING.
- CEILING-MOUNTED FA SPEAKER.
- 30 — CEILING-MOUNTED FA HORN/STROBE WITH CANDELA RATING. MINIMUM OF 15cd RATING.
- 30 — CEILING-MOUNTED FA SPEAKER/STROBE WITH CANDELA RATING. MINIMUM OF 15cd RATING.
- R — RELAY
- FACP — FIRE ALARM CONTROL PANEL
- FAAP — FIRE ALARM ANNUNCIATOR PANEL
- FARA — REMOTE ANNUNCIATOR PANEL
- FAEC — FIRE ALARM EXTENDER CABINET

ABBREVIATIONS

A/E	ARCHITECT / ENGINEER	ELEV	ELEVATION	MH	MANHOLE
AFF	ABOVE FINISHED FLOOR	EM	EMERGENCY FIXTURE/DEVICE	MLO	MAIN LUGS ONLY
AFG	ABOVE FINISHED GRADE	EWT	ENTERING WATER TEMPERATURE	NFA	NET FREE AREA
AG	ABOVE GRADE	EX	EXISTING ITEM	NL	NIGHT LIGHT
AHJ	AUTHORITY HAVING JURISDICTION	FFA	FROM FLOOR ABOVE	OA	OUTSIDE AIR
AHU	AIR HANDLING UNIT	FFB	FROM FLOOR BELOW	ORD	OVERFLOW ROOF DRAIN
ARCH	ARCHITECT	FFCO	FINISHED FLOOR CLEAN OUT	P/C	PLUMBING CONTRACTOR
BFP	BACKFLOW PREVENTER	FGCO	FLUSH GRADE CLEAN OUT	PSI	POUNDS PER SQUARE INCH
BG	BELOW GRADE	FL	FLOW LINE	PVC	POLYVINYLCHLORIDE
BLDG	BUILDING	FLR	FLOOR	RA	RETURN AIR
BMS	BUILDING MANAGEMENT SYSTEM	FP	FIRE PROTECTION	RE/REF	REFER / REFERENCE
C	CONDUIT	FPM	FEET PER MINUTE	RF	RELIEF FAN
CD	CANDELA	FWCO	FLUSH WALL CLEAN OUT	RL	RELOCATED ITEM
CD	COLD DECK	G	GROUND / GANG	RPZ	REDUCED PRESSURE ZONE
CLG	COOLING	G/C	GENERAL CONTRACTOR	RR	RESTROOM
CM	COORDINATE MOUNTING HEIGHT	GFI	GROUND FAULT CIRCUIT INTERUPTER	SA	SUPPLY AIR
CO	CLEAN OUT	GFIP	GFI-PROTECTED DEVICE	SPD	SURGE PROTECTIVE DEVICE
CTE	CONNECT TO EXISTING	GPM	GALLONS PER MINUTE	ST	SHUNT TRIP
DCVA	DOUBLE CHECK VALVE ASSEMBLY	HD	HOT DECK	TA	TRANSFER AIR
DCW	DOMESTIC COLD WATER	HTG	HEATING	TFA	TO FLOOR ABOVE
DDC	DIRECT DIGITAL CONTROLS	IG	ISOLATED GROUND	TFB	TO FLOOR BELOW
DF	DRINKING FOUNTAIN	JB	JUNCTION BOX	TP	TAMPERPROOF
DHW	DOMESTIC HOT WATER	LED	LIGHT EMITTING DIODE	TYP	TYPICAL
DHWR	DOMESTIC HOT WATER RETURN	LWT	LEAVING WATER TEMPERATURE	UNO	UNLESS NOTED OTHERWISE
DIA	DIAMETER	M/C	MECHANICAL CONTRACTOR	VRF	VARIABLE REFRIGERANT FLOW
DN	DOWN	MA	MIXED AIR	VTR	VENT THROUGH ROOF
E/C	ELECTRICAL CONTRACTOR	MAU	MAKE UP AIR UNIT	WCO	WALL CLEANOUT
EA	EXHAUST AIR	MCB	MAIN CIRCUIT BREAKER	WG	WIRE GUARD
EDF	ELECTRIC DRINKING FOUNTAIN	MECH	MECHANICAL	WP	WEATHERPROOF

FIRE SEALING NOTES

1. COORDINATE CONSTRUCTION OF OPENINGS AND PENETRATING ITEMS TO ENSURE THAT THROUGH-PENETRATION FIRESTOP SYSTEMS ARE INSTALLED ACCORDING TO SPECIFIED AND APPLICABLE UL REQUIREMENTS.
2. COORDINATE SIZING OF SLEEVES, OPENINGS, CORE-DRILLED HOLES, OR CUT OPENINGS TO ACCOMMODATE THROUGH-PENETRATION FIRESTOP SYSTEMS.
3. DO NOT COVER UP THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATIONS UNTIL EXAMINED BY INSPECTOR, IF REQUIRED BY AUTHORITIES HAVING JURISDICTION.
4. COMPATIBILITY: PROVIDE THROUGH-PENETRATION FIRESTOP SYSTEMS THAT ARE COMPATIBLE WITH ONE ANOTHER; WITH THE SUBSTRATES FORMING OPENINGS; AND WITH THE ITEMS, IF ANY, PENETRATING THROUGH-PENETRATION FIRESTOP SYSTEMS, UNDER CONDITIONS OF SERVICE AND APPLICATION, AS DEMONSTRATED BY THROUGH-PENETRATION FIRESTOP SYSTEM MANUFACTURER BASED ON TESTING AND FIELD EXPERIENCE.
5. PROVIDE COMPONENTS FOR EACH THROUGH-PENETRATION FIRESTOP SYSTEM THAT ARE NEEDED TO INSTALL FILL MATERIALS. USE ONLY COMPONENTS SPECIFIED BY THROUGH-PENETRATION FIRESTOP SYSTEM MANUFACTURER AND APPROVED BY QUALIFIED TESTING AND INSPECTING AGENCY FOR FIRESTOP SYSTEMS INDICATED.
6. PROVIDE SLEEVES THROUGH ALL FIRE-RATED WALLS AND FILL VOIDS SURROUNDING SLEEVES AND INTERIOR TO SLEEVES AROUND PIPING WITH FIRE STOP PUTTY WITH U.L. LISTED 3 HOUR RATING INSTALLED AS PER MANUFACTURERS RECOMMENDATIONS.
7. FIRE SEAL ALL PIPING, CONDUIT, CABLE, ETC PENETRATIONS ROUTED THROUGH FIRE RATED WALLS.
8. PROVIDE FIRE RATED ENCLOSURES OR WRAPS ON LIGHT FIXTURES AND OTHER ITEMS PENETRATING FIRE RATED CEILINGS, FLOOR/CEILING/ CEILING/ROOF ASSEMBLIES TO MAINTAIN UL LISTING FOR CONSTRUCTION.

SHEET INDEX

GENERAL ELECTRICAL NOTES

1. COMPLETE INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST ADOPTED VERSION OF THE NATIONAL ELECTRICAL CODE, LOCAL AND STATE CODES, AND REQUIREMENTS OF THE AHJ.
2. REFER TO MOUNTING HEIGHTS DETAIL FOR MOUNTING HEIGHTS OF ALL DEVICES NOT INDICATED OTHERWISE.
3. PROVIDE ALL EMPTY CONDUITS WITH PULL STRINGS AND BUSHED ENDS.
4. CONTRACTOR SHALL CONCEAL ALL CONDUIT, FITTINGS, AND DEVICES FROM VIEW WHERE REASONABLY POSSIBLE.
   4.2. REFER TO SPECIFICATIONS FOR ALLOWABLE WIRING METHODS THROUGHOUT PROJECT.
   4.3. ALL EXPOSED WIRING SHALL BE IN EMT OR METALLIC CONDUIT, EXCEPT AS PERMITTED BY SPECIFICATIONS FOR WHIPS TO EQUIPMENT.

COORDINATION NOTES

1. COORDINATE REQUIREMENTS FOR INSTALLATION OF SYSTEMS AND EQUIPMENT WITH ALL OTHER TRADES.
2. THE CONTRACTOR SHALL COORDINATE THE ROUTING AND PATH OF ALL SYSTEMS, CONDUITS, PIPES, DUCTS, ETC WITH THE POSITION AND LAYOUT OF THE STRUCTURE. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING NECESSARY OFFSETS, TURNS, RISES AND DROPS FOR SYSTEMS AND COMPONENTS AS NEEDED TO INSTALL THE MEP SYSTEMS TO CLEAR STRUCTURE, CEILINGS, ETC AND OTHER SYSTEMS IN POTENTIAL CONFLICT WITH ROUTING.
3. COORDINATE WORK WITH OTHER TRADES TO INSTALL SYSTEMS ABOVE CEILING HEIGHTS INDICATED ON ARCHITECTURAL PLANS.
4. CHECK SPACE REQUIREMENTS WITH OTHER TRADES AND STRUCTURE/CONSTRUCTION TO ENSURE THAT ALL MATERIALS AND EQUIPMENT CAN BE INSTALLED IN THE SPACE ALLOTTED INCLUDING FINISHED SUSPENDED CEILINGS AND OTHER SPACES, CHASES, ETC WITHIN THE BUILDING. MAKE MODIFICATIONS THERETO AS REQUIRED AND APPROVED.
5. TRANSMIT TO OTHER TRADES ALL INFORMATION REQUIRED FOR WORK TO BE PROVIDED UNDER THEIR RESPECTIVE SECTIONS IN AMPLE TIME FOR INSTALLATION.
6. WHEREVER WORK INTERCONNECTS WITH WORK OF OTHER TRADES, COORDINATE WITH THOSE TRADES TO ENSURE THAT ALL SUBCONTRACTORS HAVE THE INFORMATION NECESSARY SO THAT THEY MAY PROPERLY INSTALL ALL CONNECTIONS AND EQUIPMENT. IDENTIFY ALL ITEMS OF WORK THAT REQUIRE ACCESS SO THAT THE CEILING TRADE WILL KNOW WHERE TO INSTALL ACCESS DOORS AND PANELS.
7. COORDINATE, PROJECT AND SCHEDULE WORK WITH OTHER TRADES IN ACCORDANCE WITH THE CONSTRUCTION SEQUENCE.
8. DRAWINGS SHOW THE GENERAL RUNS OF CONDUITS, PIPING AND DUCTWORK AND APPROXIMATE LOCATION OF OUTLETS. ANY SIGNIFICANT CHANGES IN LOCATION OF ITEMS NECESSARY IN ORDER TO MEET FIELD CONDITIONS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT/ENGINEER AND RECEIVE HIS APPROVAL BEFORE SUCH ALTERATIONS ARE MADE. ALL SUCH MODIFICATIONS SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION AND REPAIR OF SURFACES, AREAS AND PROPERTY THAT MAY BE DAMAGED AS A RESULT OF CONSTRUCTION ACTIVITIES.
10. ADJUST LOCATION OF PIPING, DUCTWORK, ETC. TO PREVENT INTERFERENCES, BOTH ANTICIPATED AND ENCOUNTERED. DETERMINE THE EXACT ROUTE AND LOCATION OF EACH ITEM PRIOR TO FABRICATION. MAKE OFFSETS, TRANSITIONS AND CHANGES IN DIRECTION IN SYSTEMS AS REQUIRED TO MAINTAIN ADEQUATE CLEARANCES AND HEADROOM.
11. WHEREVER THE WORK IS OF SUFFICIENT COMPLEXITY, PREPARE ADDITIONAL COORDINATION DRAWINGS AND ORGANIZE ON-SITE MEETINGS WITH ALL RELATED SUBCONTRACTORS TO COORDINATE THE WORK BETWEEN TRADES. DRAWINGS SHALL CLEARLY SHOW THE WORK AND ITS RELATION TO THE WORK OF OTHER TRADES, AND BE SUBMITTED FOR REVIEW PRIOR TO COMMENCING SHOP FABRICATION OR ERECTION IN THE FIELD.
12. COORDINATE WITH LOCAL UTILITY PROVIDERS FOR THEIR REQUIREMENTS FOR SERVICE CONNECTIONS AND PROVIDE ALL NECESSARY PAYMENTS, MATERIALS, LABOR AND TESTING TO ACCOMPLISH THE WORK.

GENERAL NOTES

1. SOME ROOM NAMES MAY NOT BE SHOWN FOR PURPOSE OF CLARIFYING PLAN. REFER TO ARCHITECTURAL PLANS FOR REFERENCE TO ROOM NAMES NOT SHOWN.
2. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN AND KEEP AT THE JOB SITE, AN UP TO DATE SET OF "RECORD DRAWINGS" SHOWING ALL CHANGES FROM THE ORIGINAL PLANS. THE CONTRACTOR SHALL DELIVER THE "RECORD DRAWINGS" TO THE ENGINEER AT THE CONCLUSION OF THE PROJECT ELECTRONICALLY.
3. THESE DRAWINGS ARE DIAGRAMMATIC. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS (NEW AND EXISTING), DIMENSIONS, AND CLEARANCES PRIOR TO THE COMMENCEMENT OF WORK AND SHALL INCLUDE ALL COSTS, EQUIPMENT, MATERIAL, ACCESSORIES, ETC. REQUIRED FOR A FULLY COMPLETE, FUNCTIONAL AND CODE COMPLIANT INSTALLATION.
4. FINAL LOCATIONS OF ALL DEVICES, LIGHT FIXTURES, EQUIPMENT ETC SHALL BE INDICATED ON THE ARCHITECTURAL DRAWINGS. ALL DIMENSIONAL INFORMATION SHALL BE OBTAINED FROM ARCHITECTURAL PLANS. NO DIMENSIONAL INFORMATION SHALL BE OBTAINED FROM MEP DRAWINGS.
5. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS, APPROVALS, LICENSES, ETC. AS NEEDED FOR THE COMPLETE INSTALLATION AND PROJECT. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER FOR ALL FEES AND DATA NEEDED FOR THIS.

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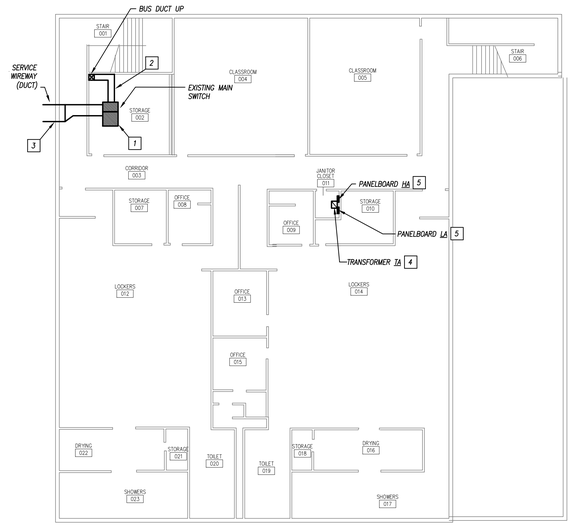
SHEET TITLE: COVER SHEET

DATE: 5/8/23 PKMR PROJECT: 22.637

SHEET NUMBER: E001



BASEMENT FLOOR PLAN - ELECTRICAL

1/16" = 1'-0"

GENERAL DEMOLITION NOTES

1. *REFER TO GENERAL DEMOLITION NOTES ON MEP COVER SHEET FOR ADDITIONAL REQUIREMENTS OF WORK.*

GENERAL ELECTRICAL NOTES

1. *REFER TO GENERAL NOTES ON COVER SHEET FOR ADDITIONAL REQUIREMENTS OF WORK.*
2. *EXACT EQUIPMENT LOCATIONS MAY NOT BE SHOWN FOR CLARITY. COORDINATE EXACT LOCATIONS OF ALL MECHANICAL EQUIPMENT, DUCT DETECTORS, ETC. WITH MECHANICAL DRAWINGS AND CONTRACTOR.*

EXISTING PANELBOARD WORK

1. *ALL BREAKERS IN EXISTING PANELBOARDS ARE EXISTING TO REMAIN UNLESS INDICATED OTHERWISE ON THE PANELBOARD SCHEDULES.*
2. *EXISTING BREAKERS, CIRCUITS, AND LOADS ARE SHOWN LIGHT. NEW LOADS, BREAKERS, AND CIRCUITS ARE SHOWN DARK.*
3. *EXISTING LOAD VALUES ARE ASSUMED AND/OR BASED OFF EXISTING DRAWINGS.*
4. *AVAILABILITY OF CIRCUITS IN EXISTING PANELBOARDS IS BASED ON FIELD OBSERVATION AND EXISTING CIRCUIT DIRECTORIES. CONTRACTOR SHALL FIELD VERIFY ACTUAL CONDITIONS AND PROVIDE WORK ACCORDING TO INTENTION OF CONTRACT DOCUMENTS. ACTUAL CIRCUITS AVAILABLE DUE TO DEMOLITION, CIRCUITS THAT ARE REQUIRED TO REMAIN, AND PANELBOARD AVAILABILITY MAY BE DIFFERENT THAN INDICATED.*
5. *FAULT CURRENT RATINGS AND/OR TYPE'XS OF NEW BREAKERS IN EXISTING PANELBAORDS SHALL MATCH THE TYPE AND AIC RATING OF THE EXISTING BREAKERS IN ORDER TO MAINTAIN THE FAULT CURRENT RATING OF THE PANELBOARD.*
6. *PROVIDE NEW TYPE CIRCUIT DIRECTORIES FOR ALL PANELBOARDS WITH UPDATED CIRCUIT INFORMATION AS SHOWN AND/OR FIELD-VERIFIED.*

PLAN KEYED NOTES

1 *REMOVE EXISTING DUAL MAIN SWITCH.*

2 *REMOVE EXISTING 4000A BUS DUCT. PATCH AND PAINT HOLES LEFT BY REMOVAL.*

3 *REMOVE EXISTING SERVICE FEEDERS AND WIREWAY. PATCH AND PAINT WALLS AFTER REMOVAL.*

4 *EXISTING PANELBOARD TO BE REPLACED.*

5 *EXISTING TRANSFORMER TO BE REPLACED.*

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SHEET TITLE:
BASEMENT ELECTRICAL

DATE: 5/8/23
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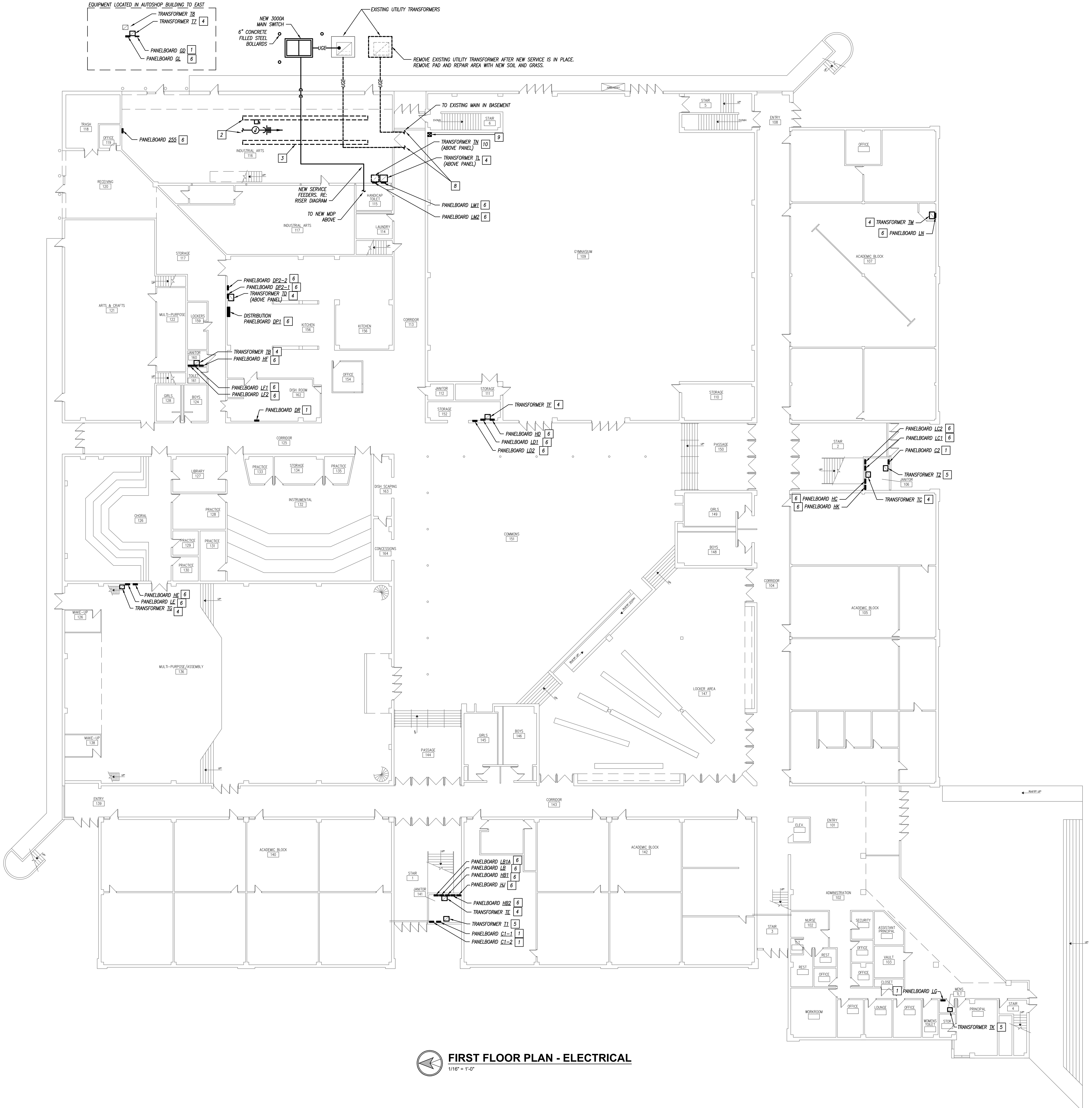

FIRST FLOOR PLAN - ELECTRICAL

1/16" = 1'-0"

GENERAL DEMOLITION NOTES

1. REFER TO GENERAL DEMOLITION NOTES ON MEP COVER SHEET FOR ADDITIONAL REQUIREMENTS OF WORK.

GENERAL ELECTRICAL NOTES

1. REFER TO GENERAL NOTES ON COVER SHEET FOR ADDITIONAL REQUIREMENTS OF WORK.
2. EXACT EQUIPMENT LOCATIONS MAY NOT BE SHOWN FOR CLARITY. COORDINATE EXACT LOCATIONS OF ALL MECHANICAL EQUIPMENT, DUCT DETECTORS, ETC. WITH MECHANICAL DRAWINGS AND CONTRACTOR.

EXISTING PANELBOARD WORK

1. ALL BREAKERS IN EXISTING PANELBOARDS ARE EXISTING TO REMAIN UNLESS INDICATED OTHERWISE ON THE PANELBOARD SCHEDULES.
2. EXISTING BREAKERS, CIRCUITS, AND LOADS ARE SHOWN LIGHT. NEW LOADS, BREAKERS, AND CIRCUITS ARE SHOWN DARK.
3. EXISTING LOAD VALUES ARE ASSUMED AND/OR BASED OFF EXISTING DRAWINGS.
4. AVAILABILITY OF CIRCUITS IN EXISTING PANELBOARDS IS BASED ON FIELD OBSERVATION AND EXISTING CIRCUIT DIRECTORIES. CONTRACTOR SHALL FIELD VERIFY ACTUAL CONDITIONS AND PROVIDE WORK ACCORDING TO INTENTION OF CONTRACT DOCUMENTS. ACTUAL CIRCUITS AVAILABLE DUE TO DEMOLITION, CIRCUITS THAT ARE REQUIRED TO REMAIN, AND PANELBOARD AVAILABILITY MAY BE DIFFERENT THAN INDICATED.
5. FAULT CURRENT RATINGS AND/OR TYPEXS OF NEW BREAKERS IN EXISTING PANELBAORDS SHALL MATCH THE TYPE AND AIC RATING OF THE EXISTING BREAKERS IN ORDER TO MAINTAIN THE FAULT CURRENT RATING OF THE PANELBOARD.
6. PROVIDE NEW TYPE CIRCUIT DIRECTORIES FOR ALL PANELBOARDS WITH UPDATED CIRCUIT INFORMATION AS SHOWN AND/OR FIELD-VERIFIED.

PLAN KEYED NOTES

1. EXISTING PANELBOARD AND STEP DOWN TRANSFORMER TO REMAIN AND BE REFED FROM NEW MAIN SWITCHBOARD.
2. REMOVE EXISTING BUS DUCT AND FEEDER BACK TO MAIN. DISCONNECT EXISTING FEEDERS FROM BUS DUCT SWITCH SERVING PANEL IN ROOM 255. SET JUNCTION BOX AND PROVIDE NEW CIRCUIT FROM PANEL LM TO REFEED EXISTING PANEL.
3. REMOVE EXISTING SUSPENDED WIREWAY AND DROP CORDS/PLUGS. REMOVE FEEDERS BACK TO MAIN.
4. EXISTING TRANSFORMER TO BE REPLACED.
5. EXISTING TRANSFORMER TO REMAIN.
6. EXISTING PANELBOARD TO BE REPLACED.
7. DISCONNECT EXISTING TRANSFORMER FROM EXISTING DUAL MAIN SWITCH IN BASEMENT AND RECONNECT TRANSFORMER TO NEW SWITCH.
8. REMOVE EXISTING CONDUCTORS FROM EXISTING SERVICE. FILL/PLUG EXISTING CONDUITS WITH FLOWABLE FILL AND PATCH ALL PENETRATIONS IN BASEMENT FOUNDATION WALL.
9. REMOVE EXISTING BUS DUCT.
10. EXISTING TRANSFORMER TO BE REMOVED.

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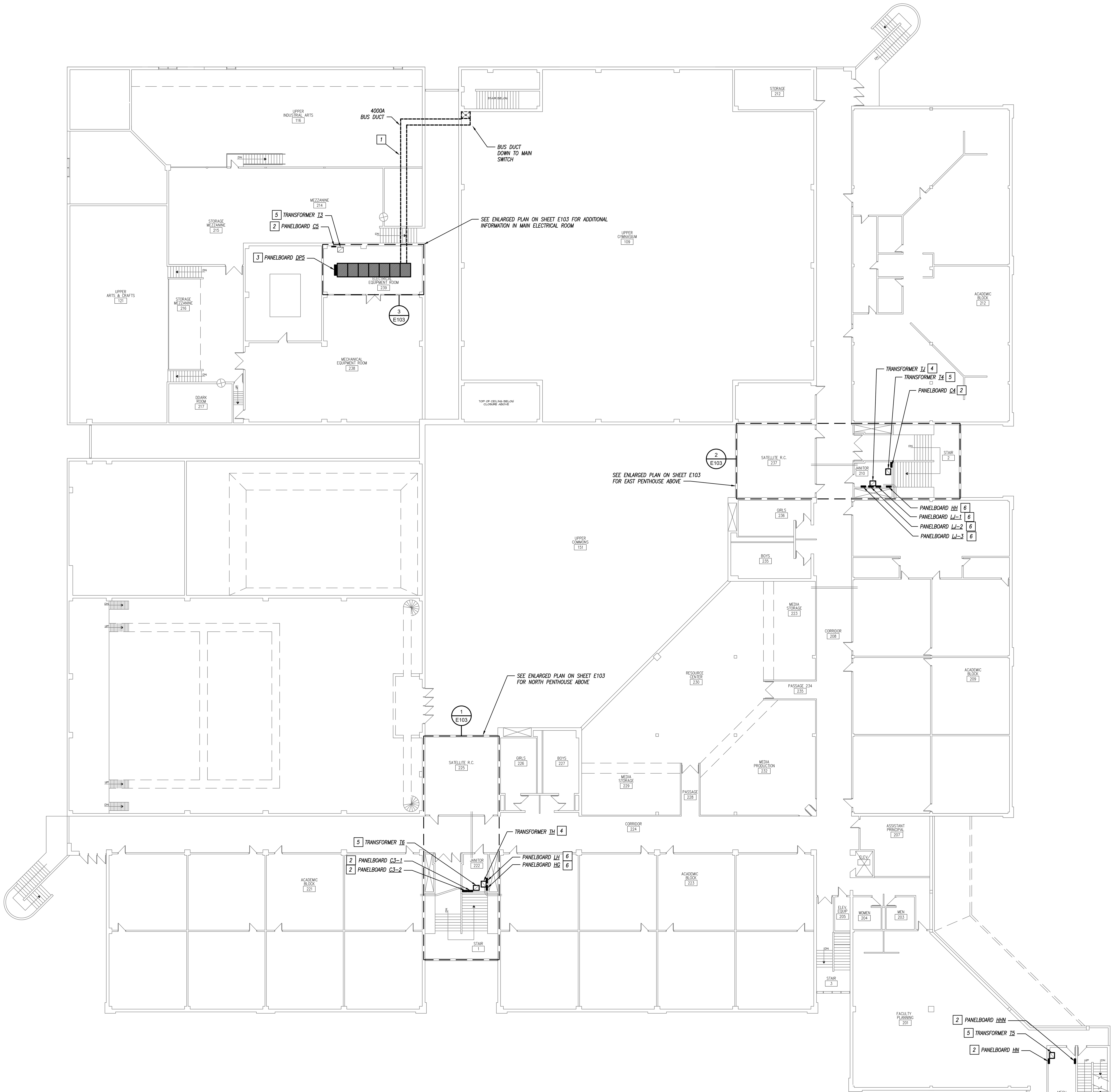

SECOND FLOOR PLAN - ELECTRICAL

1/16" = 1'-0"

GENERAL DEMOLITION NOTES

1. REFER TO GENERAL DEMOLITION NOTES ON MEP COVER SHEET FOR ADDITIONAL REQUIREMENTS OF WORK.

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5. FAULT CURRENT RATINGS AND/OR TYPEXS OF NEW BREAKERS IN EXISTING PANELBAORDS SHALL MATCH THE TYPE AND AIC RATING OF THE EXISTING BREAKERS IN ORDER TO MAINTAIN THE FAULT CURRENT RATING OF THE PANELBOARD.
6. PROVIDE NEW TYPE CIRCUIT DIRECTORIES FOR ALL PANELBOARDS WITH UPDATED CIRCUIT INFORMATION AS SHOWN AND/OR FIELD-VERIFIED.

PLAN KEYED NOTES

1 REMOVE EXISTING BUS DUCT.
2 EXISTING PANELBOARD AND STEP DOWN TRANSFORMER TO REMAIN AND BE REFED FROM NEW MAIN SWITCHBOARD.
3 EXISTING PANELBOARD TO BE REMOVED AND EXISTING LOADS TO BE RELOCATED TO NEW SWITCHBOARD.
4 EXISTING TRANSFORMER TO BE REPLACED.
5 EXISTING TRANSFORMER TO REMAIN.
6 EXISTING PANELBOARD TO BE REPLACED.

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SECOND FLOOR ELECTRICAL

DATE: 5/8/23
PKMR PROJECT: 22.637

SHEET NUMBER:
E102

GENERAL DEMOLITION NOTES

1. REFER TO GENERAL DEMOLITION NOTES ON MEP COVER SHEET FOR ADDITIONAL REQUIREMENTS OF WORK.

GENERAL ELECTRICAL NOTES

1. REFER TO GENERAL NOTES ON COVER SHEET FOR ADDITIONAL REQUIREMENTS OF WORK.
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EXISTING PANELBOARD WORK

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6. PROVIDE NEW TYPE CIRCUIT DIRECTORIES FOR ALL PANELBOARDS WITH UPDATED CIRCUIT INFORMATION AS SHOWN AND/OR FIELD-VERIFIED.

PLAN KEYED NOTES

1 REPLACE EXISTING PANELBOARD.

2 EXISTING PANELBOARD AND TRANSFORMER TO REMAIN AND BE RECONNECTED TO NEW SWITCHBOARD.

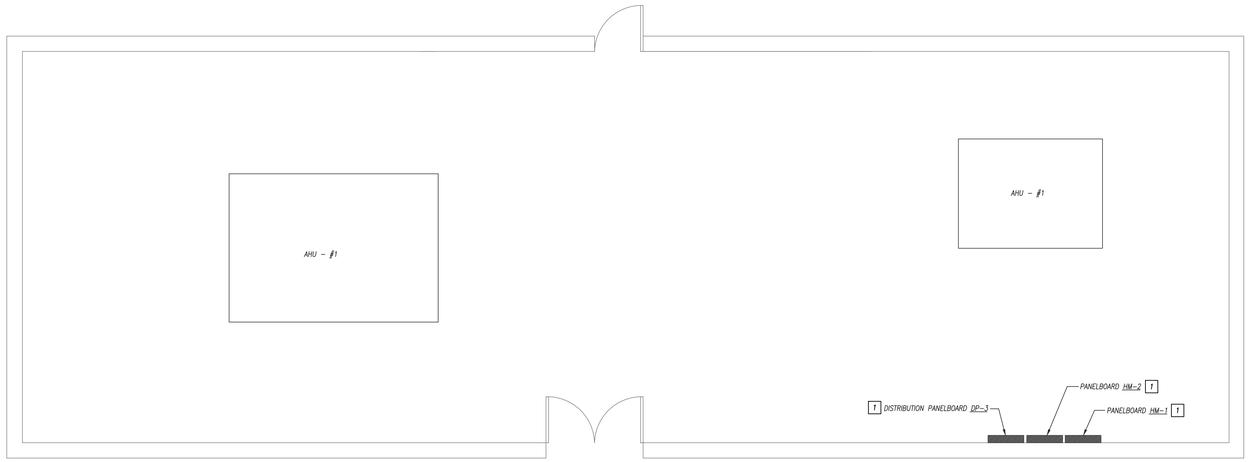
3 EXISTING PANELBOARD TO BE REMOVED AND EXISTING LOADS REFED FROM NEW SWITCHBOARD.

4 EXISTING 400A DISCONNECT SWITCH TO BE REMOVED. SWITCH IS FUSED AT 225A. EXISTING CIRCUIT TO BE REFED FROM NEW SWITCHBOARD WITH NEW CONDUCTORS AND CONDUIT. REWORK AND PROVIDE JUNCTION BOXES AS NECESSARY.

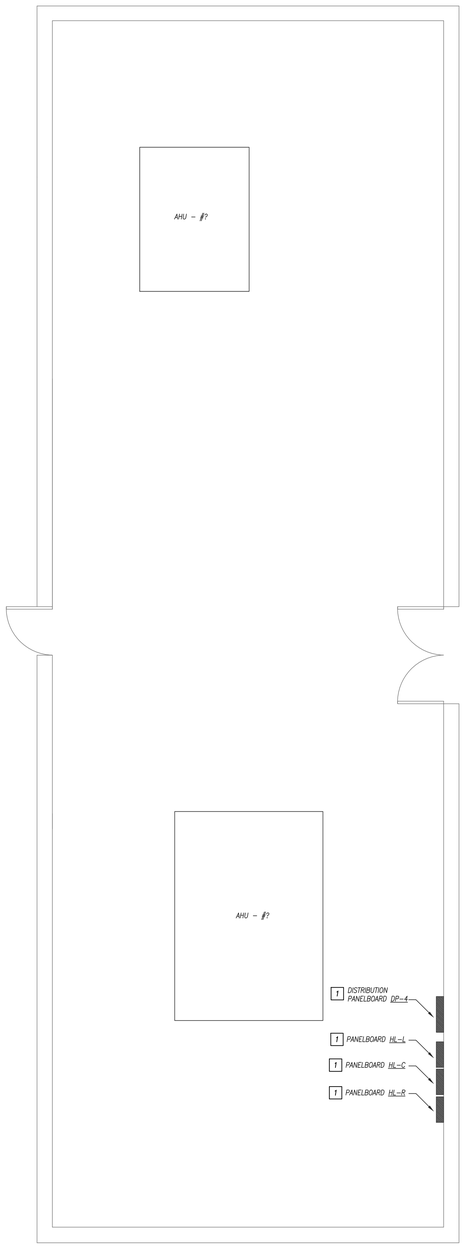
5 EXISTING BUS DUCT TO BE REMOVED.

6 REPLACE EXISTING SWITCHBOARD. PROVIDE MODIFICATIONS TO EXISTING HOUSEKEEPING PAD. PROVIDE NEW JUNCTION BOXES AND WIREWAYS TO ENCLOSE AND RECONNECT EXISTING CIRCUITS AND FEEDERS TO NEW SWITCHBOARD.

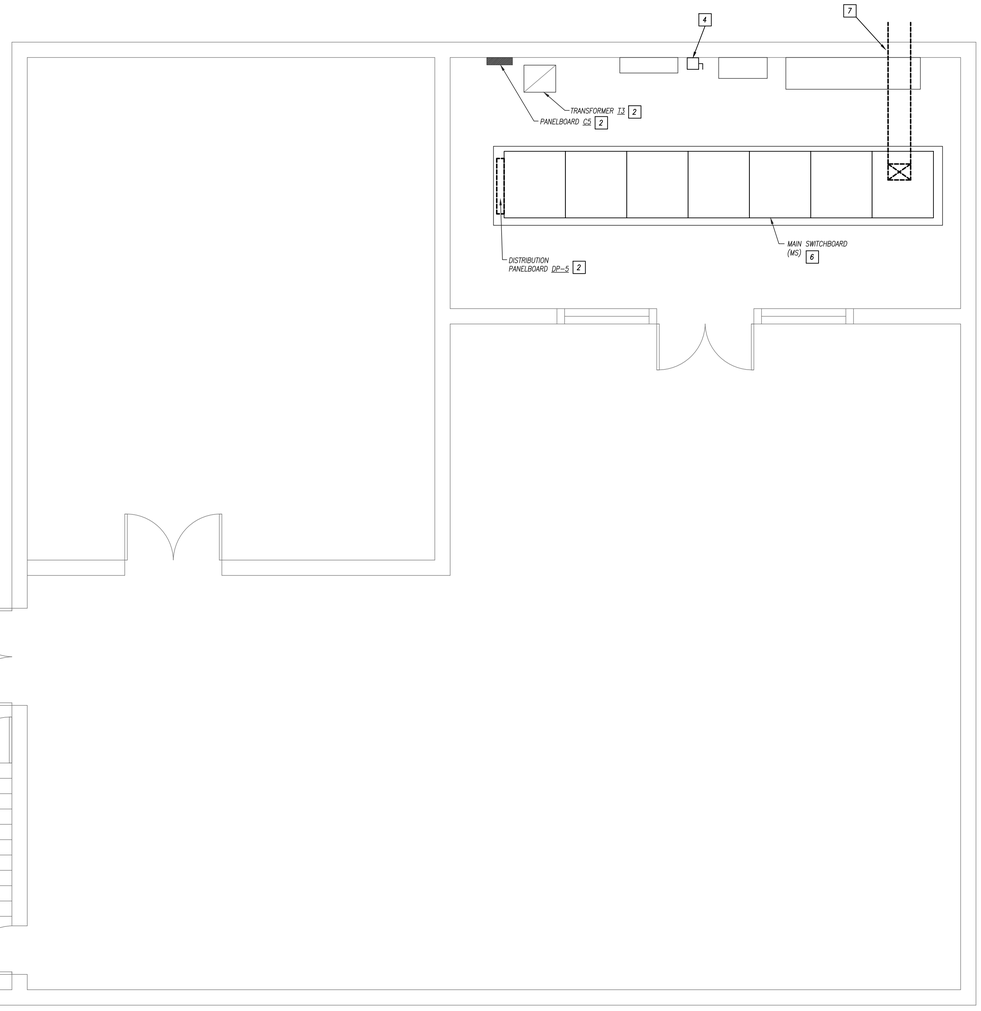
7 EXISTING BUS DUCT TO BE REMOVED. PROVIDE NEW FEEDERS FROM NEW EXTERIOR MAIN SWITCH TO NEW SWITCHBOARD.



2 **ENLARGED - EAST - PENTHOUSE**
1/4" = 1'-0"



1 **ENLARGED - NORTH - PENTHOUSE**
1/4" = 1'-0"



3 **ENLARGED - MECHANICAL ROOM-321b**
1/4" = 1'-0"

PEARSON KENT MCKINLEY RAAF ENGINEERS LLC
13300 W 98TH STREET LENEXA, KS 66215
913.492.2400 WWW.PKMRENG.COM

KCK SCHOOLS - HARMON HIGH SCHOOL ELECTRICAL UPGRADES

2400 STEELE ROAD
KANSAS CITY, KS

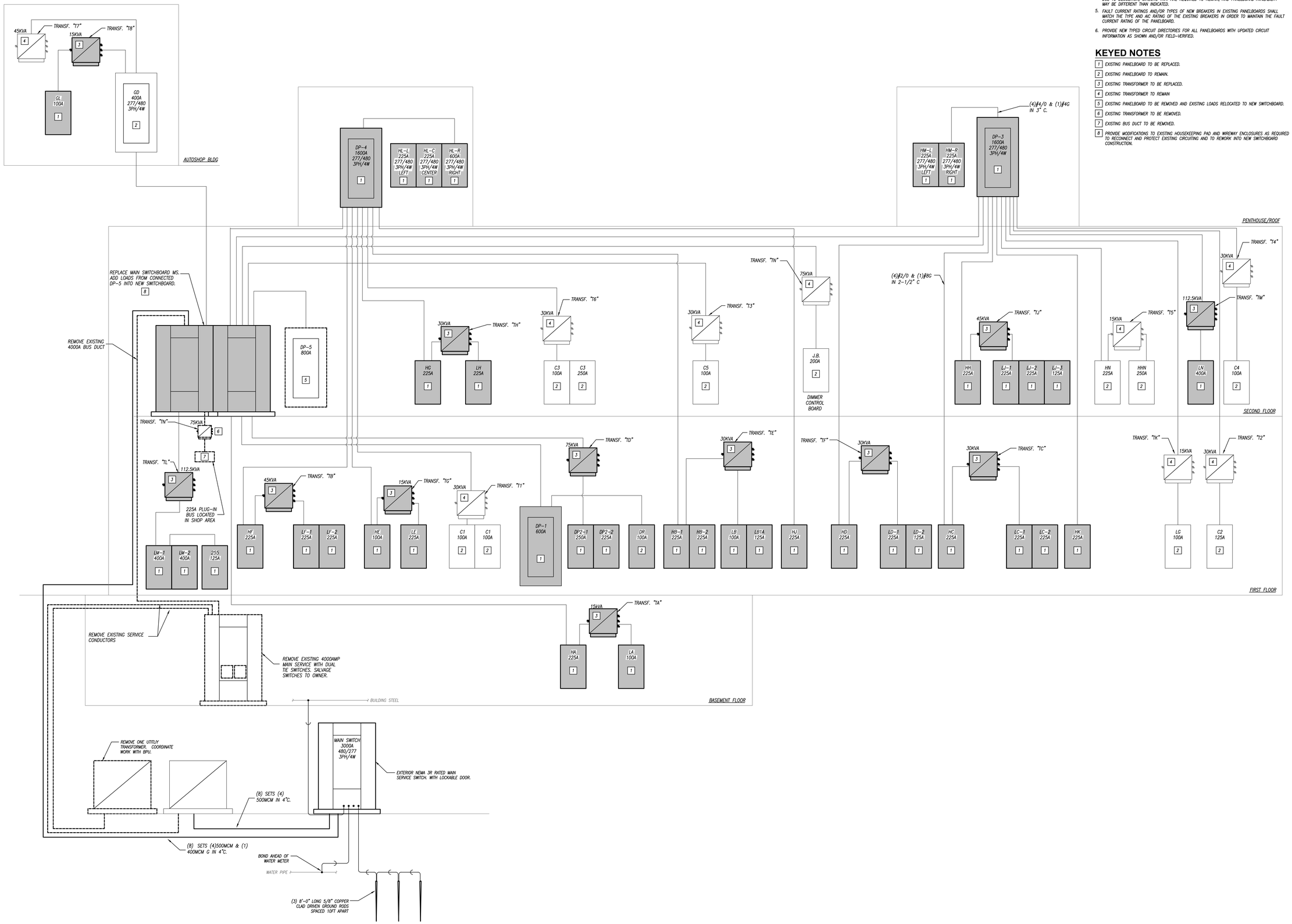
ISSUED FOR:	
DESCRIPTION	DATE
1	
2	
3	

DRAWN BY:	
CHECKED BY:	WK

SHEET TITLE:
ENLARGED PLANS ELECTRICAL

DATE:	PKMR PROJECT:
5/8/23	22.637

SHEET NUMBER:
E103



ELECTRICAL RISER DIAGRAM

EXISTING PANELBOARD WORK

1. ALL BREAKERS IN EXISTING PANELBOARDS ARE EXISTING TO REMAIN UNLESS INDICATED OTHERWISE ON THE PANELBOARD SCHEDULES.
2. EXISTING BREAKERS, CIRCUITS, AND LOADS ARE SHOWN LIGHT. NEW LOADS, BREAKERS, AND CIRCUITS ARE SHOWN DARK.
3. EXISTING LOAD VALUES ARE ASSUMED AND/OR BASED OFF EXISTING DRAWINGS.
4. AVAILABILITY OF CIRCUITS IN EXISTING PANELBOARDS IS BASED ON FIELD OBSERVATION AND EXISTING CIRCUIT DIRECTORIES. CONTRACTOR SHALL FIELD VERIFY ACTUAL CONDITIONS AND PROVIDE WORK ACCORDING TO INTENTION OF CONTRACT DOCUMENTS. ACTUAL CIRCUITS AVAILABLE DUE TO DEMOLITION, CIRCUITS THAT ARE REQUIRED TO REMAIN, AND PANELBOARD AVAILABILITY MAY BE DIFFERENT THAN INDICATED.
5. FAULT CURRENT RATINGS AND/OR TYPES OF NEW BREAKERS IN EXISTING PANELBOARDS SHALL MATCH THE TYPE AND AIC RATING OF THE EXISTING BREAKERS IN ORDER TO MAINTAIN THE FAULT CURRENT RATING OF THE PANELBOARD.
6. PROVIDE NEW TYPED CIRCUIT DIRECTORIES FOR ALL PANELBOARDS WITH UPDATED CIRCUIT INFORMATION AS SHOWN AND/OR FIELD-VERIFIED.

KEYED NOTES

1. EXISTING PANELBOARD TO BE REPLACED.
2. EXISTING PANELBOARD TO REMAIN.
3. EXISTING TRANSFORMER TO BE REPLACED.
4. EXISTING TRANSFORMER TO REMAIN
5. EXISTING PANELBOARD TO BE REMOVED AND EXISTING LOADS RELOCATED TO NEW SWITCHBOARD.
6. EXISTING TRANSFORMER TO BE REMOVED.
7. EXISTING BUS DUCT TO BE REMOVED.
8. PROVIDE MODIFICATIONS TO EXISTING HOUSEKEEPING PAD AND WIREWAY ENCLOSURES AS REQUIRED TO RECONNECT AND PROTECT EXISTING CIRCUITING AND TO REWORK INTO NEW SWITCHBOARD CONSTRUCTION.

WILLIAM M. KENT MCKINLEY
14924
KANSAS
PROFESSIONAL ENGINEER

pkmr ENGINEERS

PEARSON KENT MCKINLEY RAAF ENGINEERS LLC
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913.492.2400 WWW.PKMRENG.COM

KCK SCHOOLS - HARMON HIGH SCHOOL
ELECTRICAL UPGRADES

2400 STEELE ROAD
KANSAS CITY, KS

ISSUED FOR:

	DESCRIPTION	DATE
1		
2		
3		

DRAWN BY:	
CHECKED BY:	WK

SHEET TITLE: ELECTRICAL RISER

DATE: 5/8/23

PKMR PROJECT: 22.637

SHEET NUMBER: E200

EXISTING SWITCHBOARD SCHEDULE

PANEL DESIGNATION: **MS** | VOLTAGE: 480/277 | PHASE/WIRE: 3Ø, 4W | MOUNTING: SURFACE | LOCATION: 321B-MECHANICAL | MAIN BUS AMPS: 3000 | MAIN BREAKER AMPS: MLO | SCCR RATING (AIC): 65,000

SEC NO.	CIR NO.	CIRCUIT DESIGNATION	CIRCUIT BREAKER POLE	FRAME	TRIP
1	1	DISTRIBUTION PANEL DP-3	3	1600	1500
	2	DISTRIBUTION PANEL DP-4	3	1600	1500
	1	DISTRIBUTION PANEL DP-1	3	800	500
	2	SECONDARY MAIN BREAKER	3	3000	–
3	1	STEAM BOILER	3	400	300
	2	CHILLER #1	3	400	300
	3	CHILLER #2	3	400	300
	4	SPARE	3	400	–
	5	PANEL C5	3	100	50
4	1	NO. 8 DUCT HEATER GYM – WEST	3	400	300
	2	NO. 10 DUCT HEATER GYM – EAST	3	400	300
	3	HOT WATER STORAGE HEATER	3	400	225
	4	SOMAT	3	100	0
	5	AHU #4 – THEATER/MUSIC	3	100	0
	6	NEW AUTO SHOP	3	200	200
5	1	SPARE	3	200	125
	2	TRANSFORMER TN	3	200	110
	3	TRANSFORMER TL	3	200	150
	3	TRANSFORMER TD	3	200	110
	4	DIMMER CONTROL BOARD	3	200	100
	5	PANELBOARD HA	3	100	80
	6	KITCHEN AREA DUCT HEATER	3	100	80
6	1	DUCT HEATER	3	100	45
	2	COOLING TOWER FAN	3	60	45
	3	ARTS/CRAFTS	3	60	45
	4	AHU #6 – GYM – WEST	3	60	40
	5	SPARE	3	60	–
	6	DUCT HEATER #24 PE LOCKER ROOMS	3	60	60
	7	SPARE	3	60	–
	8	CHILLED WATER SUPPLY PUMP	3	30	30
	9	COOLING TOWER PUMP #1	3	30	15
	10	SPARE	3	30	–
	11	CLG MTD ELECTRIC HEATER- SHOP CENTER	3	30	12
	12	KITCHEN AREA DUCT HEATER	3	100	0
	13	SPARE	3	60	–
	14	ELECTRIC DUCT HEATER #4 MEZ LEVEL- NE	3	60	0
	15	AHU #7 – GYM – EAST	3	60	50
	16	DUCT HEATER #23 PE LCKR RMS	3	60	0
	17	SPARE	3	60	0
	18	CHILLED WATER SUPPLY PUMP	3	30	0
	19	CHILLED WATER SUPPLY PUMP	3	30	30
	20	COOLING TOWER PUMP #2	3	30	25
	21	TEMP CONTROL AIR COMP	3	30	20
	22	CLG MTD ELECTRIC HEATER RECEIVING	3	30	12
7	1	AHU #9 ART/MEZ LEVEL	3	30	20
	2	ELECTRIC DUCT HEATER #3	3	30	25
	3	GYM CHILLED WATER PUMP	3	30	0
	4	EXHAUST FAN #9 – KITCHEN EXH.	3	30	7
	5	EXHAUST FAN #11 – KITCHEN EXH.	3	30	5
	6	REFRIGERATION COMPRESSOR	3	30	7
	7	REFRIGERATION COMPRESSOR – WEST C	3	30	5
	8	ELEVATOR	3	30	25
	9	SPARE	3	30	–
	10	FIRE ALARM CONTROL PANEL	3	30	20
	11	TOWER HEAT CABLE CONTACTOR	3	30	–
	12	AHU #8 – SHOP AREA	3	30	20
	13	ELECTRIC DUCT HEATER #5 IND. ARTS	3	30	25
	14	CUSTODIAN PARKING LIGHT	1	30	7
	15	EXHAUST FAN #10 – KITCHEN EXH.	2	30	5
	16	FREEZER – EAST KITCHEN BAKERY FR2-EAST	3	30	12
	17	REFRIGERATOR KITCHEN	1	30	7
	18	REFRIGERATION COMPRESSOR – HALL FREEZ.	3	30	10
	19	SPARE	3	30	–
	20	SPARE	3	30	–
	21	EQUIP. RM. EXH. FAN	3	30	15
	22	IND. ARTS AIR COMPRESSION	3	30	15
FROM PANELBOARD DP-5 LOADS					
8	1	SPARE	3	70	
	2	DH-6	3	60	
	3	DH-1	3	50	
	4	AHU-12	3	30	
	5	SPARE	3	30	
	6	SPARE	1	20	
	7	SPARE	1	20	
	8	SPARE	1	20	
	9	SPARE	1	20	
	10	SPARE	1	20	
	11	SPARE	1	20	
	12	DH-12	3	600	
	13	DH-4	3	50	
	14	SPARE	3	50	
	15	AHU-9	3	30	
	16	SPARE	3	20	
	17	SPARE	1	20	
	18	SPARE	1	20	
	19	SPARE	1	20	
	20	SPARE	1	20	
	21	SPARE	1	20	
	21	–	–	–	–
FROM DISCONNECT SWITCH					
9	1	DISCONNECT SWITCH	1	400	–

PROPOSED SWITCHBOARD SCHEDULE

PANEL DESIGNATION: **MS** | VOLTAGE: 480/277 | PHASE/WIRE: 3Ø, 4W | MOUNTING: SURFACE | LOCATION: 321B-MECHANICAL | MAIN BUS AMPS: 3000 | MAIN BREAKER AMPS: MLO | SCCR RATING (AIC): 65,000

SEC NO.	CIR NO.	CIRCUIT DESIGNATION	CIRCUIT BREAKER POLE	FRAME	TRIP	NOTE
1	1	DISTRIBUTION PANEL DP-3	3	1600	1500	
	2	DISTRIBUTION PANEL DP-4	3	1600	1500	
	1	DISTRIBUTION PANEL DP-1	3	800	500	
	2	SECONDARY MAIN BREAKER	3	3000	–	
3	1	STEAM BOILER	3	400	300	
	2	CHILLER #1	3	400	300	
	3	CHILLER #2	3	400	300	
	4	PANEL C5	3	100	50	
4	1	NO. 8 DUCT HEATER GYM – WEST	3	400	300	
	2	NO. 10 DUCT HEATER GYM – EAST	3	400	300	
	3	HOT WATER STORAGE HEATER	3	400	225	
	4	SOMAT	3	100	–	A
	5	AHU #4 – THEATER/MUSIC	3	100	–	A
	6	NEW AUTO SHOP	3	200	200	
5	1	SPARE	3	200	125	
	2	TRANSFORMER TN	3	200	110	
	3	TRANSFORMER TL	3	200	150	
	3	TRANSFORMER TD	3	200	110	
	4	DIMMER CONTROL BOARD	3	200	100	
	5	PANELBOARD HA	3	100	80	
	6	KITCHEN AREA DUCT HEATER	3	100	80	
6	1	DUCT HEATER	3	100	45	
	2	COOLING TOWER FAN	3	60	45	
	3	ARTS/CRAFTS	3	60	45	
	4	AHU #6 – GYM – WEST	3	60	40	
	5	DUCT HEATER #24 PE LOCKER ROOMS	3	60	60	
	6	CHILLED WATER SUPPLY PUMP	3	30	30	
	7	COOLING TOWER PUMP #1	3	30	15	
	8	CLG MTD ELECTRIC HEATER- SHOP CENTER	3	30	15	
	9	KITCHEN AREA DUCT HEATER	3	100	–	A
	10	ELECTRIC DUCT HEATER #4 MEZ LEVEL- NE	3	60	–	A
	11	AHU #7 – GYM – EAST	3	60	50	
	12	DUCT HEATER #23 PE LCKR RMS	3	60	–	A
	13	SPARE	3	60	–	A
	14	CHILLED WATER SUPPLY PUMP	3	30	–	A
	15	CHILLED WATER SUPPLY PUMP	3	30	30	
	16	COOLING TOWER PUMP #2	3	30	25	
	17	TEMP CONTROL AIR COMP	3	30	20	
	18	CLG MTD ELECTRIC HEATER RECEIVING	3	30	15	
7	1	AHU #9 ART/MEZ LEVEL	3	30	20	
	2	ELECTRIC DUCT HEATER #3	3	30	25	
	3	GYM CHILLED WATER PUMP	3	30	–	A
	4	EXHUAST FAN #9 – KITCHEN EXH.	3	30	15	
	5	EXHAUST FAN #11 – KITCHEN EXH.	3	30	15	
	6	REFRIGERATION COMPRESSOR	3	30	15	
	7	REFRIGERATION COMPRESSOR – WEST C	3	30	15	
	8	ELEVATOR	3	30	25	
	9	FIRE ALARM CONTROL PANEL	3	30	20	
	10	TOWER HEAT CABLE CONTACTOR	3	30	–	
	11	AHU #8 – SHOP AREA	3	30	20	
	12	ELECTRIC DUCT HEATER #5 IND. ARTS	3	30	25	
	13	CUSTODIAN PARKING LIGHT	1	30	15	
	14	EXHAUST FAN #10 – KITCHEN EXH.	2	30	15	
	15	FREEZER – EAST KITCHEN BAKERY FR2-EAST	3	30	15	
	16	REFRIGERATOR KITCHEN	1	30	15	
	17	REFRIGERATION COMPRESSOR – HALL FREEZ.	3	30	15	
	18	EQUIP. RM. EXH. FAN	3	30	15	
	19	IND. ARTS AIR COMPRESSION	3	30	15	
FROM PANELBOARD DP-5 LOADS						
	1	DH-6	3	60		
	2	DH-1	3	50		
	3	AHU-12	3	30		
	4	DH-12	3	600		
	5	DH-4	3	50		
	6	SPARE	3	50		
	7	AHU-9	3	30		
	8	SPARE	3	60		
	9	SPARE	3	30		
	10	SPARE	3	20		
	11	SPARE	3	20		
	12	SPARE	3	20		
	13	SPARE	3	20		
FROM ADJACENT 400A DISCONNECT SWITCH						
9	1	DISCONNECT SWITCH	1	400	300	

REMARKS:
1. EATON POW-R-LINE PRLX SWITCHBOARD OR EQUAL.
2. PROVIDE PULL/CT SECTION, MAIN DEVICE SECTION, AND NO. OF DISTRIBUTION SECTIONS AS INDICATED ABOVE.
3. FURNISH WITH EXTERNAL SPD.
4. LOADS FROM PANELBOARD DP-5 WILL BE PUT IN NEW MAIN SWITCHBOARD AS PANELBOARD DP-5 WILL NO LONGER REMAIN.
5. EXISTING FUSE SIZES FIELD VERIFIED WHERE ACCESSIBLE. CONTRACTOR TO INVESTIGATE AND VERIFY ALL EXISTING

A FUSE BOXES INACCESSIBLE DURING INVESTIGATION. FUSE SIZES NEED TO BE FIELD VERIFIED.

DISTRIBUTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **DP-1** | VOLTAGE: 480/277 | PHASE/WIRE: 3Ø, 4W | MOUNTING: SURFACE | LOCATION: 246-KITCHEN | MAIN BUS AMPS: 600 | MAIN BREAKER AMPS: MLO | SCCR RATING (AIC): 35,000

CIRCUIT NO.	CIRCUIT DESIGNATION	CIRCUIT BREAKER POLE	TRIP
1	MIXER BAKERY	3	15
2	CONVECTION OVEN 1 BAKERY EAST	3	40
3	CONVECTION OVEN 2 BAKERY	3	40
4	CONVECTION OVEN 3 BAKERY	3	40
5	CONVECTION OVEN 4 BAKERY WEST	3	40
6	KITCHEN OVEN 1 WEST	3	20
7	CONVECTION OVEN 2 KITCHEN EAST	3	40
8	DEEP FRYER 2 KITCHEN	3	20
9	NEW OVEN N TOP	3	20
10	OVEN	3	20
11	NEW OVEN W BOTTOM	3	20
12	NEW SOUTH TOP	3	20
13	FRY PANL KITCHEN – TILT PAN	3	30
14	DISPOSER SOULLERY	3	15
15	DISPOSER KITCHEN	3	15
16	AHU #11	3	15
17	MIXER CUTTER KITCHEN	3	30
18	RINSE TANK HTR – SOULLERY (OVEN #6)	3	40
19	OVEN #6	3	20
20	OVEN #6	3	100
21	DISPOSER RM 201C	3	15
22	CONVEYOR DISHWASHER	3	15
23	AHU #10	3	15
24	SPACE	–	–

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.
2. SINGLE SECTION, 44" WIDE PANELBOARD.
3. FURNISH PANELBOARD WITH EXTERNAL SPD.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **DP2-1** | MOUNTING: SURFACE | LOCATION: 246-KITCHEN | MAIN LUG AMPS: 250 | MAIN BREAKER: 250 | SCCR RATING (AIC): 10,000 | VOLTAGE: 208/120 | PHASE/WIRE: 3Ø, 4W

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
246 E SERV. LINE HOT FOOD W.	40	3	1	2	3	40	246 W SERV. LINE HOT FOOD W.
–	–	–	3	4	–	–	–
–	–	–	5	6	–	–	–
246 W MIXER (60QT)	20	3	7	8	3	20	245 HALL FREEZER
–	–	–	9	10	–	–	–
–	–	–	11	12	–	–	–
246 KITCHEN DRYERS RECP	40	2	13	14	2	20	UNKNOWN CIRCUIT
–	–	–	15	16	–	–	–
246 W MIXER (80QT)	20	2	17	18	2	20	246 E SERV. LINE WARMING LTS
–	–	–	19	20	–	–	–
–	–	–	21	22	2	20	246 W SERV. LINE WARMING LTS
–	–	–	23	24	–	–	–
246 DETERGENT DISPENSER	20	1	25	26	2	20	UNKNOWN CIRCUIT
MOTORS RM	20	3	27	28	–	–	–
–	–	–	29	30	2	15	SPARE
–	–	–	31	32	–	–	–
SPARE	15	2	33	34	2	15	SPARE
–	–	–	35	36	–	–	–
SPARE	30	1	37	38	1	20	SPARE
246 W RECP	20	1	39	40	1	20	246A PAN WASHER
246 KITCHEN FRIDGE	20	1	41	42	1	20	SPARE
238 S RECP	20	1	43	44	1	20	246 KITCH. WASH. MACH. RECP
SPARE	20	1	45	46	–	–	–

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

EXISTING PANELBOARD WORK

1. ALL BREAKERS IN EXISTING PANELBOARDS ARE EXISTING TO REMAIN UNLESS INDICATED OTHERWISE ON THE PANELBOARD SCHEDULES.
2. EXISTING BREAKERS, CIRCUITS, AND LOADS ARE SHOWN LIGHT. NEW LOADS, BREAKERS, AND CIRCUITS ARE SHOWN DARK.
3. EXISTING LOAD VALUES ARE ASSUMED AND/OR BASED OFF EXISTING DRAWINGS.
4. AVAILABILITY OF CIRCUITS IN EXISTING PANELBOARDS IS BASED ON FIELD OBSERVATION AND EXISTING CIRCUIT DIRECTORIES. CONTRACTOR SHALL FIELD VERIFY ACTUAL CONDITIONS AND PROVIDE WORK ACCORDING TO INTENTION OF CONTRACT DOCUMENTS. ACTUAL CIRCUITS AVAILABLE DUE TO DEMOLITION, CIRCUITS THAT ARE REQUIRED TO REMAIN, AND PANELBOARD AVAILABILITY MAY BE DIFFERENT THAN INDICATED.
5. FAULT CURRENT RATINGS AND/OR TYPES OF NEW BREAKERS IN EXISTING PANELBOARDS SHALL MATCH THE TYPE AND AIC RATING OF THE EXISTING BREAKERS IN ORDER TO MAINTAIN THE FAULT CURRENT RATING OF THE PANELBOARD.
6. PROVIDE NEW TYPED CIRCUIT DIRECTORIES FOR ALL PANELBOARDS WITH UPDATED CIRCUIT INFORMATION AS SHOWN AND/OR FIELD-VERIFIED.

WILLIAM E. KENT LICENSED 14924 KANSAS PROFESSIONAL ENGINEER 5/8/23

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SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **DP2-2** | MOUNTING: SURFACE | LOCATION: 246-KITCHEN | MAIN LUG AMPS: 250 | MAIN BREAKER: MLO | SCCR RATING (AIC): 10,000 | VOLTAGE: 208/120 | PHASE/WIRE: 3Ø, 4W

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
246 TV RECP	20	1	1	2	1	20	238A N RECP
246 SERV. LINE E FROST TOP	20	1	3	4	1	15	SPARE
237 NE RECP/W FROST TOP	15	1	5	6	1	20	238A NW COUNTER TOP RECP
SPARE	15	1	7	8	1	15	246 S RECP & E RECP
246 E RECP	15	1	9	10	1	15	246 EAST HOOD LTS
246 W HOOD LTS	20	1	11	12	1	15	SPARE
246 E RECP	15	1	13	14	1	15	246 SERVICE LINE RECP
246 SERV. LINE COUNTER RECP	15	1	15	16	1	15	SPARE
246 W SINK&FLR RECP/246A EM	15	1	17	18	1	15	246 W RECP
246 E RECP	15	1	19	20	1	15	246 E RECP
246 E RECP	15	1	21	22	1	15	246 E RECP
246 SERV. LINE COUNTER RECP	15	1	23	24	1	15	246B W RECP & S RECP
246 SE MILK FRIDGE RECP	15	1	25	26	1	15	246 NW MILK FRIDGE RECP
246 SERV. LINE COUNTER RECP	15	1	27	28	1	15	246 PREP TABLE FLOOR RECP
238A MILK FRIDGE RECP	15	1	29	30	1	15	246 E PREP TABLE FLOOR RECP
238A NW&SW COUNT. TOP RECP	15	1	31	32	1	15	SPARE
238 E RECP/238A W RECP	15	1	33	34	1	15	SPARE
246 N PREP TABLE RECP	15	1	35	36	1	15	SPARE
246 FREEZER HEAT TAPE	15	1	37	38	1	15	245 HALL FREEZER LTS
SPARE	15	1	39	40	1	15	237 N RECP/238B COUNT. RECP
SPARE	15	1	41	42	1	15	SPARE

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

DISTRIBUTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **DP-3** | VOLTAGE: 480/277 | PHASE/WIRE: 3Ø, 4W | MOUNTING: SURFACE | LOCATION: PENTHOUSE-R | MAIN BUS AMPS: 1600 | MAIN BREAKER AMPS: MLO | SCCR RATING (AIC): 35,000

CIRCUIT NO.	CIRCUIT DESIGNATION	CIRCUIT BREAKER POLE	FRAME	TRIP
1	TRANS. TM	3	200	175
2	PANEL HH	3	200	150
3	SPARE	3	60	–
4	UNIT HTR	3	30	10
5	TRANS. TK	3	30	20
6	AHU #4	3	30	25
7	EXH. FAN 4	3	30	20
8	UNIT HTR	3	30	10
9	AHU #2	3	100	100
10	PANEL C4	3	60	50
11	PANEL C2	3	60	50
12	PANEL HD	3	200	150
13	PANEL HM	3	400	225
14	DUCT HTR 12 (AH-4)	3	200	125
15	PANEL HN	3	200	200
16	SPARE	3	200	–
17	PANEL HC	3	400	150
18	PANEL HK	3	400	225

REMARKS:
1. EATON POW-R-LINE PRLX SWITCHBOARD OR EQUAL.
2. FURNISH PANELBOARD WITH EXTERNAL SPD.

DISTRIBUTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **DP-4** | VOLTAGE: 480/277 | PHASE/WIRE: 3Ø, 4W | MOUNTING: SURFACE | LOCATION: PENTHOUSE-L | MAIN BUS AMPS: 1600 | MAIN BREAKER AMPS: MLO | SCCR RATING (AIC): 35,000

CIRCUIT NO.	CIRCUIT DESIGNATION	CIRCUIT BREAKER POLE	FRAME	TRIP
1	DUCT HTR #11	3	200	125
2	PANEL HG	3	200	175
3	SPARE	3	30	–
4	SPARE	3	30	–
5	AHU #3	3	400	30
6	UNIT HTR	2	200	15
7	PANEL C3	3	60	50
8	PANEL C1	3	60	50
9	EXH FAN 3- GIRLS & BOYS RESTROOM	3	30	10
10	UNIT HTR	3	30	10
11	SPARE	3	100	90
12	AHU #1	3	100	100
13	PANEL HF	3	200	150
14	PANEL HL	3	600	500
15	SPARE	3	200	–
16	PANEL HB	3	200	150
17	PANEL HE	3	200	100
18	PANEL HJ	3	400	225

REMARKS:
1. EATON POW-R-LINE PRLX SWITCHBOARD OR EQUAL.
2. FURNISH PANELBOARD WITH EXTERNAL SPD.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **255** | MOUNTING: SURFACE | LOCATION: 255-CLASSR. | MAIN LUG AMPS: 125 | MAIN BREAKER: MLO | SCCR RATING (AIC): 10,000 | VOLTAGE: 208/120 | PHASE/WIRE: 3Ø, 4W

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
–	20	1	13	14	1	20	258A N COUNTER TOP RECP
256 STAIR RECP/255 W RECP	20	1	15	16	1	20	258A S COUNTER TOP RECP
–	20	1	17	18	1	20	SPARE
SANDER	20	3	19	20	3	90	SPARE
–	–	–	21	22	–	–	SPARE
–	–	–	23	24	–	–	SPARE
SPARE	30	3	25	26	1	20	323 N 4 PLEX RECP
–	–	–	27	28	1	20	323 N RECP
–	–	–	29	30	1	20	SPARE
255 NW DRYER RECP	30	2	31	32	3	20	SPARE
–	–	–	33	34	–	–	–
255 NW RECP	20	1	35	36	–	–	–
255 NE RECP	20	1	37	38	–	–	–

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **GD** | MOUNTING: SURFACE | LOCATION: AUTOSHP BLDG | MAIN LUG AMPS: 400 | MAIN BREAKER: MLO | SCCR RATING (AIC): 10,000 | VOLTAGE: 480/277 | PHASE/WIRE: 3Ø, 4W

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
WEST CLASSROOM LTS	20	1	1	2	3	20	WATER HEATER
NORTH CLASSROOM LTS	20	1	3	4	–	–	–
NE SHOP LTS	20	1	5	6	–	–	–
SOUTH CLASSROOM LTS	20	1	7	8	3	100	RTU#2
KITCHEN/TEACHERS LOUNGE LTS	20	1	9	10	–	–	–
AIR CURTAIN	30	3	11	12	–	–	–
–	–	–	13	14	3	70	RTU#1
–	–	–	15	16	–	–	–
OUTDOOR EXTERIOR LTS	20	1	17	18	–	–	–
SPARE	20	1	19	20	3	70	XFMR PANEL "GL"
SPARE	20	1	21	22	–	–	–
SPARE	20	1	23	24	–	–	–

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **GL** | MOUNTING: SURFACE | LOCATION: AUTOSHP BLDG | MAIN LUG AMPS: 100 | MAIN BREAKER: 100 | SCCR RATING (AIC): 10,000 | VOLTAGE: 208/120 | PHASE/WIRE: 3Ø, 4W

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
SPARE	30	3	1	2	1	20	SPARE
–	30	–	3	4	1	20	SPARE
–	30	–	5	6	1	20	SPARE
NORTH CLASSRM RANGE RECP	30	2	7	8	1	20	NORTH CLASSROOM RECP
–	30	–	9	10	1	20	KITCHEN N. GFCI RECP
NORTH CLASSRM RANGE RECP	50	2	11	12	1	20	KITCHEN E. RECP
–	50	–	13	14	1	20	NORTH CLASSROOM E. RECP
SPARE	20	1	15	16	1	20	COMPUTER SERVER RECP
SPARE	20	1	17	18	1	20	SPARE
SPARE	20	1	19	20	1	20	NORTH COPY MACHINE RECP
NORTH CLASSRM RANGE RECP	40	2	21	22	1	20	SPARE
–	40	–	23	24	1	20	TEACHERS LOUNGE E. RECP
WEST & SOUTH LOUNGE RECP	20	1	25	26	1	20	NORTH CLASSROOM N. RECP
SPARE	20	1	27	28	1	20	WEST CLASSROOM N. RECP
SPARE	20	1	29	30	1	20	WEST CLASSROOM W. RECP
SPARE	20	1	31	32	1	20	WEST CLASSROOM W. RECP
SPARE	20	1	33	34	1	20	WEST CLASSROOM S. RECP
SPARE	20	1	35	36	1	20	SPARE
SPARE	20	1	37	38	1	20	SPARE
SPARE	20	1	39	40	1	20	HALLWAY RECP/WATER FTN RECP
SPARE	20	1	41	42	1	20	EXIT LTS

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HA** | MOUNTING: SURFACE | LOCATION: 108-CUST. | MAIN LUG AMPS: 225 | MAIN BREAKER: MLO | SCCR RATING (AIC): 10,000 | VOLTAGE: 480/277 | PHASE/WIRE: 3Ø, 4W

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
TRANSFORMER TA	30	3	1	2	3	30	101 EXH FAN #2
–	–	–	3	4	–	–	–
–	–	–	5	6	–	–	–
107I DUEL SUMP PUMP	20	3	7	8	3	20	101 EXH FAN #1
–	–	–	9	10	–	–	–
–	–	–	11	12	–	–	–
107C, 107D, 107 N LTS	20	1	13	14	1	20	107 S LTS
106 MIDDLE ROW LTS	20	1	15	16	1	20	106 E LTS
102 LTS	20	1	17	18	1	20	101 LTS
100, 104, 105 HALL LTS	20	1	19	20	1	20	106A & 106B LTS
HEATER RM	20	1	21	22	1	20	SPARE
SPARE	20	1	23	24	1	20	SPARE
108 FA BATTERY PACK #1	20	1	25	26	1	20	108 LTS/EM HALL LTS
SPARE	20	1	27	28	1	20	SPARE
SPARE	20	1	29	30	–	–	–

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HB-1** | MOUNTING: SURFACE | LOCATION: 230A-ELEC. | MAIN LUG AMPS: 225 | MAIN BREAKER: MLO | SCCR RATING (AIC): 22,000 | VOLTAGE: 480/277 | PHASE/WIRE: 3Ø, 4W

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
TRANSFORMER TE	40	3	1	2	3	20	DUCT HEATER
–	–	–	3	4	–	–	–
–	–	–	5	6	–	–	–
LTS: 224 S HALL	20	1	7	8	1	20	230A HTR DH#14
LTS: 224 W HALL	20	1	9	10	1	20	SPARE
LTS: 229 & 228 RESTROOM	20	1	11	12	1	20	230 ELECTRICAL RM LTS
DUCT HEATER	20	3	13	14	1	20	SPARE
–	–	–	15	16	1	20	SPARE
–	–	–	17	18	1	20	SPARE
SPARE	20	1	19	20	1	20	SPARE
SPARE	20	1	21	22	1	20	SPARE
SPARE	20	1	23	24	1	20	SPARE

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HB-2** | MOUNTING: SURFACE | LOCATION: 230A-ELEC. | MAIN LUG AMPS: 225 | MAIN BREAKER: MLO | SCCR RATING (AIC): 22,000 | VOLTAGE: 480/277 | PHASE/WIRE: 3Ø, 4W

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
SPARE	20	1	1	2	1	20	LTS: 235B
LTS: 225A	20	1	3	4	1	20	LTS: 233B
LTS; 225B	20	1	5	6	1	20	WINDOW HTR
LTS: 227A	20	1	7	8	1	20	LTS: 235A
LTS: 226A	20	1	9	10	1	20	LTS: 233A
LTS: 230A/230B	20	1	11	12	1	20	LTS: 234B
LTS: 227B	20	1	13	14	1	20	LTS: 232A
WINDOW HTR SE	20	1	15	16	1	20	WINDOW HTR SE
LTS: 225A	20	1	17	18	1	20	LTS: 234A
BAD BREAKER	20	1	19	20	1	20	LTS & REC: 200,201,223
219 WINDOW HTR	20	1	21	22	1	20	LTS & REC: 211,222
LTS: 230 (BACK ROW)	20	1	23	24	1	20	LTS: 233B

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HC** | MOUNTING: SURFACE | LOCATION: 273C-CUST. | MAIN LUG AMPS: 225 | MAIN BREAKER: MLO | SCCR RATING (AIC): 22,000 | VOLTAGE: 480/277 | PHASE/WIRE: 3Ø, 4W

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
TRANSFORMER TC	40	3	1	2	3	20	DUCT HTR
–	–	–	3	4	–	–	–
–	–	–	5	6	–	–	–
275A LTS	20	1	7	8	1	20	273B LTS
274B LTS	20	1	9	10	1	20	274A LTS
268A W LTS	20	1	11	12	1	20	271 & 272 BATHROOM LTS
WINDOW HTR	20	1	13	14	1	20	276A LTS
273C HTR	20	1	15	16	1	20	SPARE
286A E LTS	20	1	17	18	1	20	266 E WINDOW HTR
267A LTS	20	1	19	20	1	20	275B LTS
SPARE	20	1	21	22	1	20	NE WINDOW HTR
269A LTS	20	1	23	24	1	20	WINDOW HTR
267B LTS	20	1	25	26	1	20	273A N LTS
–	–	–	27	28	1	20	WINDOW HTR
269B LTS	20	1	29	30	1	20	SP
SPARE	20	1	31	32	1	20	276B LTS
273C LTS	20	1	33	34	1	20	268B N LTS
–	–	–	35	36	1	20	SPARE
DUCT HTR	20	3	37	38	1	20	266 HALL LTS
–	–	–	39	40	1	20	268B W LTS
–	–	–	41	42	–	–	–

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HD** | MOUNTING: SURFACE | LOCATION: JAN.-CAFE. | MAIN LUG AMPS: 225 | MAIN BREAKER: MLO | SCCR RATING (AIC): 22,000 | VOLTAGE: 480/277 | PHASE/WIRE: 3Ø, 4W

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
TRANSFORMER TF	50	3	1	2	3	20	265 BOOSTER FAN
–	–	–	3	4	–	–	–
–	–	–	5	6	–	–	–
–	–	–	7	8	3	20	261B BOOSTER FAN
SPARE	20	1	9	10	–	–	–
SPARE	20	1	11	12	–	–	–
SPARE	20	1	13	14	1	20	SPARE
SPARE	20	1	15	16	1	20	HTR CORRIDOR
SPARE	20	1	17	18	1	20	LTS: 265, 264, 261A
LTS: 261 GYM ROW 7	20	1	19	20	1	20	SPARE
LTS: 261 GYM ROW 4	20	1	21	22	1	20	LTS: 237 HIGH BAY
LTS: 261 GYM ROW 5	20	1	23	24	1	–	–
SPARE	20	1	25	26	1	20	SPARE
LTS: 261 GYM ROW 8	20	1	27	28	1	–	–
LTS: 261 GYM ROW 6	20	1	29	30	1	20	SPARE
LTS: 261 GYM ROW 3	20	1	31	32	1	–	–
SPARE	20	1	33	34	1	20	SPARE
LTS: 261 GYM EAST & WEST	20	1	35	36	1	–	–
LTS: 261 GYM ROW 2	20	1	37	38	1	20	LTS; 237 HIGH BAY
LTS: 261 GYM ROW 1	20	1	39	40	1	20	SPARE
SPACE	–	–	41	42	–	–	SPACE

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

KCK SCHOOLS - HARMON HIGH SCHOOL ELECTRICAL UPGRADES

2400 STEELE ROAD KANSAS CITY, KS

ISSUED FOR: DESCRIPTION	DATE
1	
2	
3	

DRAWN BY:
CHECKED BY: WK

SHEET TITLE: ELECTRICAL SCHEDULES

DATE: 5/8/23 | PKMR PROJECT: 22.637

SHEET NUMBER: E300

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HE**

MAIN LUG AMPS: 100
MAIN BREAKER: MLO
SCCR RATING (AIC): 10,000
VOLTAGE: 480/277
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: AUDITORIUM

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
LTS: 246A,B,C,D/239A,B,C,D	20	1	1	2	1	20	LTS: 236 UNDER MEZZ
LTS: 240 S	20	1	3	4	1	20	LTS: 239 N
LTS: 240 N	20	1	5	6	1	20	LTS: 239 S
240 REHEAT COIL	30	2	7	8	2	30	239 NE REHEAT COIL
–	–	–	9	10	–	–	–
240 REHEAT COIL	30	2	11	12	2	30	239 REHEAT COIL
–	–	–	13	14	–	–	–
SPARE	20	1	15	16	1	20	SPARE
SPARE	20	1	17	18	1	20	SPARE
SPARE	20	1	19	20	1	20	SPARE
SPARE	20	1	21	22	1	20	SPARE
SPARE	20	1	23	24	1	20	SPARE
236 TRANSFORMER TG	20	3	25	26	3	30	239 REHEAT COIL
–	–	–	27	28	–	–	–
–	–	–	29	30	–	–	–

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HF**

MAIN LUG AMPS: 225
MAIN BREAKER: MLO
SCCR RATING (AIC): 10,000
VOLTAGE: 480/277
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: 248A-STORAGE

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
TRANSFORMER TB	70	3	1	2	3	20	256 UNIT HTR
–	–	–	3	4	–		–
–	–	–	5	6	–	–	–
254 DOCK UNIT HTR	20	3	7	8	3	20	324 EXH FAN
–	–	–	9	10	–	–	–
–	–	–	11	12	–	–	–
LTS: 254 HALL/ 250	20	1	13	14	1	20	LTS: 246
LTS: 243, 244, 247, 249	20	1	15	16	1	20	LTS: 246A, 246C, 246B S. LINE
LTS: 258 S	20	1	17	18	1	20	LTS: 252/253
LTS: 258 N/ 255A/ 258A	20	1	19	20	1	20	HTR HALL
LTS: 324 N	20	1	21	22	1	20	LTS: 324 S
LTS: 242 W	20	1	23	24	1	20	LTS: 323
SPARE	20	1	25	26	1	20	SPARE
LTS: 242 E	20	1	27	28	1	20	LTS: 322/320
LTS: 257	20	1	29	30	1	20	SPARE
LTS: 259	20	1	31	32	1	20	SPARE
LTS: 255	20	1	33	34	1	20	SPARE
LTS: 321 N	20	1	35	36	1	20	SPARE
LTS: 321 B	20	1	37	38	3	30	254 DOCK UNIT HTR
LTS: 321 S	20	1	39	40	–	–	–
SPARE	20	1	41	42	–	–	–

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HG**

MAIN LUG AMPS: 250
MAIN BREAKER: MLO
SCCR RATING (AIC): 35,000
VOLTAGE: 480/277
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: 313-CUST.

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
TRANSFORMER TH	50	3	1	2	1	20	316A LTS
–	–	–	3	4	1	20	318B LTS
–	–	–	5	6	1	20	317A LTS
319A LTS	20	1	7	8	1	20	319B LTS
312A LTS/313 LTS	20	1	9	10	1	20	312B LTS
309A LTS	20	1	11	12	1	20	309B LTS
308B LTS	20	1	13	14	1	20	308A LTS
306A LTS	20	1	15	16	1	20	STARI HTR
317B LTS	20	1	17	18	1	20	310 & 311 RESTROOM LTS
WINDOW HTRS	20	1	19	20	1	20	314 LTS
318A LTS	20	1	21	22	1	20	306B LTS
304 LTS/302 LTS/303 LTS	20	1	23	24	1	20	SW EXIT HEATER
301 LTS	20	1	25	26	1	20	307 S LTS (TALL CEILING)
301 LTS	20	1	27	28	1	20	307 N LTS (LOW CEILING)
SPARE	20	1	29	30	1	20	307 N LTS (TALL CEILING)
316B LTS	20	1	31	32	1	20	SPARE
WINDOW HTR	20	1	33	34	1	20	SPARE
WINDOW HTR	20	1	35	36	1	20	SPARE
WINDOW HTR	20	1	37	38	1	20	SPARE
WINDOW HTR	20	1	39	40	1	20	SPARE
WINDOW HTR	20	1	41	42	1	20	SPARE

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HH**

MAIN LUG AMPS: 225
MAIN BREAKER: MLO
SCCR RATING (AIC): 35,000
VOLTAGE: 480/277
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: 332-CUST.

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
TRANSFORMER LJ	40	3	1	2	1	20	SCIENCE RM SPARE
–	–	–	3	4	1	20	329B LTS
–	–	–	5	6	1	20	329D OFFICE LTS/329C LTS
SCIENCE RM SPARE	20	1	7	8	1	20	HEATER CORRIDOR
329A LTS	20	1	9	10	1	20	SPARE
329 WINDOW HTRS	20	1	11	12	1	20	333 E ROW LTS
SPARE	20	1	13	14	1	20	SPARE
336A LTS/336B LTS	20	1	15	16	1	20	337B LTS
333 LTS/333A LTS	20	1	17	18	1	20	338B LTS
334 LTS/335 LTS/330 LTS	20	1	19	20	1	20	307A LTS (NORTH SIDE)
SPARE	20	1	21	22	1	20	307A LTS (SOUTH SIDE)
329 A SW CORNER LTS	20	1	23	24	1	20	307 E LTS
326 STORAGE LTS	20	1	25	26	1	20	327, 327A, 328 LTS
337A LTS	20	1	27	28	1	20	STAIR HEATER
338A LTS	20	1	29	30	1	20	WINDOW HTR
SPARE	20	1	31	32	1	20	SPARE
SPARE	20	1	33	34	1	20	SPARE
332 LTS	20	1	35	36	1	20	331 LTS
SPARE	20	1	37	38	1	20	SPARE
SPARE	20	1	39	40	1	20	SPARE
SPARE	20	1	41	42	1	20	SPARE

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

EXISTING PANELBOARD WORK

1. ALL BREAKERS IN EXISTING PANELBOARDS ARE EXISTING TO REMAIN UNLESS INDICATED OTHERWISE ON THE PANELBOARD SCHEDULES.
2. EXISTING BREAKERS, CIRCUITS, AND LOADS ARE SHOWN LIGHT. NEW LOADS, BREAKERS, AND CIRCUITS ARE SHOWN DARK.
3. EXISTING LOAD VALUES ARE ASSUMED AND/OR BASED OFF EXISTING DRAWINGS.
4. AVAILABILITY OF CIRCUITS IN EXISTING PANELBOARDS IS BASED ON FIELD OBSERVATION AND EXISTING CIRCUIT DIRECTORIES. CONTRACTOR SHALL FIELD VERIFY ACTUAL CONDITIONS AND PROVIDE WORK ACCORDING TO INTENTION OF CONTRACT DOCUMENTS. ACTUAL CIRCUITS AVAILABLE DUE TO DEMOLITION, CIRCUITS THAT ARE REQUIRED TO REMAIN, AND PANELBOARD AVAILABILITY MAY BE DIFFERENT THAN INDICATED.
5. FAULT CURRENT RATINGS AND/OR TYPES OF NEW BREAKERS IN EXISTING PANELBOARDS SHALL MATCH THE TYPE AND AIC RATING OF THE EXISTING BREAKERS IN ORDER TO MAINTAIN THE FAULT CURRENT RATING OF THE PANELBOARD.
6. PROVIDE NEW TYPED CIRCUIT DIRECTORIES FOR ALL PANELBOARDS WITH UPDATED CIRCUIT INFORMATION AS SHOWN AND/OR FIELD-VERIFIED.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HJ**

MAIN LUG AMPS: 225
MAIN BREAKER: MLO
SCCR RATING (AIC): 35,000
VOLTAGE: 480/277
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: 230A-ELEC.

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
232A HTR	30	2	1	2	2	30	232B HTR
–	–	–	3	4	–	–	–
233A HTR	30	2	5	6	2	30	233B HTR
–	–	–	7	8	–	–	–
SPARE	30	2	9	10	2	30	234A HTR
–	–	–	11	12	–	–	–
235B HTR	30	2	13	14	2	30	235A HTR
–	–	–	15	16	–	–	–
SPARE	30	2	17	18	2	30	231 N. HALL HTR
–	–	–	19	20	–	–	–
230A HTR	30	2	21	22	2	30	230A HTR / 230B HTR
–	–	–	23	24	–	–	–
227A HTR	30	2	25	26	2	30	227B HTR
–	–	–	27	28	–	–	–
226B HTR	30	2	29	30	2	30	226A HTR
–	–	–	31	32	–	–	–
225B HTR	30	2	33	34	2	20	225A HTR
–	–	–	35	36	–	–	–
234B HTR	30	2	37	38	1	20	SPARE
–	20	1	39	40	1	20	SPARE
SPARE	20	1	41	42	1	20	SPARE

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HK**

MAIN LUG AMPS: 225
MAIN BREAKER: MLO
SCCR RATING (AIC): 35,000
VOLTAGE: 480/277
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: 273C-CUST.

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
273A REHEAT COIL	30	2	1	2	2	30	276A REHEAT COIL
–	–	–	3	4	–	–	–
273B REHEAT COIL	30	2	5	6	2	30	274A REHEAT COIL
–	–	–	7	8	–	–	–
274B REHEAT COIL	30	2	9	10	2	30	275A REHEAT COIL
–	–	–	11	12	–	–	–
275B REHEAT COIL	30	2	13	14	2	30	268A REHEAT COIL
–	–	–	15	16	–	–	–
276B REHEAT COIL	30	2	17	18	2	30	269A REHEAT COIL
–	–	–	19	20	–	–	–
269B REHEAT COIL	30	2	21	22	2	30	268B REHEAT COIL
–	–	–	23	24	–	–	–
268B REHEAT COIL	30	2	25	26	2	30	267 REHEAT COIL
–	–	–	27	28	–	–	–
268A REHEAT COIL	30	2	29	30	2	30	266 E HALL REHEAT COIL
–	–	–	31	32	–	–	–
267A VAV BOX	30	2	33	34	2	20	STAIRS #4 REHEAT COIL
–	–	–	35	36	–	–	–
SPARE	20	1	37	38	1	20	SPARE
SPARE	20	1	39	40	1	20	SPARE
SPARE	20	1	41	42	1	20	SPARE

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HL-C**

MAIN LUG AMPS: 225
MAIN BREAKER: MLO
SCCR RATING (AIC): 10,000
VOLTAGE: 480/277
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: PENTHOUSE-L

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
REHEAT COIL RM 310A VAV BOX	30	2	1	2	2	30	REHEAT COIL RM 310B
–	–	–	3	4	–	–	–
REHEAT COIL RM 309B	30	2	5	6	2	30	REHEAT COIL STAIR #1
–	–	–	7	8	–	–	–
REHEAT COIL RM 308A	30	2	9	10	2	30	REHEAT COIL 308B
–	–	–	11	12	–	–	–
REHEAT COIL RM 307A	30	2	13	14	2	30	REHEAT COIL 303B
–	–	–	15	16	–	–	–
REHEAT COIL RM 302B	30	2	17	18	2	30	REHEAT COIL 302A
–	–	–	19	20	–	–	–
REHEAT COIL ENT #139	30	2	21	22	2	30	REHEAT COIL RM 307B
–	–	–	23	24	–	–	–
REHEAT COIL RM 305A	30	2	25	26	2	30	REHEAT COIL 303A
–	–	–	27	28	–	–	–
REHEAT COIL RM 304B	30	2	29	30	2	30	REHEAT COIL 309A
–	–	–	31	32	–	–	–
SPACE	–	–	33	34	2	30	REHEAT COIL 304A
SPACE	–	–	35	36	–	–	–

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.
2. PROVIDE FEED THRU LUGS FOR ADJACENT PANEL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HL-L**

MAIN LUG AMPS: 225
MAIN BREAKER: MLO
SCCR RATING (AIC): 10,000
VOLTAGE: 480/277
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: PENTHOUSE-L

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
REHEAT COIL RM 202A STAGE(E)	30	2	1	2	3	40	SPARE
–	–	–	3	4	–	–	–
REHEAT COIL RM 202A STAGE(W)	30	2	5	6	–	–	–
–	–	–	7	8	3	30	DUCT HTR #16 RM 320A
REHEAT COIL RM 202A STAGE	30	2	9	10	–	–	–
–	–	–	11	12	–	–	–
REHEAT COIL RM 202A STAGE	30	2	13	14	3	30	DUCT HTR #18 RM 320C
–	–	–	15	16	–	–	–
REHEAT COIL RM 202A STAGE	30	2	17	18	–	–	–
–	–	–	19	20	3	30	DUCT HTR #17 RM 320A
REHEAT COIL RM 202A STAGE	30	2	21	22	–	–	–
–	–	–	23	24	–	–	–
REHEAT COIL RM 202A STAGE	30	2	25	26	3	30	DUCT HTR #15 RM 320C
–	–	–	27	28	–	–	–
REHEAT COIL RM 202A STAGE	30	2	29	30	–	–	–
–	–	–	31	32	3	30	EXH FAN NEW
REHEAT COIL RM 202A STAGE	20	2	33	34	–	–	–
–	–	–	35	36	–	–	–

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.
2. PROVIDE FEED THRU LUGS FOR ADJACENT PANEL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HL-R**

MAIN LUG AMPS: 600
MAIN BREAKER: MLO
SCCR RATING (AIC): 10,000
VOLTAGE: 480/277
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: PENTHOUSE-L

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
DUCT HTR #19 RM 306A	20	3	1	2	3	20	SPARE
–	–	–	3	4	–	–	–
–	–	–	5	6	–	–	–
LTS-PENTHOUSE	20	1	7	8	2	20	REHEAT COIL PENTHOUSE
REHEAT COIL STAIR #3 RM 202B	20	2	9	10	–	–	–
–	–	–	11	12	1	20	SPARE
SPARE	20	1	13	14	1	20	SPARE
REHEAT COIL RM 305B	20	1	15	16	1	20	SPARE
–	–	–	17	18	1	20	SPARE
SPARE	20	1	19	20	1	20	SPARE
SPARE	20	1	21	22	1	20	SPARE

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HM-L**

MAIN LUG AMPS: 225
MAIN BREAKER: MLO
SCCR RATING (AIC): 10,000
VOLTAGE: 480/277
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: PENTHOUSE-R

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
SPACE	–	–	1	2	–	–	SPACE
SPACE	–	–	3	4	–	–	SPACE
SPACE	–	–	5	6	–	–	SPACE
SPACE	–	–	7	8	–	–	SPACE
SPACE	–	–	9	10	–	–	SPACE
SPACE	–	–	11	12	3	30	EXHAUST FAN
LTS PENTHOUSE VANDAL LITE	20	1	13	14	–	–	–
SPARE	20	1	15	16	–	–	–
REHEAT COIL STAIR #2	20	2	17	18	2	20	REHEAT COIL RM 318D-F
–	–	–	19	20	–	–	–
REHEAT COIL RM 312B,313B	30	2	21	22	2	30	REHEAT COIL RM 312A, 313A
–	–	–	23	24	–	–	–
REHEAT COIL 413A,311B	30	2	25	26	2	30	REHEAT COIL RM 314A, 311A
–	–	–	27	28	–	–	–
REHEAT COIL RM 313A,312B	30	2	29	30	2	30	REHEAT COIL RM 314A VAV BOX
–	–	–	31	32	–	–	–
REHEAT COIL RM 313A,312A	30	2	33	34	2	40	REHEAT COIL ROOM 318A
–	–	–	35	36	–	–	–

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **HM-R**

MAIN LUG AMPS: 225
MAIN BREAKER: MLO
SCCR RATING (AIC): 10,000
VOLTAGE: 480/277
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: PENTHOUSE-R

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
DUCT HTR #20 RM 316	30	3	1	2	2	40	REHEAT COIL ENT 108 2ND FLOOR
–	–	–	3	4	–	–	–
–	–	–	5	6	2	30	REHEAT COIL RM 318B
REHEAT COIL RM 313B	30	2	7	8	–	–	–
–	–	–	9	10	2	30	REHEAT COIL RM 317B
REHEAT COIL RM 314B	30	2	11	12	–	–	–
–	–	–	13	14	2	30	REHEAT COIL RM 317A VAV BOX
REHEAT COIL RM 317A-B-C	30	2	15	16	–	–	–
–	–	–	17	18	2	30	REHEAT COIL PENTHOUSE
REHEAT COIL RM 317D-F	20	2	19	20	–	–	–
	–	–	21	22	1	20	SPARE
SPARE	20	1	23	24	1	20	SPARE
SPARE	20	1	25	26	–	–	SPACE

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.
2. PROVIDE FEED THRU LUGS FOR ADJACENT PANEL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LA**

MAIN LUG AMPS: 100
MAIN BREAKER: MLO
SCCR RATING (AIC): 10,000
VOLTAGE: 208/120
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: 108-CUST.

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
107A SHOWER LTS/108 LTS	40	3	1	2	1	20	107G SW SHOWER LTS
107E LTS	–	–	3	4	1	20	107H RECP
106C NE LTS	–	–	5	6	1	20	107H, 101I, 107G NE LTS
106C NW LTS	20	1	7	8	1	20	101,105 REC/SUMPRECP/EXT LT
105 N HALL RECP	20	1	9	10	1	20	SPARE
106 RECP/106B RECP	20	1	11	12	1	20	107&107D&E/106 S RECP
102 RECP/107A RECP	20	1	13	14	1	20	101 SUMP PUMP
107I SUMP PUMP ALARM	20	1	15	16	1	20	108 FIRE ALARM PANEL
SPARE	20	1	17	18	1	20	SPARE
SPARE	20	1	19	20	1	20	SPARE

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LB**

MAIN LUG AMPS: 100
MAIN BREAKER: 100
SCCR RATING (AIC): 22,000
VOLTAGE: 208/120
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: 230A-ELEC.

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
REC: 230 W	20	1	1	2	1	–	–
UNKNOWN CIRCUIT	20	1	3	4	1	20	LTS: COMMONS ENTRY CAN
LTS: 231 HALL NW EM/EXIT	20	1	5	6	1	20	REC: 232A,B N/233A,B S
UNKNOWN CIRCUIT	20	1	7	8	1	20	REC: 233B N/255A,B S
REC: 227A,B S/226A N	20	1	9	10	1	20	REC: 234 N/235A,B
REC: 226A,B S/225A,B	20	1	11	12	1	20	REC: 232A,B S
MAIN BREAKER LB-1A	70	3	13	14	1	20	REC: 233B,234B,235A W
–	–	–	15	16	1	20	REC: 231W/234A N
–	–	–	17	18	1	20	REC: 281 N
REC: 231 GIRLS WATER FTN	20	1	19	20	1	20	SPARE
REC: 231 BOYS WATER FTN	20	1	21	22	1	20	REC: 230B N
REC: 230 NW	20	1	23	24	1	20	REC: 230 NE/225A/227A/226A E
–	20	1	25	26	1	20	REC: 227B W/226B W/225B W
–	20	1	27	28	1	20	REC: 227B N,E
REC: 230 SW	20	1	29	30	1	20	REC: 230 W

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.
2. PROVIDE FEED THRU LUGS FOR ADJACENT PANEL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LB1A**

MAIN LUG AMPS: 125
MAIN BREAKER: MLO
SCCR RATING (AIC): 22,000
VOLTAGE: 208/120
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: 230A-ELEC.

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
REC: 230 SE/227A N	20	1	1	2	1	20	REC: 230B W/230 E
REC: 230B S	20	1	3	4	1	20	REC: 230B W/FA PANEL/230 E
REC: 227A E	20	1	5	6	1	20	REC: 230B E
REC: 230B NE	20	1	7	8	1	20	SPARE
SPARE	20	1	9	10	1	20	SPARE
SPARE	20	1	11	12	1	20	SPARE

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LC-1**

MAIN LUG AMPS: 225
MAIN BREAKER: 100
SCCR RATING (AIC): 10,000
VOLTAGE: 208/120
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: 273C-CUST.

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
271 RECP	20	1	1	2	–	–	–
275A N RECP	20	1	3	4	1	20	237 S STAIR CAN LTS
MAGDOOR LCKS/273A&274A RECP	20	1	5	6	1	20	273B E & S RECP
273A W RECP	20	1	7	8	1	20	274B SW COUNTERTOP RECP
274B NE RECP	20	1	9	10	1	20	274B SE COUNTER TOP RECP
274A W RECP/275A E RECP	20	1	11	12	1	20	274 N FLOOR DUCT
274B N RECP	20	1	13	14	1	20	274 FLOOR DUCT
274B N RECP	20	1	15	16	1	20	274 S FLOOR DUCT
274B CEILING J-BOX	20	1	17	18	1	20	273A FLOOR DUCT
275A FLOOR DUCT	20	1	19	20	1	20	273A FLOOR DUCT
SPARE	20	1	21	22	1	20	273A FLOOR DUCT
SPARE	20	1	23	24	1	20	273A FLOOR DUCT
237 S HALL RECP	20	1	25	26	–	–	–
272 RECP	20	1	27	28	–	–	–

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.
2. PROVIDE FEED THRU LUGS FOR ADJACENT PANEL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LC-2**

MAIN LUG AMPS: 225
MAIN BREAKER: MLO
SCCR RATING (AIC): 10,000
VOLTAGE: 208/120
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: 273C-CUST.

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
275A FLOOR DUCT	20	1	1	2	1	20	270 GIRLS WATER FTN RECP
269A&B N RECP/W RECP	20	1	3	4	1	20	270 BOYS WATER FTN RECP
269A E RECP	20	1	5	6	1	20	SPARE
267A N RECP	20	1	7	8	1	20	LIFT STATION ALARM
267A W RECP	20	1	9	10	1	20	276A FLOOR DUCT
267C RECP/267B E RECP	20	1	11	12	1	20	276A FLOOR DUCT
267B SW RECP	20	1	13	14	1	20	276A FLOOR DUCT
SPARE	20	1	15	16	1	20	276A FLOOR DUCT
275B FLOOR DUCT	20	1	17	18	1	20	269B FRIDGE RECP
275A FLOOR DUCT	20	1	19	20	1	20	269B E COUNTER TOP RECP
275A FLOOR DUCT	20	1	21	22	1	20	SPARE
269B WASHER RECP	20	1	23	24	1	20	273C PANEL RECP
269B DRYER RECP	30	2	25	26	2	50	269B STOVE RECP

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LD-1**

MAIN LUG AMPS: 225
MAIN BREAKER: MLO
SCCR RATING (AIC): 10,000
VOLTAGE: 208/120
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: JAN.-CAFE.

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
REC: 237 E COLUMN	20	1	1	2	1	20	261 W RECP/237 SE RECP/EMLTS
REC: 237 N COLUMN	20	1	3	4	1	20	REC: 260 S/261A
–	20	1	5	6	1	20	REC: 261 E GYM
REC: 237 W WATER FTN	20	1	7	8	1	20	REC: 260 WATER FTN
REC: 261 N FLOOR GYM	20	1	9	10	1	20	5&6 STAIR & RECP
REC: 266 S HALL	20	1	11	12	1	20	UNKNOWN CIRCUIT
REC: 366 E HALL	20	1	13	14	1	–	–
–	20	1	15	16	1	–	–
–	20	1	17	18	1	–	–
–	20	1	19	20	1	20	UNKNOWN CIRCUIT
–	20	1	21	22	1	–	–
LTS: 260 HALL	20	1	23	24	1	–	–
LTS: 237 N LOWER HANGING	20	1	25	26	1	–	–
LTS: 237 E LOWER HANGING	20	1	27	28	1	–	–
LTS: 241 HALL	20	1	29	30	1	30	REC: 265 E

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.
2. PROVIDE FEED THRU LUGS FOR ADJACENT PANEL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LD-2**

MAIN LUG AMPS: 125
MAIN BREAKER: MLO
SCCR RATING (AIC): 10,000
VOLTAGE: 208/120
PHASE/WIRE: 3Ø, 4W
MOUNTING: RECESSED
LOCATION: JAN.-CAFE.

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
SPARE	20	3	1	2	3	20	SPARE
SPARE	–	–	3	4	–	–	SPARE
SPARE	–	–	5	6	–	–	SPARE
AHU #6 & #7 LTS/FILTER	20	1	7	8	1	20	LTS: 237 STEP RAMP
AHU #6 & #7 SMOKE DETECTOR	20	1	9	10	1	20	261 W SCORE BOARD
REC: 265 NW	20	1	11	12	1	20	261 E SCORE BOARD
LTS: 237 N TROPHY CASE	20	1	13	14	1	20	REC: 265 SW
265 LANN NETWORK SYSTEM	20	1	15	16	1	20	REC: 265 SW
261 N BLEACHER MOTOR	40	1	17	18	1	20	UPS
–	30	1	19	20	1	40	261 S BLEACHER MOTOR
SPARE	30	1	21	22	1	30	UNKNOWN CIRCUIT
SPACE	–	1	23	24	1	–	SPACE
SPACE	–	1	25	26	1	–	SPACE
SPACE	–	1	27	28	1	–	SPACE
SPACE	–	1	29	30	1	–	SPACE

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LE**

MAIN LUG AMPS: 100
MAIN BREAKER: 50
SCCR RATING (AIC): 10,000
VOLTAGE: 208/120
PHASE/WIRE: 3Ø, 4W
MOUNTING: SURFACE
LOCATION: AUDITORIUM

DESCRIPTION	C/B TRIP	C/B POLE	CIRCUIT #	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
LTS/REC: 236A&236B/236 W	20	1	1	2	1	20	REC: 240B & 240C
REC: 240W/S	20	1	3	4	1	20	REC: 240A/241 N HALL
REC: 236 NE/EM/240	20	1	5	6	1	20	REC: 239 E/239B,C,D/241 S
SPARE	20	1	7	8	1	20	REC: STAGE FACE
SPARE	20	1	9	10	1	20	REC: 236 W
REC: 239 N/S	20	1	11	12	1	20	LTS/REC: 236N/236B
REC: 236 SE/239 SE	20	1	13	14	1	20	REC: 236 SOUND BOOTH
SPARE	20	1	15	16	1	20	REC: 236 SOUND BOOTH
LTS/REC: 236 & SW MAINT.	20	1	17	18	1	20	SPARE
SPARE	20	1	19	20	1	20	SPARE
SPARE	20	1	21	22	1	20	SPARE
SPARE	20	1	23	24	1	20	SPARE

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

WILLIAM ... LICENSED 14924 KANSAS PROFESSIONAL ENGINEER 5/8/23

PEARSON KENT MCKINLEY RAAF ENGINEERS LLC
13300 W 98TH STREET LENEXA, KS 66215
913.492.2400 WWW.PKMRENG.COM

KCK SCHOOLS - HARMON HIGH SCHOOL ELECTRICAL UPGRADES

2400 STEELE ROAD
KANSAS CITY, KS

ISSUED FOR:

	DESCRIPTION	DATE
1		
2		
3		

DRAWN BY:
CHECKED BY: WK

SHEET TITLE: ELECTRICAL SCHEDULES

DATE: 5/8/23
PKMR PROJECT: 22.637

SHEET NUMBER: E301

EXISTING PANELBOARD WORK

1. *ALL BREAKERS IN EXISTING PANELBOARDS ARE EXISTING TO REMAIN UNLESS INDICATED OTHERWISE ON THE PANELBOARD SCHEDULES.*
2. *EXISTING BREAKERS, CIRCUITS, AND LOADS ARE SHOWN LIGHT. NEW LOADS, BREAKERS, AND CIRCUITS ARE SHOWN DARK.*
3. *EXISTING LOAD VALUES ARE ASSUMED AND/OR BASED OFF EXISTING DRAWINGS.*
4. *AVAILABILITY OF CIRCUITS IN EXISTING PANELBOARDS IS BASED ON FIELD OBSERVATION AND EXISTING CIRCUIT DIRECTORIES. CONTRACTOR SHALL FIELD VERIFY ACTUAL CONDITIONS AND PROVIDE WORK ACCORDING TO INTENTION OF CONTRACT DOCUMENTS. ACTUAL CIRCUITS AVAILABLE DUE TO DEMOLITION, CIRCUITS THAT ARE REQUIRED TO REMAIN, AND PANELBOARD AVAILABILITY MAY BE DIFFERENT THAN INDICATED.*
5. *FAULT CURRENT RATINGS AND/OR TYPES OF NEW BREAKERS IN EXISTING PANELBOARDS SHALL MATCH THE TYPE AND AIC RATING OF THE EXISTING BREAKERS IN ORDER TO MAINTAIN THE FAULT CURRENT RATING OF THE PANELBOARD.*
6. *PROVIDE NEW TYPED CIRCUIT DIRECTORIES FOR ALL PANELBOARDS WITH UPDATED CIRCUIT INFORMATION AS SHOWN AND/OR FIELD-VERIFIED.*

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LF-1**
MOUNTING: *SURFACE*
LOCATION: *248A–STORAGE*
MAIN LUG AMPS: *225*
MAIN BREAKER: *MLO*
SCCR RATING (AIC): *10,000*
VOLTAGE: *208/120*
PHASE/WIRE: *3Ø, 4W*

C/B TRIP	C/B POLE	DESCRIPTION	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
20	*1*	*REC: 243 SE*	1 2	*1*	*20*	*REC: 246B N*
20	*1*	*REC: 254 S/252 N*	3 4	*1*	*20*	*–*
20	*1*	*REC: 254 E*	5 6	*1*	*20*	*REC: 320 N*
20	*1*	*REC: 258A WINDOW COLUMN*	7 8	*1*	*20*	*LTS: 242 W TRACK*
20	*1*	*REC: 249/247/244/243/241*	9 10	*1*	*20*	*LTS: 242 E TRACK/CEILING FAN*
20	*1*	*REC: 242 S*	11 12	*1*	*20*	*REC: 324 S/324 W*
20	*1*	*REC: 342 W & E*	13 14	*1*	*20*	*REC: 324A N*
20	*1*	*REC: 324 E*	15 16	*1*	*20*	*LTS: 324A/EXH FAN*
20	*1*	*REC: 324 W/322 S&E*	17 18	*1*	*20*	*REC: 242 NE*
20	*1*	*REC: 242 E*	19 20	*1*	*20*	*REC: 242 N*
20	*1*	*REC: 242 N*	21 22	*1*	*20*	*REC: 242 N*
20	*1*	*REC: 242 N*	23 24	*1*	*20*	*REC: 242 N*
20	*1*	*REC: 242 S*	25 26	*1*	*20*	*REC: 242 N*
20	*1*	*REC: 242W*	27 28	*1*	*20*	*REC: 242 N*
20	*1*	*321 N CTRL PNL 321A GFCI*	29 30	*1*	*20*	*REC: 242 S/ 242A E CEILING*
20	*1*	*REC: 320 NW/N*	31 32	*1*	*20*	*REC: 242A W CEILING*
20	*1*	*REC: 242A S*	33 34	*1*	*20*	*REC: 242 S*
20	*1*	*REC: 242A W*	35 36	*1*	*20*	*REC: 324 SE*
20	*1*	*REC: 242A S*	37 38	*1*	*20*	*–*
20	*1*	*321 N&S/321 S&E TEMP. PNL*	39 40	*1*	*20*	*REC: 321 E*
20	*1*	*REC: 321NE/321B N*	41 42	*1*	*20*	*TCP/SM. DET./COOL. TWR MOTOR*

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.
2. PROVIDE FEED THRU LUGS FOR ADJACENT PANEL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LF-2**
MOUNTING: *SURFACE*
LOCATION: *248A–STORAGE*
MAIN LUG AMPS: *225*
MAIN BREAKER: *MLO*
SCCR RATING (AIC): *10,000*
VOLTAGE: *208/120*
PHASE/WIRE: *3Ø, 4W*

C/B TRIP	C/B POLE	DESCRIPTION	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
20	*1*	*EXH FAN #8*	1 2	*1*	*20*	*246A DISH MACHINE EXH FAN*
20	*1*	*321 FAN COIL EQUIP RM*	3 4	*1*	*20*	*321 E EMLT & REC/WTR SOFT*
20	*1*	*TEMP. CONTROL #1*	5 6	*1*	*20*	*321 HOT WTR CIRC PUMP/EQRM*
20	*1*	*AIR HANDLER*	7 8	*1*	*20*	*TIME CLOCK*
20	*1*	*UNKNOWN CIRCUIT*	9 10	*1*	*20*	*UNKNOWN CIRCUIT*
20	*1*	*UNKNOWN CIRCUIT*	11 12	*1*	*20*	*TEMP. CONTROL #2*
20	*1*	*REC: 245 HALL*	13 14	*1*	*20*	*SPARE*
20	*1*	*UNKNOWN CIRCUIT*	15 16	*1*	*20*	*REC: 245 HALL*
20	*1*	*REC: 246 N*	17 18	*1*	*20*	*REC: 246 N*
20	*1*	*REC: 246 N*	19 20	*1*	*20*	*REC: 246 N*
20	*1*	*LTS: AHU #5*	21 22	*1*	*20*	*SPARE*
20	*1*	*REC: AHU#5/SMOKE DETECTOR*	23 24	*1*	*–*	*–*
20	*1*	*REC: 321B S*	25 26	*1*	*20*	*SPARE*
20	*1*	*SPARE*	27 28	*1*	*20*	*SPARE*
20	*1*	*SPARE*	29 30	*1*	*20*	*SPARE*
20	*1*	*SPARE*	31 32	*2*	*60*	*242A KILN*
30	*1*	*SPARE*	33 34	*–*	*60*	*–*
–	*1*	*SPACE*	35 36	*2*	*60*	*242A KILN*
–	*1*	*SPACE*	37 38	*–*	*60*	*–*
–	*1*	*SPACE*	39 40	*1*	*20*	*SPARE*
–	*1*	*SPACE*	41 42	*1*	*–*	*SPACE*

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LH**
MOUNTING: *SURFACE*
LOCATION: *313–CUST.*
MAIN LUG AMPS: *225*
MAIN BREAKER: *100*
SCCR RATING (AIC): *10,000*
VOLTAGE: *208/120*
PHASE/WIRE: *3Ø, 4W*

C/B TRIP	C/B POLE	DESCRIPTION	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
20	*1*	*INTERLOCK REHEAT COIL*	1 2	*1*	*20*	*SPARE*
20	*1*	*313 COMPUTER SERVER*	3 4	*1*	*20*	*SPARE*
20	*1*	*FILTER MOTORS*	5 6	*1*	*20*	*SPARE*
20	*1*	*SPARE*	7 8	*1*	*20*	*SPARE*
20	*1*	*SPARE*	9 10	*1*	*20*	*310&311 BATHROOM RECP*
20	*1*	*300 HALL LTS*	11 12	*1*	*20*	*307 LIBRARY COMP RECP*
20	*1*	*317B W RECP/316A&B S RECP*	13 14	*1*	*20*	*309B W/312A&B N & W RECP*
20	*1*	*315 N WATER FTN RECP*	15 16	*1*	*20*	*306A S/306B S & W RECP*
20	*1*	*SPARE*	17 18	*1*	*20*	*317A&B S/316A&B N RECP*
20	*1*	*SPARE*	19 20	*1*	*20*	*SPARE*
20	*1*	*SPARE*	21 22	*1*	*20*	*319A&B S/318A E/316A E RECP*
20	*1*	*SPARE*	23 24	*1*	*20*	*SPARE*
20	*1*	*308A N RECP/309A S RECP*	25 26	*1*	*20*	*305 BOYS WATER FTN RECP*
20	*1*	*309A N RECP*	27 28	*1*	*20*	*SPARE*
20	*1*	*309B S (LEFT)/309B E RECP*	29 30	*1*	*20*	*307 N RECP (EAST)/307 E RECP*
20	*1*	*318A&B S/317A&B N/315 RECPS*	31 32	*1*	*15*	*STAIR#3 CAN LTS/314 E RECP*
20	*1*	*309B S/309B N/312B S RECPS*	33 34	*1*	*20*	*SPARE*
20	*1*	*EXH FAN FACILITY RESTROOMS*	35 36	*1*	*20*	*EAR PHONE RACK*
–	*1*	*EAR PHONE RACK*	37 38	*1*	*20*	*307 N RECP (WEST)*
20	*1*	*313 PANEL RECP*	39 40	*1*	*20*	*307 N RECP (MIDDLE)*
20	*1*	*319A&B N/319B,318B W RECP*	41 42	*1*	*20*	*305 GIRLS WTR FTN/314 RECP*

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LJ-1**
MOUNTING: *SURFACE*
LOCATION: *332–CUST.*
MAIN LUG AMPS: *225*
MAIN BREAKER: *150*
SCCR RATING (AIC): *10,000*
VOLTAGE: *208/120*
PHASE/WIRE: *3Ø, 4W*

C/B TRIP	C/B POLE	DESCRIPTION	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
20	*1*	*LTS CORRIDOR N*	1 2	*1*	*20*	*315 COMP OUTLET*
20	*1*	*LTS CORRIDOR N*	3 4	*1*	*20*	*315 COMP OUTLET*
20	*1*	*EXH FAN 317*	5 6	*1*	*20*	*STAIR #2 LTS & CORRIDOR*
20	*1*	*317 RECP*	7 8	*1*	*20*	*LTS CORRIDOR*
20	*1*	*GOGGLE CAB 327*	9 10	*1*	*20*	*S WALL GFIS 328*
20	*1*	*N GFIS 327*	11 12	*1*	*20*	*S WALL GFIS 328*
20	*1*	*N GFIS 327*	13 14	*1*	*20*	*SPARE*
20	*1*	*REFRIGERATOR 327A*	15 16	*1*	*20*	*SPARE*
20	*1*	*S WALL OUTLET 327*	17 18	*1*	*20*	*S WALL GFIS 328*
20	*1*	*N WALL OUTLET 328*	19 20	*1*	*20*	*S WALL GFIS 327*
20	*1*	*PLGMLD 317A&B*	21 22	*1*	*20*	*N WALL GFIS 328*
20	*1*	*PLGMLD 317*	23 24	*1*	*20*	*N WALL GFIS 328*
20	*1*	*PLGMLD 317*	25 26	*1*	*20*	*PLGMLD 317*
20	*1*	*PLGMLD 317*	27 28	*1*	*20*	*PLGMLD 317*
20	*1*	*S WALL GFIS 327*	29 30	*1*	*20*	*LAB CON UNITS 314 A&B*

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.
2. PROVIDE FEED THRU LUGS FOR ADJACENT PANEL.
3. THIS PANEL MAY BE COMBINED INTO (2) 42 CIRCUIT PANELS.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LJ-2**
MOUNTING: *SURFACE*
LOCATION: *332–CUST.*
MAIN LUG AMPS: *225*
MAIN BREAKER: *MLO*
SCCR RATING (AIC): *10,000*
VOLTAGE: *208/120*
PHASE/WIRE: *3Ø, 4W*

C/B TRIP	C/B POLE	DESCRIPTION	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
20	*1*	*PLGMLD. RM 318A&318C*	1 2	*1*	*20*	*LTS UNDERCOUNT. RM 318A&C*
20	*1*	*RECP WORK TABLES RM 313A*	3 4	*1*	*20*	*PLGMLD. RM 311B & 321B*
20	*1*	*RECP WORK TABLES RM 313A*	5 6	*1*	*20*	*PLGMLD. RM 311A*
20	*1*	*RECP WORK TABLES RM 314A*	7 8	*1*	*20*	*LTS UNDRCNT. RM 317ABCE*
20	*1*	*RECP RM 313A&314A*	9 10	*1*	*20*	*LTS UNDRCNT. RM 311B&312B*
20	*1*	*RECP RM 313A&314A*	11 12	*1*	*20*	*LTS & RECP RM 320CLIBRARY*
20	*1*	*DRINKING FTN CORR. 208–GIRL*	13 14	*1*	*20*	*LTS UNDERCOUNT. 311A–312B*
20	*1*	*DRINKING FTN CORR. 208NORTH*	15 16	*1*	*20*	*RECP RM 311B–312A–312B HALL*
20	*1*	*DRINKING FTN CORR. 208–BOY*	17 18	*1*	*20*	*PLGMLD. RM 312B*
20	*1*	*RECP RM 313C &315C*	19 20	*1*	*20*	*PLGMLD. RM 311A & 311B*
20	*1*	*RECP. 311A–316B–301A–EMLT*	21 22	*1*	*20*	*RECP. PENTHOUSE*
20	*1*	*MASTER CLOCK RM 320A*	23 24	*1*	*20*	*FILTER MOTORS AHU #2&4*
20	*1*	*RECP RM 320 LIB REF DESK*	25 26	*1*	*20*	*INTRICK ON RHT COILS AHU #2*
20	*1*	*TEACH. TABLE 208 & 313A*	27 28	*1*	*20*	*RANGE RM 317E–318E*
20	*1*	*TEACH. TABLE 208 & RM 313A*	29 30	*1*	*20*	*RANGE RM 317E–318E*

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.
2. PROVIDE FEED THRU LUGS FOR ADJACENT PANEL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LJ-3**
MOUNTING: *SURFACE*
LOCATION: *332–CUST.*
MAIN LUG AMPS: *225*
MAIN BREAKER: *MLO*
SCCR RATING (AIC): *10,000*
VOLTAGE: *208/120*
PHASE/WIRE: *3Ø, 4W*

C/B TRIP	C/B POLE	DESCRIPTION	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
SPARE	*20*	*1*	1 2	*1*	*20*	*SPARE*
SPARE	*20*	*1*	3 4	*1*	*20*	*333B FUME HOOD & RECP*
SPARE	*20*	*1*	5 6	*1*	*20*	*333A FUME HOOD & RECP*
336B N RECP	*20*	*1*	7 8	*1*	*20*	*332 IDF CAB.*
336A S RECP	*20*	*1*	9 10	*1*	*15*	*FIRE ALARM*
331 HALL LTS	*20*	*1*	11 12	*2*	*20*	*GAS VALVE*
–	*–*	*–*	13 14	*–*	*20*	*SPARE*

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LM-1**
MOUNTING: *SURFACE*
LOCATION: *ART ROOM HALL*
MAIN LUG AMPS: *400*
MAIN BREAKER: *400*
SCCR RATING (AIC): *10,000*
VOLTAGE: *208/120*
PHASE/WIRE: *3Ø, 4W*

C/B TRIP	C/B POLE	DESCRIPTION	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
SPARE	*60*	*3*	1 2	*3*	*30*	*SPARE*
–	*–*	*–*	3 4	*–*	*–*	*–*
–	*–*	*–*	5 6	*–*	*–*	*–*
SPARE	*50*	*3*	7 8	*3*	*20*	*SPARE*
–	*–*	*–*	9 10	*–*	*–*	*–*
–	*–*	*–*	11 12	*–*	*–*	*–*
SPARE	*20*	*3*	13 14	*3*	*70*	*PANEL 255*
–	*–*	*–*	15 16	*–*	*–*	*–*
–	*–*	*–*	17 18	*–*	*–*	*–*
REC: 259 SE	*20*	*3*	19 20	*–*	*–*	*–*
–	*–*	*–*	21 22	*–*	*–*	*–*
–	*–*	*–*	23 24	*–*	*–*	*–*
REC: 259 NE	*20*	*3*	25 26	*–*	*–*	*–*
–	*–*	*–*	27 28	*–*	*–*	*–*
–	*–*	*–*	29 30	*–*	*–*	*–*
EXH FAN	*20*	*1*	31 32	*–*	*–*	*–*
SPARE	*20*	*1*	33 34	*2*	*20*	*REC: 324 E*
SPACE	*–*	*–*	35 36	*–*	*–*	*–*

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.
2. PROVIDE FEED THRU LUGS FOR ADJACENT PANEL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LM-2**
MOUNTING: *SURFACE*
LOCATION: *ART ROOM HALL*
MAIN LUG AMPS: *400*
MAIN BREAKER: *MLO*
SCCR RATING (AIC): *10,000*
VOLTAGE: *208/120*
PHASE/WIRE: *3Ø, 4W*

C/B TRIP	C/B POLE	DESCRIPTION	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
SPARE	*20*	*3*	1 2	*–*	*–*	*–*
–	*–*	*–*	3 4	*–*	*–*	*–*
–	*–*	*–*	5 6	*–*	*–*	*–*
SPARE	*20*	*3*	7 8	*–*	*–*	*–*
–	*–*	*–*	9 10	*–*	*–*	*–*
–	*–*	*–*	11 12	*–*	*–*	*–*
–	*–*	*–*	13 14	*3*	*20*	*3D PRINTER*
–	*–*	*–*	15 16	*–*	*–*	*–*
–	*–*	*–*	17 18	*–*	*–*	*–*
REC: 259 W	*20*	*1*	19 20	*2*	*50*	*SPARE*
REC: 256/257 N	*20*	*1*	21 22	*–*	*50*	*–*
SPARE	*30*	*2*	23 24	*1*	*20*	*REC: 258 N*
–	*30*	*–*	25 26	*3*	*30*	*SPARE*
SPARE	*20*	*1*	27 28	*–*	*–*	*–*
REC: 256 CEILING	*20*	*1*	29 30	*–*	*–*	*–*
REC: 259 S WALL/257 E	*20*	*1*	31 32	*1*	*20*	*REC: 255 W/255 N*
SPARE	*20*	*1*	33 34	*1*	*20*	*REC: 258 E WALL*
REC: 255A/251	*20*	*1*	35 36	*1*	*20*	*SPARE*
REC: 255A/251	*20*	*1*	37 38	*1*	*20*	*REC: 262/263A*
REC: 257 E WALL	*20*	*1*	39 40	*2*	*30*	*SPARE*
REC: 259 E WALL	*20*	*1*	41 42	*–*	*30*	*–*

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

SINGLE-SECTION PANELBOARD SCHEDULE

PANEL DESIGNATION: **LN**
MOUNTING: *SURFACE*
LOCATION: *268A–CLASSR.*
MAIN LUG AMPS: *400*
MAIN BREAKER: *400*
SCCR RATING (AIC): *10,000*
VOLTAGE: *208/120*
PHASE/WIRE: *3Ø, 4W*

C/B TRIP	C/B POLE	DESCRIPTION	CIRCUIT #	C/B POLE	C/B TRIP	DESCRIPTION
60	*2*	*268 RANGE RECP*	1 2	*1*	*20*	*SPARE*
–	*–*	*–*	3 4	*1*	*20*	*268B NE COUNTER RECP*
20	*1*	*258A W SINK RECP*	5 6	*1*	*20*	*268C REHAB RECP & LTS*
20	*1*	*268A&B W COUNTER TOP RECP*	7 8	*1*	*20*	*268A N UNDERCOUNTER LTS (E)*
20	*1*	*268A S WASHER RECP*	9 10	*1*	*20*	*268A N UNDERCOUNTER LTS (W)*
20	*1*	*–*	11 12	*1*	*20*	*SPARE*
20	*1*	*–*	13 14	*1*	*20*	*SPARE*
20	*1*	*268B DIVIDER WALL RECP*	15 16	*1*	*20*	*268A S/268A S FLR RECP*
20	*1*	*–*	17 18	*1*	*20*	*SPARE*
20	*1*	*–*	19 20	*1*	*20*	*SPARE*
20	*1*	*268B NW COUNTER TOP RECP*	21 22	*1*	*20*	*268A N SINK RECP #1 (LEFT)*
20	*1*	*–*	23 24	*1*	*20*	*268A N SINK RECP #2 (MIDDLE)*
20	*1*	*268B NE COUNTER TOP RECP*	25 26	*1*	*20*	*268A N SINK RECP #3 (RIGHT)*
50	*2*	*268B NE DRYER RECP*	27 28	*2*	*40*	*268A S DRYER RECP*
–	*–*	*–*	29 30	*–*	*–*	*–*
50	*2*	*–*	31 32	*2*	*50*	*SPARE*
–	*–*	*–*	33 34	*–*	*–*	*SPARE*
50	*2*	*SPARE*	35 36	*2*	*50*	*268A N DRYER RECP*
–	*–*	*SPARE*	37 38	*–*	*–*	*–*
50	*2*	*268 NE DRYER RECP*	39 40	*2*	*40*	*SPARE*
–	*–*	*–*	41 42	*–*	*–*	*–*

REMARKS:
1. EATON POW-R-LINE 4X PANELBOARD OR EQUAL.

PEARSON KENT MCKINLEY RAAF ENGINEERS LLC
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KANSAS CITY, KS

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SHEET TITLE:
ELECTRICAL SCHEDULES

DATE: **5/8/23**
PKMR PROJECT: **22.637**

SHEET NUMBER:
E302