SECTION 000101 - PROJECT TITLE PAGE

MONTGOMERY COUNTY PUBLIC SCHOOLS

ELEVATOR MODERNIZATION FOR

ALBERT EINSTEIN HIGH SCHOOL

11135 NEWPORT MILL ROAD

KENSINGTON, MD 20895

PROJECT #: 24-078.00

PERMIT/ BID SET ISSUE

MARCH 12, 2025

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SECTION 011000 - SUMMARY

PART 1 GENERAL

1.01 SUMMARY

A. Unless otherwise noted, Contractor shall provide and pay for labor, materials, equipment, tools, construction machinery, transportation, and other facilities and services necessary for proper execution and completion of Work required by Contract Documents.

B. Work of Contract can be summarized by reference to Contract, General Conditions, specification sections as listed in "Table of Contents" bound herewith, drawings as listed in "Schedule of Drawings" bound herewith, addenda and modifications to Contract Documents issued subsequent to initial printing of project specifications and including but not necessarily limited to printed matter referenced by any of these. It is recognized that Work of Contract may be affected or influenced by governing regulations, natural phenomenon including weather conditions, and other forces outside Contract Documents. General contractor will be responsible for supervising and coordinating work that has to be performed by Contractor or Subcontractors.

C. General Contractor shall include all costs to perform and document inspections, observations, surveys, and measurements required to prepare complete and accurate As-Built Plans, provide required certifications, and obtain approval thereof from Montgomery County Department of Permitting Services in its bid.

D. This project includes removal and replacement of elevator components to modernize one existing hydraulic elevator installations at Albert Einstein High School. Furnish all labor, materials, equipment, and services necessary for and incidental to the elevator modernization scope of work described in spec section 142410 including selective demolition of existing elevator components, general building components, and replacement as further specified herein. All work shall be bid as lump sum as indicated on the drawings and specifications. Work shall be coordinated with the Owner and completed in the time frame dictated by the Owner. Work is further described as follow:

1. Site Summary: The existing site is home to Albert Einstein High School. The building will remain operational during construction of this project and will continue to operate in the same capacity after this project is complete. There is no sitework included in this project.

2. The Owner will be occupying the entire existing school building, following a normal school schedule for the 2024-2025 school year. All work of this project is to be complete prior to the start of the 2025-2026 school year. It is imperative that the Contractor understand the access, operational, safety and utility requirements of the Owner during the occupied periods. All work located on the interior and exterior of the building, and/or affecting occupied areas shall be completed at no disturbance to students or MCPS staff and teachers. Work at the existing building shall be completed during non-school hours – primarily over summer vacation, or as directed by the Owner. All utility outages shall be coordinated with the Owner and occur during unoccupied periods.

3. During the construction period, all deliveries and construction traffic must be coordinated with school activities and use.

4. New Work: is indicated on the contract documents and includes architectural, mechanical, plumbing and electrical work.
    a. Architectural work includes, but is not limited to, replacement of select elevator components, machine room equipment, doors and frames, and select new finish systems. Some work is required to modify the existing built-up asphalt roofing and metal deck for installation of a new rooftop split system HVAC unit. All roofing work

must be performed by an MCPS approved roofing contractor and approved by the roofing system manufacturer in order to maintain the existing roof warranty.

MCPS Approved Roofing Contractors Tier System

Updated 2/26/2025

Tier 1	**Contractor has successfully demonstrated the ability to complete all types of roofs, with no restriction in size or dollar limit. The contractor is eligible to bid on ALL MCPS' roofing projects.**
Tier 2	**Contractor will be limited to roofs of 100 squares (+-) BUR and single ply until they demonstrate they have the manpower, equipment and the means to successfully complete them in the time allotted and to MCPS roofing standards. After successful completion of two or three roofing projects, the contractor will be re-evaluated to see if they qualify to be classified as a TIER 1 Roofing Contractor where they will be granted all rights as a TIER 1 Roofing Contractor.**

Contractor	Street Address	Contact Person	Email Addresses	Tier Level	Phone Number	Fax Number
CitiRoof Corporation	9510 Berger Road Columbia, MD 21046	H. Lee Goldhammer	rodney@citiroof.com sales@citiroof.com	1	410-381-3100	410-381-8835
Cole Roofing Co., Inc.	3915 Coolidge Avenue Baltimore, MD 21229	Billy Cole	Dennis@coleroofing.com Billy@coleroofing.com mailbox@coleroofing.com	1	410-242-0600	410-242-8007
Function Enterprises, Inc.	7954 Cameron Brown Court Springfield, VA 22153	Ryland T. Gray	ryland@function.net	1	703-569-2422	703-569-9661
HRGM Corporation	1807 Martin Luther King Jr. Avenue, SE Washington, DC 20020	Rachna Butani Bhatt	rachna@hrgm.com	1	202-889-8400	
Interstate Corporation	8040 Queenair Drive Gaithersburg, MD 20879	Perry Cho	perry@icroof.com	1	301-738-7111	301-762-7355
Kalkreuth Roofing & Sheet Metal, Inc.	5726 Industry Lane Frederick, MD 21704	Andrew Vanlandingham Betsy Longo	avanlandingham@krsm.net blongo@krsm.net	1	301-418-6100	301-695-0884
Orndorff & Spaid, Inc	11722 Old Baltimore Pike Beltsville, MD 20705	Dave Porterfield	mitchs@osroofing.com estimating@osroofing.com davep@osroofing.com John@osroofing.com	1	301-937-5911	301-937-0310
R. D. Bean, Inc	5105-13 Powder Mill Road Beltsville, MD 20705	Rick Drew	rick@rdbean.com info@rdbean.com	1	301-937-0260	301-937-0958
Rayco Roof Service, Inc.	6870 Wellington Road Manassas, VA 20109	Raymond Conley	jim.wright@raycoroofservice.com marlene.iseman@raycoroofservice.com	1	703-335-5110	703-631-2274
Tecta America	5220 Pennington Ave. Baltimore, MD 21226	S Coyne	Scoyne@tectaamerica.com ablackmon@tectaamerica.com scobahey@tectaamerica.com	1	410-319-0300	410-467-2439
Vatica Contracting, Inc. (Approved 11-29-10)	4350 Kenilworth Avenue Hyattsville, MD 20781	S Kim	SKim@vaticainc.com kpsaromatis@vaticainc.com	1	301-927-8530	301-927-8760
North East Contracting	7220 Lockport Place Lorton, VA 22079	Devon Robey	devon@northeastcontracting.com	2	571-969-0467	
Chu Contracting Inc.	14020 Thunderbolt Pl., Ste 300 Chantilly, VA 20151	Jason Yu	it-admin@chucontracting.com	2	703-378-8190	703 378-8191
Ruff Roofing and Sheet Metal Inc.	1420 Knecht Ave. Baltimore, MD 21227	Timothy Ruff	info@ruffroofers.com	2	410-242-2400	410-247-7171
Alliance Exterior Construction	4215 Eastern Ave. Baltimore, MD 21224	Kassandra Bowling	kassandrab@allianceexterior.com	2	410-483-7470	
IronShore Contracting LLC Approved Date May2024	1000 Haverhill Road Baltimore, MD 21229	Antonio Cornish	ebaires@ironshoregrp.com	2	443-552-5232	

b. Select mechanical and electrical systems are provided, including HVAC and ventilation systems, lighting and lighting controls, sprinkler systems, fire alarm, and telecommunications systems.

1.02 WORK BY OWNER OF SEPARATE CONTRACTOR

A. Not applicable.

1.03 HOUSEKEEPING

A. Fire protection during construction

1. Provide and maintain hand fire extinguishers suitable for fire hazard involved at convenient accessible locations during construction.
   a. Provide each storage location with at least one approved portable fire extinguisher having a rating of not less than 20 - B: C.
   b. Place portable extinguishers rated not less than 2A so that maximum travel distance to the nearest exit shall not exceed 100 feet.

2. Avoid accumulation of flammable debris and waste within the building and vicinity. Avoid large and unnecessary accumulations of combustible forms and form lumber. Keep lumber stacked in an orderly manner.

3. Store flammable or volatile liquids in the open or in small, detached structures or trailers. Handle liquids with low flash points to be used within the building in approved safety cans. Supervise closely the storage of paint materials and other combustible finishing and cleaning products. Do not permit oily rags to be stored in closets or other tight permanent spaces.

4. Prohibit smoking on school property.

5. Closely supervise welding and torch cutting operations near combustible materials.

6. Supervise locations and operation of temporary portable heating units and fuel.

7. Use only fire-resistant building paper, plastic sheet, and tarpaulins for temporary protection.

8. Do not store combustible material outdoors within 10 feet of a building or structure.

9. Do not use gasoline for cleaning within the building under any circumstances.

10. Take other precautions suitable for hazardous conditions at the site to prevent fire.

B. Burning

1. Do not burn any trash or other material on site.

C. Clean Up

1. The contractor is responsible for cleanup of the adjacent rooms and areas used for next day’s normal school activities that occur inside and outside the construction containment spaces. All cleaning is to be provided by a professional cleaning services contractor. Owner's only acceptable standard is “White Glove Clean.”

2. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period. Provide wall to wall protection in contiguous areas and/or as directed by Owner.

1.04 SALVAGE RIGHTS

A. The contractor shall coordinate with the Owner on the disposal of salvageable items. The Owner has first rights to all salvageable materials. In order to avoid Owner induced delays, a duration limit of up to 5-7 working days for Owner's reclamation of salvage items shall apply unless written extension is submitted.

B. All items not claimed by the Owner for salvage shall become the responsibility of the Contractor for removal.

END OF SECTION

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedural requirements for proposed substitutions.

1.02 DEFINITIONS

A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.

1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
   a. Unavailability.

2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.

2. Agrees to provide the same warranty for the substitution as for the specified product.

3. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.

4. Waives claims for additional costs or time extension that may subsequently become apparent.

5. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.

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

1. Note explicitly any non-compliant characteristics.

C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.

1. No specific form is required. Contractor's Substitution Request documentation must include the following:
   a. Project Information:
      1) Official project name and number, and any additional required identifiers established in Contract Documents.
      2) Owner's, Architect's, and Contractor's names.
   b. Substitution Request Information:
      1) Discrete and consecutive Substitution Request number, and descriptive subject/title.

2) Indication of whether the substitution is for cause or convenience.
3) Issue date.
4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
5) Description of Substitution.
6) Reason why the specified item cannot be provided.
7) Differences between proposed substitution and specified item.
8) Description of how proposed substitution affects other parts of work.

c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:

d. Impact of Substitution:
1) Savings to Owner for accepting substitution.
2) Change to Contract Time due to accepting substitution.

D. Limit each request to a single proposed substitution item.

1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 RESOLUTION

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

B. Architect will notify Contractor in writing of decision to accept or reject request.

1. Architect's decision following review of proposed substitution will be noted on the submitted form.

3.03 ACCEPTANCE

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

END OF SECTION

SECTION 013000 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General administrative requirements.

B. Electronic document submittal service.

C. Preconstruction meeting.

D. Progress meetings.

E. Construction progress schedule.

F. Progress photographs.

G. Coordination drawings.

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

I. Number of copies of submittals.

J. Requests for Interpretation (RFI) procedures.

K. Submittal procedures.

1.02 RELATED REQUIREMENTS

A. Individual requirements for submittals may be described in Divisions 2 through 26 of these Specifications.

1.03 REFERENCE STANDARDS

A. AIA G716 - Request for Information; 2004.

1.04 GENERAL ADMINISTRATIVE REQUIREMENTS

A. Comply with requirements of Section 017000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

B. Make the following types of submittals to Architect:

1. Requests for Interpretation (RFI).
2. Requests for substitution.
3. Shop drawings, product data, and samples.
4. Test and inspection reports.
5. Design data.
6. Manufacturer's instructions and field reports.
7. Applications for payment and change order requests.
8. Progress schedules.

9. Coordination drawings.

10. Correction Punch List and Final Correction Punch List for Substantial Completion.

11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENTS

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document.

1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.

2. It is Contractor's responsibility to submit documents in allowable format.

3. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

3.02 PRECONSTRUCTION MEETING

A. Owner will schedule a meeting after Notice of Award.

B. Attendance Required:

1. Owner.

2. Architect.

3. Contractor.

C. Agenda:

1. Execution of Owner-Contractor Agreement.

2. Submission of executed bonds and insurance certificates.

3. Distribution of Contract Documents.

4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.

5. Designation of personnel representing the parties to Contract, _____ and Architect.

6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.

7. Scheduling.

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

3.03 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the work at maximum weekly intervals.

B. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required:

1. Contractor.
2. Owner.
3. Architect.
4. Contractor's superintendent.
5. Major subcontractors.

D. Agenda:

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

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

3.04 CONSTRUCTION PROGRESS SCHEDULE

A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.

B. If preliminary schedule requires revision after review, submit revised schedule within 5 days.

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

D. Submit updated schedule with each Application for Payment.

3.05 PROGRESS PHOTOGRAPHS

A. Submit new photographs weekly, within 3 days after being taken.

B. Photography Type: Digital; electronic files.

C. In addition to periodic, recurring views, take photographs of each of the following events:

1. Completion of site clearing.

2. Structural framing in progress and upon completion.

3. Final completion, minimum of ten (10) photos.

D. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.

1. Delivery Medium: Via email.

2. File Naming: Include project identification, date and time of view, and view identification.

3.06 COORDINATION DRAWINGS

A. Provide information required by Project Coordinator for preparation of coordination drawings.

3.07 REQUESTS FOR INTERPRETATION (RFI)

A. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.

1. Prepare a separate RFI for each specific item.

2. Prepare in a format and with content acceptable to Owner.
   a. Use AIA G716 - Request for Information .

3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.

B. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.

1. Official Project name and number, and any additional required identifiers established in Contract Documents.

2. Owner's, Architect's, and Contractor's names.

3. Discrete and consecutive RFI number, and descriptive subject/title.

4. Issue date, and requested reply date.

5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).

6. Annotations: Field dimensions and/or description of conditions which have engendered the request.

C. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.

D. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.

E. Review Time: Architect will respond and return RFIs to Contractor within 5 calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs

received after 12:00 noon will be considered as having been received on the following regular working day.

1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.

F. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.

3.08 SUBMITTAL SCHEDULE

A. Submit to Architect for review a schedule for submittals in tabular format.

1. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
   a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.09 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:

1. Product data.

2. Shop drawings.

3. Samples for selection.

4. Samples for verification.

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

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

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 017800 - Closeout Submittals.

3.10 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:

1. Design data.

2. Certificates.

3. Test reports.

4. Inspection reports.

5. Manufacturer's instructions.

6. Manufacturer's field reports.

7. Other types indicated.

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

3.11 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 017800 - Closeout Submittals:

1. Project record documents.
2. Operation and maintenance data.
3. Warranties.
4. Bonds.
5. Other types as indicated.

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

3.12 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.

3.13 SUBMITTAL PROCEDURES

A. General Requirements:

1. Use a separate transmittal for each item.
2. Transmit using approved form.
   a. Use Contractor's form, subject to prior approval by Architect.
3. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
4. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
5. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
   a. Send submittals in electronic format via email to Architect.
6. Schedule submittals to expedite the Project, and coordinate submission of related items.
   a. For each submittal for review, allow 10 days excluding delivery time to and from the Contractor.
7. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
8. Provide space for Contractor and Architect review stamps.
9. When revised for resubmission, identify all changes made since previous submission.

10. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.

11. Submittals not requested will not be recognized or processed.

B. Product Data Procedures:

1. Submit only information required by individual specification sections.

2. Collect required information into a single submittal.

3. Do not submit (Material) Safety Data Sheets for materials or products unless requested.

C. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.

2. Do not reproduce Contract Documents to create shop drawings.

3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

D. Samples Procedures:

1. Transmit related items together as single package.

2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

3. Include with transmittal high-resolution image files of samples to facilitate electronic review and approval. Provide separate submittal page for each item image.

3.14 SUBMITTAL REVIEW

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

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

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

1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.

2. Until approval has been given by Architect, materials or items shall not be fabricated or incorporated in Work. Architect's approval will be only general in nature and shall not be construed as permitting departure from Contract requirements, or as relieving Contractor of responsibility for any errors concerning details, dimensions, materials, etc. If drawings show variations from Contract requirements because of standard shop practice or for other reasons, Contractor shall describe such variation in letter of transmittal. If acceptable, Architect may approve variations, subject to proper adjustment in Contract price. If Contractor fails to describe such variation, Contractor shall not be relieved of responsibility for executing Work in accordance with Contract, even though such drawings have been approved.

3. Acceptance shall not be construed as a complete check but will indicate only that design, fabrication, and detailing is consistent with design intent and that errors and discrepancies

observed when reviewed have been noted. Acceptance of a separate item shall not be interpreted as an approval of an assembly in which the item functions. The Owner or Architect reserves the right to require submission of additional detail, shop, erection or setting drawings and of any schedules for any part of Work, whether or not specifically mentioned in Project Specifications, where substitutions or modifications are proposed by Contractor, or where such information is essential to proper assembly, coordination, or execution of Work under Contract.

4. Review and acceptance shall not relieve the Contractor from responsibility for errors in shop drawings or for proper coordination assembly of materials and equipment with other Work, nor from responsibility of furnishing materials and labor not indicated on approved shop drawings but required by Contract Documents for completion of Work.

END OF SECTION

SECTION 017800 - CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project record documents.

B. Operation and maintenance data.

C. Materials transparency manual.

D. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 007200 - General Conditions and 007300 - Supplementary Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.

B. Section 013000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

C. Individual Product Sections: Specific requirements for operation and maintenance data.

D. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Architect.

B. Operation and Maintenance Data:

1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.

2. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.

3. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Materials Transparency Manual:

1. Compile and submit a digital version of information disclosing materials content for interior finishes. Meet IWBI (BS) requirements for format and content.

D. Warranties and Bonds:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.

2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.

3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed shop drawings, product data, and samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

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

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

1. Field changes of dimension and detail.
2. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

B. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

C. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:

1. Description of unit or system, and component parts.
2. Identify function, normal operating characteristics, and limiting conditions.
3. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

E. Provide servicing and lubrication schedule, and list of lubricants required.

F. Include manufacturer's printed operation and maintenance instructions.

G. Include sequence of operation by controls manufacturer.

H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

I. Provide control diagrams by controls manufacturer as installed.

J. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

K. Additional Requirements: As specified in individual product specification sections.

3.04 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

C. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

3.05 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. In addition to standard and special warranties described in Divisions 2 through 26, Contractor shall warrant Work included in this project, for a minimum period of two (2) year following acceptance of a Certificate of Substantial Completion by Owner, to cover performance,

material, workmanship, and compliance with Contract Documents.

F. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of warranty on Work that incorporates products, nor do they relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with Contractor.

G. 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.

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

I. 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. Contractor is responsible for cost of replacing or rebuilding defective Work regardless of whether Owner has benefited from use of Work through a portion of its anticipated useful service life.

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

    1. Rejection of Warranties: Owner reserves right to reject warranties and to limit selections of products with warranties not in conflict with requirements of contract Documents.

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

END OF SECTION

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

A. Demonstration of products and systems to be commissioned and where indicated in specific specification sections.

B. Training of Owner personnel in operation and maintenance is required for:

1. All software-operated systems.

2. HVAC systems and equipment.

3. Plumbing equipment.

4. Electrical systems and equipment.

5. Conveying systems.

6. Items specified in individual product Sections.

C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:

1. Finishes, including flooring, wall finishes, ceiling finishes.

2. Items specified in individual product Sections.

1.02 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures; except:

1. Make commissioning submittals on time schedule specified by Commissioning Authority.

2. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of overall Training Plan; submit in editable electronic format and/or in a format as directed by the Owner.

B. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.

1. Include applicable portion of O&M manuals.

2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.

3. Provide one extra copy of each training manual to be included with operation and maintenance data.

1.03 QUALITY ASSURANCE

A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.

1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.

2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.

B. Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.

C. Demonstration may be combined with Owner personnel training if applicable.

D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.

1. Perform demonstrations not less than two weeks prior to Substantial Completion.

2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.

1. Perform demonstrations not less than two weeks prior to Substantial Completion.

END OF SECTION

SECTION 024100 - DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of existing building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

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

1.03 DEFINITIONS

A. Demolition: Dismantle, raze, destroy or wreck any building or structure or any part thereof.

B. Remove and dispose: Detach or dismantle items from existing construction and legally dispose of them off site, unless items are indicated to be salvaged or reinstalled.

C. Remove and Salvage: Detach or dismantle items from existing construction in a manner to prevent damage. Clean, package, label and deliver salvaged items to Owner in ready-for-reuse condition.

D. Remove and Reinstall: Detach or dismantle items from existing construction in a manner to prevent damage. Clean and prepare for reuse and reinstall where indicated.

E. Existing to Remain: Designation for existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled. Protect construction indicated to remain against damage and soiling during selective demolition.

1.04 SUBMITTALS

A. Proposed dust-control measures.

B. Proposed noise-control measures.

C. Proposed floor covering measures.

D. Schedule of selective demolition activities indicating the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.

E. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by selective demolition operations.

F. Landfill records indicating receipt and acceptance of all wastes by a landfill facility licensed to accept such wastes.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for demolition work and dust control.

B. Obtain required permits from authorities.

C. Do not close or obstruct egress width to any building or site exit. Do not close or obstruct roadways.

D. Conform to procedures applicable when hazardous or contaminated materials are discovered.

E. Conform to applicable code for demolition of structures, safety of adjacent structures, dust control, runoff control, and disposal.

F. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.06 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed selective demolition Work similar to that indicated for this Project.

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

C. Pre-demolition Conference: Conduct conference with Owner at Project site prior to beginning demolition work.

1.07 PROJECT CONDITIONS

A. Owner assumes no responsibility for actual condition of buildings to be selectively demolished.

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

C. Storage or sale of removed items or materials on-site will not be permitted unless agreed upon in advance by the Owner.

D. Conduct demolition to minimize interference with adjacent and occupied building areas.

E. Cease operations immediately if structure appears to be in danger and notify Architect/Engineer. Do not resume operations until directed.

F. Existing Utilities: Locations of existing utilities are approximate. Locations have been determined from field survey, public utility records and Owner records.

1. Contractor shall be responsible for contacting "Miss Utility", Owner or controlling agencies of existing utilities within construction area for verification of locations and marking of utilities, prior to beginning of work.

2. Contractor shall be responsible for coordination of utility relocation or removal by others with phases of construction activities.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.

1. Obtain required permits.

2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.

3. Provide, erect, and maintain temporary barriers and security devices.

4. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.

5. Conduct operations to minimize effects on and interference with adjacent structures and occupants.

6. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.

7. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.

8. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon, or limit access to their property.

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

C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Protect existing structures and other elements to remain in place and not removed.

1. Provide bracing and shoring.

2. Prevent movement or settlement of adjacent structures.

3. Stop work immediately if adjacent structures appear to be in danger.

4. Protect existing flooring to remain with minimum 1/2" plywood sheets.

E. Minimize production of dust due to demolition operations. Do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

F. Hazardous Materials:

1. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCBs, and mercury.

G. Perform demolition in a manner that maximizes salvage and recycling of materials.

1. Dismantle existing construction and separate materials.

2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.02 EXISTING UTILITIES

A. Coordinate work with utility companies. Notify utilities before starting work, comply with their requirements, and obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone. Identify and mark, in same manner as other utilities to remain, utilities to be reconnected.

3.03 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.

1. Verify construction and utility arrangements are as indicated.

2. Report discrepancies to Architect before disturbing existing installation.

3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from areas that remain occupied.

1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 015000 .

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

1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction indicated.

2. Remove items indicated on drawings.

D. Services including, but not limited to, HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications: Remove existing systems and equipment as indicated.

1. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.

2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.

3. Verify that abandoned services serve only abandoned facilities before removal.

4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.

E. Protect existing work to remain.

1. Prevent movement of structure. Provide shoring and bracing as required.

2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.
4. Patch to match new work with the appropriate materials as specified and/or as acceptable to the Owner.

3.04 DEBRIS AND WASTE REMOVAL

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

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

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

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SECTION 061000 - ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements of the General Conditions, Supplementary Conditions, and Division 1 of these specifications apply to this Section.

B. Include all labor, materials, appliances, and services necessary to complete all rough carpentry and related work required by the drawings and/or described in this specification.

C. Generally: Concealed or temporary woodwork; rough and general carpentry duties; necessary wood framing, blocking, sheathing, finishing, trimming, and working of wood or wood fibered materials; all rough carpentry, preparatory work, bracing, propping, protection and boxing, all wood framing, grounds, bucks, wood blocking, furring, and all other general carpentry work. All wood plates as shown on the drawings. All wood blocking required by job conditions.

D. Fire retardant treated wood materials.

1.02 REFERENCE STANDARDS

A. ALSC: American Lumber Standards Committee - Softwood Lumber Standards.

B. APA: American Plywood Association.

C. AWPA (American Wood Protection Association): C1 – All Timber Products Preservative Treatment by Pressure Process

D. NFPA: National Forest Products Association.

E. SPID Southern Pine Inspection Bureau.

F. AWPA C20 - Structural Lumber -- Fire Retardant Treatment by Pressure Processes; American Wood-Protection Association.

G. AWPA C27 - Plywood -- Fire-Retardant Treatment by Pressure Processes; American Wood-Protection Association.

H. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood-Protection Association.

I. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

J. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2017).

K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2022.

L. AWPA U1 - Use Category System: User Specification for Treated Wood; 2022.

M. PS 20 - American Softwood Lumber Standard; 2021.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide list of lumber grades and sizes proposed for use and technical data on panel products.

C. Product Data: Provide technical data on wood preservative materials and application instructions.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with the following agencies:

1. Lumber Grading Agency: Certified by ALSC.

2. Plywood Grading Agency: Certified by APA.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.

1. Species: Standard Grade Douglas Fir, Western Larch, Western Hemlock (WWPA or WCLA) or #2 Dimension Souther Pine (SPIB)., unless otherwise indicated.

2. Blocking: No. 2 Common Grade of any WWPA or WCLA species or No. 2 Southern Pine Boards (SPIB). Blocking shall include any wood material, without regard to size or length, which is required for the secure fastening, stiffening, anchoring, or hanging of any cornice, soffit, eaves, water table, cabinet, counter, or attainment of any profile shall be provided of proper strength to fully secure or support as if fully detailed or specified.

3. Wood blocking or nailers on steel framing shall be bolted thereto. Wood grounds shall also be provided for securing equipment furnished under other Sections of these specifications. Provide block nailers as required for sheet metal work. Blocking adjacent to roof insulation shall be full thickness of insulation and shall finish flush with top surface.

4. Size and Shapes: Nominal sizes shown and specified refer to undressed lumber dimensions. Dress lumber 4 sides (S4S) unless otherwise shown or specified, in accordance with the requirements of the West Coast Lumber Inspection Bureau, Grading and Dressing Rules, worked to shapes and patterns shown. All lumber shall be kiln-dried to a moisture content not to exceed 19 percent.

5. All wood blocking shall be fire retardant treated.

6. Plywood Sheathing: thickness as indicated on the drawings, fire retardant treated as indicated on the drawings and/or as required by local Codes.

2.02 ACCESSORIES

A. Fasteners and Anchors:

1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

2. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt for anchorages to steel.

3. Furnish all rough hardware, nails, spikes, bolts, screws, staples, straps, etc., that are required for proper assembly of building components and materials.

2.03 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.

1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.

B. Fire Retardant Treatment:

1. Products:
   a. Hoover Treated Wood Products, Inc: www.frtw.com/#sle.

2. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
   a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
   b. Treat exterior rough carpentry items.
   c. Do not use treated wood in direct contact with the ground.

3. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
   a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
   b. Interior rough carpentry items are to be fire retardant treated.
   c. Treat rough carpentry items as indicated .
   d. Do not use treated wood in applications exposed to weather or where the wood may become wet.

PART 3 EXECUTION

3.01 INSPECTION

A. Inspect all wood and other materials.

B. Sort out and discard damp, warped or damaged material which would not provide consistent substrates or Underwriters Label Construction as herein specified.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

D. Wood blocking shall be installed as indicated on the drawings to provide an integral component for adjacent structural or architectural materials.

1. Blocking shall be erected true and with tight joints to provide a consistent substrate for surface materials, framing or roof framing. Use the longest lengths practical to minimize jointing.

E. Install wood framing as indicated on the drawings. Wood framing shall be erected plumb and true and firmly anchored to supporting structures, as indicated on the drawings, to provide a consistently secure strong substrate for covering work. Install blocking, nailers and bridging as required for secure fastening of surface materials and to minimize the flexibility of framing components. Blocking shall be placed four (4) feet on center maximum. All framing and blocking shall be built so that sheathing or finish work joints shall fall on the center of framing or blocking.

1. Set members level and plumb, in correct position.

2. Place horizontal members flat, crown side up.

3. Construct curb members of single pieces.

4. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.

5. Coordinate curb installation with installation of work of other trades.

F. All wood bucks, blocks, bolts, anchors, etc., shall be furnished and set for building into masonry walls and partitions. All temporary and permanent wood bucks and sub-bucks shall be erected, and all plates, blocking, grounds, furring, stripping, screeds, nailers, etc., shall be securely installed at proper times to suit progress of construction.

G. Fit carpentry work to other work. Scribe and cope as required for accurate fit. Set carpentry work accurately to required levels and lines with members plumb and true and accurately cut and fitted. Shim with metal or slate for full bearing on concrete or masonry substrates. Set true to line and level, plumb, with intersections true to required angle. Build into masonry as work progresses, cutting to fit masonry unit size involved. Anchor to formwork before concrete placement.

H. Wood Grounds: Provide wood grounds and blocking of size and shape required for securing trim and attaching other work in place. Set grounds true to line, level or plumb and secure firmly in place. Grounds generally will be dressed square edged, pressure treated and of a thickness required for substantial anchorage and fastening to substrate and remaining flush with adjacent finish surfaces.

END OF SECTION

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 – GENERAL

1.01 SUMMARY

A. This Section includes through-penetration firestop systems for penetrations through fire-resistance-rated walls, horizontal assemblies and smoke barriers including both empty openings and openings containing penetrating items.

B. Related Sections include the following:

1. Division 22 and 23 Sections specifying duct and piping penetrations.

2. Division 26 Sections specifying cable and conduit penetrations.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Applicable Codes:

1. International Building Code: Current approved edition per AHJ

2. NFPA 101 Life Safety Code: Current approved edition per AHJ

1.03 DEFINITIONS

A. Firestopping: A process whereby materials are used to resist (or stop) the spread of fire and its byproducts through openings made to accommodate penetrations in fire-rated walls, floors and floor/ceiling assemblies. Typical firestopping system comprised of 3 components: Wall or floor; Penetrating item; and, Firestopping material.

B. Assembly: A wall, floor, or other partition. It may include such things as receptacles, outlet boxes, recessed lighting fixtures, or penetrations.

C. System: The combination of the assembly, the penetrant(s), and the firestop materials. All of these items, together, constitute the system, and the system is the only basis for the classification.

D. Intumescent: A class or type of firestop materials that will swell or expand upon exposure to elevated temperatures. Material will also form an insulating char.

E. Fire Barrier: A fire resistance rated vertical or horizontal assembly of materials designed to restrict the spread of fire in which openings are protected.

F. Fire Wall: A wall separating buildings or subdividing a building to prevent the spread of fire and having a fire resistance rating. Fire walls a structurally stable such that collapse of construction on either side will not cause the wall to collapse.

G. Smoke Barrier: A continuous membrane, either vertical or horizontal, that is designed and constructed to restrict the movement of smoke.

H. Engineering Judgements:

1. Engineering judgements (EJ's) are used when a tested, UL classified system is not available.

2. The EJ is based on existing technology and available tested systems.

3. EJ's must be conducted by the manufacturer’s technical or engineering group. The installing contractor cannot write their own EJ!

4. A third-party review of the EJ is required.

5. EJ's can only be applied to the specific application for which they were written.

I. Qualified Contractor Programs: This category covers Contractor firms who have demonstrated knowledge and a comprehensive management system that specifically focus on the selection and installation of firestop systems or spray-applied fire-resistive materials (SFRMs). The audited Contractor firm systems under UL's Qualified Contractor Programs provide an integrated approach to controlling the processes in addressing architectural, Authorities Having Jurisdiction and customer requirements.

1.04 PERFORMANCE REQUIREMENTS

A. General: For penetrations through the following fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.

1. Fire-resistance-rated walls including fire walls.

2. Fire-resistance-rated horizontal assemblies including floors.

B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per UL 1479:

1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equal or exceed fire-resistance rating of constructions penetrated.

2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
   a. Penetrations located outside wall cavities.
   b. Penetrations located outside fire-resistance-rated shaft enclosures.

C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.

1. For piping penetrations for plumbing, provide moisture-resistant through-penetration firestop systems.

2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.

3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

1.05 SUBMITTALS

A. Product Data: For each type of product indicated from single manufacturer.

B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency. See UL Directory or FM Global.

C. Shop Drawings: For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction, and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.

1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.

2. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. A third-party review of the Engineering Judgement is required.

D. Qualification Data: For a single source qualified Installer.

E. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

B. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

C. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.

D. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:

1. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
   a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
   b. Classification markings on penetration firestopping correspond to designations listed by the following:
      1) UL in its "Fire Resistance Directory."

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section “Project Management and Coordination.”

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration fire-stop system products to Project site in original, unopened containers or packages with intact and legible manufacturers’ labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency’s classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature change, contaminants, or other causes.

1.08 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.09 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Hilti Construction Chemicals Division of Hilti Inc.

2. Specified Technologies Inc.

3. 3M Fire Protection Products.

2.02 PENETRATION FIRESTOPPING

A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. Horizontal assemblies include floors.

D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.

2.03 FIRESTOPPING, GENERAL

A. 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.

B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

1. Permanent forming/damming/backing materials, including the following:
   a. Slag-/rock-wool-fiber insulation.
   b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
   c. Fire-rated form board.
   d. Fillers for sealants.
2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.04 FILL MATERIALS

A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by referencing the types of materials described in this Article. Fill materials are those referred to in directories of referenced testing and inspecting agencies as "fill," "void," or "cavity" materials.

B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

E. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.

H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives.

I. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
    a. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and non-sag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to non-sag grade for both opening conditions.

2.05 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:

    1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.

    2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.

    3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact, or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.03 INSTALLATION

A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.

C. Install fill materials for firestopping by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.

2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.04 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

3.05 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

A. Note that the following schedule is to be used as a guide only and is not intended to include every solution that may be required due to field conditions. See UL listings for system details and applicability. Additional or alternative systems shall be proposed by the contractor as required to satisfy field conditions in order to maintain specified fire ratings. Where UL-classified systems are indicated, they refer to alpha- alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.

1. Firestop Systems with No Penetrating Items (for circular openings in concrete floors or CMU walls to 6-inch diameter):
   a. UL-Classified Systems: C-AJ-0060.

2. Firestop Systems with No Penetrating Items (for square or rectangular openings in concrete slabs or CMU walls of up to 36 square feet):
   a. UL-Classified Systems: C-AJ-0004.

3. Firestop Systems for Insulated Ducts:
   a. UL-Classified Systems (CMU walls): W-J-7030 or W-J-7114.
   b. UL-Classified Systems (framed gypsum walls): W-J-7051 or W-J-7195.

4. Firestop Systems for Combination Penetrations:

a. UL-Classified Systems (concrete slab or CMU walls): C-AJ-8087, C-AJ-8088, C- AJ-8123, or C-AJ-8135.
b. UL-Classified Systems (framed gypsum walls): C-AJ-8018, C-AJ-8021, or C-AJ-8039.

5. Firestop Systems for Metallic Pipes, Conduit, or Tubing:
   a. UL-Classified Systems (concrete slab or CMU walls): C-AJ-1001, C-AJ-1427, or C-AJ-1551.
   b. UL-Classified Systems (framed gypsum walls): W-L-1003 or W-L-1296.

6. Firestop Systems for Multiple Metallic Pipes, Conduit, or Tubing:
   a. UL-Classified Systems (concrete slab or CMU walls): C-AJ-1429.
   b. UL-Classified Systems (framed gypsum walls): W-L-1287.

7. Firestop Systems for Nonmetallic Pipe, Conduit, or Tubing:
   a. UL-Classified Systems: (concrete slab or CMU walls): C-AJ-2001.
   b. UL-Classified Systems (framed gypsum walls): W-L-2162.

8. Firestop Systems for Insulated Pipes:
   a. UL-Classified Systems (concrete slab or CMU walls):
      1) Insulated Metal Pipe: C-AJ-8072.
      2) Glass Fiber Insulated Metal Pipe: C-AJ-5210.
      3) Insulated Metal Pipe (AB/PVC Flexible Foam): C-AJ-5211.
   b. UL-Classified Systems (framed gypsum walls):
      1) Insulated Metal Pipe: W-L-5011 or W-L-8010.
      2) Glass Fiber Insulated Metal Pipe: W-L-5168.
      3) Insulated Metal Pipe (AB/PVC Flexible Foam): W-L-5169.

9. Firestop Systems for Electrical Cables:
   a. UL-Classified Systems (concrete slab or CMU walls): C-AJ-3021 or C-AJ-3310.
   b. UL-Classified Systems (framed gypsum walls): W-L-3347 or W-L-3371.

10. Firestop Systems for Insulated Electrical Cables via Device:
    a. UL-Classified Systems (concrete slab or CMU walls): C-AJ-3250.
    b. UL-Classified Systems (framed gypsum walls): W-L-3289.

11. Firestop Systems for Cable Trays:
    a. UL-Classified Systems (framed gypsum walls): W-L-4037.

12. Firestop Systems for Multiple Conduit:
    a. UL-Classified Systems (framed gypsum walls): W-L-1228 or W-L-1255.

END OF SECTION

SECTION 079200 - JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preparing substrate surfaces

B. The required applications of sealants include, but are not limited to, the following general locations in new work, or in areas disturbed by the work of this project:

1. Interior:
   a. Metal Door and window frames
   b. Joints at all surfaces to receive opaque finish
   c. Perimeter of elevator hoistway wrap to adjacent wall surfaces.
   d. Other as indicated

C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 142410 - Modernization of Hydraulic Elevators

1.03 REFERENCE STANDARDS

A. ASTM C790 - Use of Latex Sealing Compounds.

B. ASTM C804 - Use of Solvent-Release Type Sealants.

C. ASTM C834 - Latex Sealing Compounds.

D. ASTM C920 - Elastomeric Joint Sealants.

E. ASTM D1565 - Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers.

F. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

G. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:

1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.

2. List of backing materials approved for use with the specific product.

3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.

4. Substrates the product should not be used on.

C. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

D. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation and perimeter conditions requiring special attention.

E. Submit manufacturer’s certification that field-applied joint sealants installed in building interior meet testing and product requirements of California Department of Health Services Standard Practice for The Testing Of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

1. At minimum, products need to comply with VOC limits specified in LEED-for Schools if alternatives tested to CA protocol are not available.

F. Executed warranty.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

B. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

C. Specified work shall be installed by skilled tradesmen, experienced in the application of the types of materials.

D. Applicator: Company specializing in performing the work of this section with minimum five years documented experience., including installation of products by chosen manufacturer.

E. Manufacturer shall provide qualified technical representative at project site when required for purpose of rendering advice concerning proper installation.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation. Apply compound prior to final coat of paint.

1.07 PRODUCT DELIVERY, HANDLING AND STORAGE

A. Deliver all materials to job site in factory sealed and labeled containers; label shall show: Manufacturer, Type, Date of Manufacture, Shelf Life, Curing Time at 70 degrees F, Color and Manufacturer’s Instructions.

1.08 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.09 WARRANTY

A. Provide five-year warranty under provisions of Division 1.

B. Warranty: Include coverage for installed sealants and accessories which fail to achieve air tight seal, water tight seal and exhibit loss of adhesion or cohesion, or do not cure.

C. Products shall provide a minimum 30-year performance guarantee.

1.10 MAINTENANCE DATA

A. Provide under the provisions of Division 1.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Sealants:

1. Bostik Inc
2. Pecora Corporation
3. Sika Corporation
4. Tremco Commercial Sealants & Waterproofing

2.02 JOINT SEALANTS - GENERAL

A. Back-up Materials: Flexible closed cell, expanded polystyrene or polyethylene round rodding, with diameter 1.333 times width of joint

B. Interior Sealant: Acrylic Emulsion Latex Type C: ASTM C834, single component; color as selected by the Architect. Pecora AC-20, Tremco 834, or Bostik Chem-Calk 600.

C. Interior Walls/Floors (Ceramic Tile): Basis-of-Design - Pecora Urexpan NR-201, one part, self-leveling, moisture curing polyurethane sealant, designed for horizontal joints, Fed. Spec. TT-5-00230C, Type I, ASTM C920, color as selected by the Architect

D. Primers, Cleaners and Bond Breaker Tape: Provide as recommended by sealant manufacturer's installation instructions for the conditions and locations indicated on the drawings.

E. All sealants and sealant primers must meet or exceed Bay Area Air Quality Management District Reg. 8, Rule 51.

2.03 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: ASTM D1056; round, closed cell polyethylene foam rod; oversized 30 percent larger than joint width; manufactured by Dow Chemical, Sonneborn or approved equivalent.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Provide joint sealant installations complying with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:

1. Width/depth ratio of 2:1.

2. Neck dimension no greater than 1/3 of the joint width.

3. Surface bond area on each side not less than 75 percent of joint width.

D. Install bond breaker backing tape where backer rod cannot be used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished installation under provisions of Division 1.

B. Protect sealants until cured.

END OF SECTION

SECTION 096519 - RESILIENT FLOOR TILE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring, including rubber tile.

1.02 RELATED SECTIONS

A. Section 14 24 10: Modernization of Existing Hydraulic Elevators.

1.03 REFERENCES

A. ASTM E84 - Surface Burning Characteristics of Building Materials.

B. ASTM F1344 - Standard Specifications for Rubber Floor Tile; 2021a

1.04 SUBMITTALS

A. Submit under provisions of Division 1.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.

C. Samples: Submit two sets of samples illustrating color and pattern for rubber tile for color selection by the Architect.

D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

E. Submit MSDS for any applicable products used.

F. Submit manufacturer’s certification that resilient flooring and field-applied adhesives meet testing and product requirements of California Department of Health Services Standard Practice for The Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame/smoke rating requirements.

1.06 QUALITY ASSURANCE

A. Installation Qualification: Contractors for floor covering installation should be experienced in managing commercial flooring projects and provide professional installers, qualified to install the various flooring materials specified. An installer is “qualified” if certified INSTALL (International Standards & Training Alliance) resilient floor covering installer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Division 1.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

1.09 MAINTENANCE DATA

A. Submit under provisions of applicable Division 1 sections.

B. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.10 EXTRA MATERIALS

A. Furnish under provisions of Division 1.

B. Provide one box of each type of tile per 50 boxes of tile per color/pattern used.

1.11 WARRANTY

A. Provide manufacturer's standard 5-year warranty on all tile flooring products.

PART 2 - PRODUCTS

2.01 MATERIALS – RUBBER TILE FLOORING

A. Basis of Design - Tarkett Solid Color Rubber Tile Textures, ASTM F1344 (Type I-A, homogeneous solid color rubber tile.

1. Size: 24 x 24 inch
2. Thickness: .0125 inch (3.17mm)
3. Design: Raised Round
4. Manufacturers:
   a. Tarkett
   b. Armstrong
   c. Mannington
   d. Amnico Stratica Chlorine Free Eco-Polymeric Resilient Tile
5. Pattern: A single standard color will be selected for use from all of manufacturer's standard options.
6. Color: 09 Clay as the basis of design; or as selected by Architect from full color range.
7. Test data:
   a. Hardness (ASTM D2240): ≥ 85 Shore A
   b. Abrasion Resistance (ASTM D3389): Passes
   c. Thickness Tolerance (ASTM F386): Passes
   d. Resistance to Chemicals (ASTM F925): Passes
   e. Static Load Resistance (ASTM F970): 250 psi
   f. Resistance to Heat (ASTM F 1514): $\Delta E \leq 8$
   g. Size/Squareness Tolerance (ASTM F2055): Passes
   h. Dimensional Stability (ASTM F2199): Passes
   i. Static Coefficient of Friction (ASTM D 2047): ≥ 0.8 SCOF
   j. Flamability (ASTM E648, Critical Radiant Flux): Class 1 (≥ 0.45 W/cm^2)
   k. Limited Commercial Warranty: 5 years

2.02 ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic-cement-based formulation.

B. Edge (transition) Strips: Flooring material manufactured by Mercer, Johnsonite, or equal, color to be selected from all of manufacturer's standard options.

2.03 ADHESIVES (MUST BE APPROVED BY TILE MANUFACTURER AND MCPS'S DIVISION OF SAFETY & ENVIRONMENTAL HEALTH UNIT)

A. Water resistant, Non-flammable, Low odor/odorless when dry, No asbestos content, Antimicrobial protection.

B. Adhesives used in flooring installation shall meet testing and product requirements of California Department of Health Services Standard Practice for The Testing Of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

1. At minimum, products need to comply with VOC limits specified in LEED-for Schools, version 2.2, EQc4. if alternatives tested to the CA protocol are not available.

C. Adhesives: As recommended by Manufacturer to meet site conditions

1. Tarkett 965 Flooring and Tread Adhesive

2. Tarkett 975 Two-Part Urethane Adhesive

3. Tarkett 996 Two-Part Expoxy Adhesive

4. Tarkett 901 SpraySmart Adhesive

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify substrate is level.

B. Verify floor and lower wall surfaces are free of substances that may impair adhesion of new adhesive and finish materials.

C. Do not bridge building expansion joints with flooring.

3.02 PREPARATION

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

B. Prohibit traffic until filler is cured.

C. Vacuum clean substrate.

D. Do not install resilient products until they are same temperature as the space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.03 INSTALLATION – FLOORING

A. Install in accordance with manufacturer's instructions. See drawings for patterns.

B. Mix tile from container to ensure shade variations are consistent when tile is placed.

C. Resilient Rubber Floor Tile:

1. Install with Tarkett adhesive specified for the site conditions and follow adhesive label for proper use.

2. Roll the flooring in both directions using a 100 pound three-section roller.

D. Spread only enough adhesive to permit installation of materials before initial set.

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

F. Install tile to turn block pattern. Allow minimum 1/2 full size tile width at room or area perimeter.

G. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.

H. Install resilient edge strips at unprotected or exposed edges, and where flooring terminates.

3.04 CLEANING

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.

2. Sweep and vacuum surfaces thoroughly.

3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

1. No traffic for 24 hours after installation.

2. No heavy traffic, rolling loads, or furniture placement for 72 hours after installation.

D. Wait 72 hours after installation before performing initial cleaning.

E. A regular maintenance program must be started after the initial cleaning.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished Work. Entire floor to be protected with red rosin paper, taped.

B. Prohibit traffic on floor finish for 48 hours after installation.

END OF SECTION

SECTION 099123 - INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

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

D. Do Not Paint or Finish the Following Items:

1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.

2. Items indicated to receive other finishes.

3. Items indicated to remain unfinished.

4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.

5. Floors, unless specifically indicated.

6. Glass.

7. Concealed pipes, ducts, and conduits.

1.02 REFERENCE STANDARDS

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

B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.

C. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.

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

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

F. SSPC-SP 2 - Hand Tool Cleaning; 2024.

G. SSPC-SP 13 - Surface Preparation of Concrete; 2018.

1.03 SUBMITTALS

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

1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").

2. MPI product number (e.g., MPI #47).

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

1. Where sheen is specified, submit samples in only that sheen.

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

1. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.

2. Label each container with color in addition to the manufacturer's label.

1.04 DELIVERY, STORAGE, AND HANDLING

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

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

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

1.05 FIELD CONDITIONS

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

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

PART 2 PRODUCTS

2.01 MANUFACTURERS

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

B. Provide products as indicated on drawings.

C. Paints:

1. PPG Paints: www.ppgpaints.com/#sle.

2. McCormick

3. Sherwin-Williams Company: www.sherwin-williams.com/#sle.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.

1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.

2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.

3. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

4. Supply each paint material in quantity required to complete entire project's work from a single production run.

5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:

1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
   a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
      1) Flat Paints and Coatings: 50 g/L.
      2) 2. Nonflat Paints and Coatings: 50 g/L.
      3) 3. Dry-Fog Coatings: 150 g/L.
      4) 4. Primers, Sealers, and Undercoaters: 100 g/L.
      5) 5. Rust-Preventive Coatings: 100 g/L.
      6) 6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
      7) 7. Pretreatment Wash Primers: 420 g/L.
      8) 8. Shellacs, Clear: 730 g/L.
      9) 9. Shellacs, Pigmented: 550 g/L.

C. Colors: As indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

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

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

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

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:

1. Gypsum Wallboard: 12 percent.

2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.

3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

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

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

C. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

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

E. Concrete:

1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

2. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

F. Masonry:

1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.

2. Prepare surface as recommended by top coat manufacturer.

3. Clean surfaces with pressurized water. Use pressure range of 600 to 1,500 psi (4,140 to 10,350 kPa) at 6 to 12 inches (150 to 300 mm). Allow to dry.

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

H. Galvanized Surfaces:

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

2. Prepare surface according to SSPC-SP 2.

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

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

K. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

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

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

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

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

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

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

3.04 CLEANING

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

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

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SECTION 101423 - SIGNAGE

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Requirements of the General Conditions, Supplementary Conditions and Division 1 of these specifications apply to this Section.

B. Interior ADA-compliant Room Signage.

1.02 RELATED SECTIONS

A. Section 08 11 13 - Hollow Metal Doors and Frames

1.03 REFERENCES

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

1. American National Standards Institute (ANSI): ANSI A117.1 – Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

2. Architectural and Transportation Barriers Compliance Board (ATBCB): Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)

3. American Society for Testing & Materials (ASTM)

4. Uniform Sign Code

1.04 SUBMITTALS

A. Manufacturer's Data: Submit manufacturer's descriptive literature and specifications, including color samples of material for selection, as well as installation and maintenance instructions.

B. Submit shop drawings for approval, including: sign styles, materials, artwork, lettering and locations, finishes, fabrication details, overall dimensions of each sign, and installation details.

C. Submit full size sample sign or letter of type, style and color specified including method of attachment.

D. Submit manufacturer's standard warranty information.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Signage shall comply with applicable requirements of ADAAG and ANSI A117.1

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package to prevent damage or deterioration during shipment, handling, storage, and installation.

B. Store products in dry location inside enclosed facilities and in accordance with manufacturer’s requirements.

C. Maintain protective coverings in place and in good repair until removal is necessary.

1.07 PROJECT CONDITIONS

A. Environmental Requirements: Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.08 WARRANTY

A. Provide manufacturer's warranty against defect in materials. Warranty shall provide material and labor to repair or replace defective materials at the manufacturer's discretion. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted. Removal and reinstallation of existing signage is not warranted.

PART 2 – PRODUCTS

2.01 INTERIOR ROOM SIGNAGE

A. Manufacturers for interior signage systems shall be as follows, subject to compliance with requirements as specified in this section:

1. 2/90 Sign Systems - Used as the Basis of Design
2. Apco Signs
3. ASI

B. MATERIALS

1. Signs shall have the following characteristics:
   a. Signs shall be of one-piece construction; added-on and/or engraved characters are unacceptable.
   b. Interior sign plaque material shall consist of melamine plastic laminate, approximately 1/4-inch thick, with core painted a contrasting color and rated non-static, fire-retardant, and self-extinguishing. Plastic Laminate shall be impervious to most acids, alkalis, alcohol, solvents, abrasives, and boiling water.
   c. Finish colors to be selected from all of manufacturer's available standard color options.
   d. Numbers, letters, symbols, and braille shall be raised .032" from the background surface.
   e. Lettering style shall be either Helvetica Medium, upper case, and 5/8-inch in height.
   f. Text shall be accompanied by Grade 2 braille.
   g. Braille dimension measurements shall comply with ADAAG 703.3.1.
   h. All letters, number and/or symbols shall contrast with their background – either light characters on a dark background or dark characters on a light background. Characters and background shall have matte finish.
   i. Provide signage for elevator machine room door and hoistway openings.
   j. Provide code required "No Smoking" signage for elevator hoistway entrances.
   k. Provide additional signage as required by local codes and ADA to designate the means of egress to exits.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine all surfaces to which the work of this Section will attach to determine that all finish work has been completed and is completely dry.

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

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

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

3.03 INSTALLATION

A. Install in accordance with manufacturer’s instructions.

B. Locate signs in accordance with ADAAG requirements.

C. Install signs plumb and square.

3.04 PROTECTION

A. Protect installed products until completion of project.

B. Repair or replace damaged products before Substantial Completion.

3.05 SCHEDULES

A. Refer to signage types and locations on drawings.

1. CLEAN-UP
    a. Remove all containers and packaging from the site at the completion of the work.
    b. Clean all signage.

END OF SECTION

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SECTION 142410 - MODERNIZATION OF EXISTING HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY OF WORK

A. Section includes modernization of one in-ground hydraulic passenger elevator with three (3) stops: Floor Ground, Floor First and Floor S.

B. Related Requirements:

1. Section 09 65 19 "Resilient Flooring" for finish flooring in elevator cars.

2. Divisions 22, 23, and 26 Sections for coordination with plumbing, mechanical, and electrical work.

1.03 SCOPE OF WORK

A. The following is a comprehensive checklist of work items to be included in this contract. Where required, items identified as “Provide New” are further specified in Part 2 of this specification. Where items are not specified beyond this scope of work, Contractor shall supply materials compatible with existing conditions and meeting current industry standards.

B. MACHINE ROOM SYSTEMS AND COMPONENTS

1. Drive Machines:
   a. Hydraulic Pump Unit (pump, tank & valve) — Provide New
   b. Sound isolation pads — Provide New
   c. Hydraulic Fluid — Provide New

2. Hydraulic Jack Assembly:
   a. Jack assembly — Retain & Recondition

3. Motion Controls:
   a. Motion Controllers — Provide New
   b. Landing Devices and Selectors — Provide New
   c. Positioning devices — Provide New

4. Electrical Wiring:
   a. Traveling conductors and electrical field wiring — Provide New
   b. Machine room conduit and trough work — Provide New
   c. Hoistway raceway and fasteners — Provide New
   d. Electrical door lock wiring — Provide New
   e. GFCI electrical receptacles in elevator machine rooms and pits — Provide New
   f. Electrical signal wiring — Provide New

C. HOISTWAY EQUIPMENT AND COMPONENTS

1. Hatch Equipment:
   a. Car top inspection stations — Provide New
   b. Hoistway leveling switches — Provide New
   c. Digital landing devices — Provide New

d.	Terminal limit switches	Provide New
e.	Directional limit switches	Provide New
f.	Hoistway junction boxes	Provide New

2. Car Door Equipment (Standard):

a.	Car door hangers and tracks	Provide New
b.	Neoprene car door rollers	Provide New
c.	Linear door operators	Provide New
d.	Door arms and linkages	Provide New
e.	Door relation cables	Provide New
f.	Car door clutches	Provide New
g.	Car door restrictors	Provide New
h.	Infra-red detector curtains	Provide New
i.	Nickel-silver car door sills	Provide New

3. Hoistway Door Components:

a.	Hoistway door hangers and tracks	Provide New
b.	Hatch door rollers and hardware	Provide New
c.	Hatch door tracks eccentrics	Provide New
d.	Electrical interlocks	P rovide New
e.	Hatch door relating cables	Provide New
f.	Hatch door engaging devices and pick-up rollers	Provide New
g.	Hatch door sill closures	Provide New
h.	Dust covers	Replace as warranted
i.	Hatch door sills	Provide New

4. Door Panels & Entrances:

a.	Stainless steel Hatch Door panels Entrance dimensions 42” wide x 84” height	Provide New
b.	Escutcheon holes and Trim rings	Provide New
c.	Lobby entrance frames	Clad #4 Stainless Steel
d.	Door stops and bumpers	Provide New

5. Pit Equipment:

a.	Car spring buffers	Retain
b.	Steel buffer channels and stands	Retain
c.	Steel pit channels	Retain
d.	Pit Stop Switches	Provide New
e.	Pit Lighting	Provide New
f.	Pit Ladder	Provide New

6. Car Slings:

a.	Platform	Retain/Recondition/Align
b.	Cross head and side styles	Retain/Recondition/Align
c.	Car guides (slide type)	Provide New Roller Type
d.	Car top steady plates	As Required
e.	Sound isolation pads	Provide New
f.	Mounting hardware	Replace as warranted

D. SIGNAL FIXTURES:

1. Car and Corridor Fixtures:

a.	Main car operating panel	Provide New
b.	Corridor call stations	Provide New

c.	Fire emergency key switches	Provide New
d.	Digital car position indicators	Provide New
e.	Code compliant passing chimes	Provide New
f.	Digital lobby positional indicators	Provide New
g.	Corridor directional lanterns	Provide New
h.	Code compliant arrival gongs	Provide New
i.	Phone line monitoring	Provide New

2. Emergency Communication Devices:

a.	Fire fighter's emergency recall service (phases 1 & 2 at Flr 1)	Provide New
b.	Hands free emergency communication devices	Provide New
c.	Braille jamb plates	Provide New
d.	Emergency evacuation signage	Provide New
e.	Inspection certificate frames	Provide New

E. ELEVATOR CABS:

1. -

a.	Cab Shell Interior cab dimensions 6'-9 5/8" width x 5'-2 5/8" depth (VIF)	Retain and Recondition
b.	Interior wall panels, SS#4	Provide New
c.	Suspended ceiling panels and grids	Provide New
d.	Incandescent down-lighting fixtures	Provide New
e.	Two speed cab exhaust fans	Provide New
f.	Two speed cab exhaust fans	Provide New
g.	Cab handrails, SS#4	Provide New
h.	Cab Flooring	Provide New
i.	Sub-flooring panels	Provide New
j.	Re-clad all existing steel returns, reveals and transoms	Provide New

F. SPECIAL FEATURES:

1. -

a.	Addressable firefighter's emergency recall systems (Recall to Floor 1)	Provide New
b.	Lobby and machine room smoke detectors	Provide New
c.	Batter decent unit	Provide New
d.	Electrical feeders	Retain if viable
e.	Dedicated ground wires	Provide if required
f.	Hoistway ventilation	If Required
g.	HVAC in elevator machine room	Provide New
h.	Shunt trips, flow sensors and heat detectors	Provide New
i.	Hoistway beveling	Not Required
j.	Machine room lighting	Provide New
k.	Sump pit and pump	Provide New

1.04 UNIT PRICES

A. Base bid includes the reuse of existing jack hole and existing jacks and pistons. If existing jack is found to be damaged beyond reuse and jack hole is found to be insufficiently sized for lining and reuse, further excavation may be required. Bid is to include unit prices for excavation for cylinder well holes.

1.05 DEFINITIONS

A. Definitions in ASME A17.1/CSA B44 “Safety Code for Elevators and Escalators” apply to work of this Section.

B. Service Elevator: A passenger elevator that is also used to carry freight.

1.06 ACTION SUBMLTTALS

A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information. Include product data for car enclosures; hoistway entrances; and operation, control, and signal systems.

B. Shop Drawings:

1. Include plans, elevations, sections, and large-scale details indicating service at each landing; machine room layout; coordination with building structure; relationships with other construction; and locations of equipment.

2. Include large-scale layout of car-control station.

3. Indicate maximum dynamic and static loads imposed on building structure at points of support as well as maximum and average power demands. Existing conditions prevail.

C. Samples for Initial Selection: For finishes involving color selection.

D. Samples for Verification: For exposed car, hoistway door and frame, and signal equipment finishes, 3-inch- (75-mm-) square Samples of sheet materials and 4-inch (100-mm) lengths of running trim members.

1.07 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Sample Warranty: For special warranty.

1.08 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manual.

1. Submit manufacturer’s/installer’s standard operation and maintenance manual, in accordance with ASME A17.1/CSA B44.

B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.

1.09 QUALITY ASSURANCE

A. Installer Qualifications: Elevator manufacturer or an authorized representative who is trained and approved by manufacturer.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle materials, components and equipment in manufacturer's protective packaging. Store materials, components, and equipment off of ground, under cover, and in a dry location.

1.11 COORDINATION

A. Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.

B. Coordinate locations and dimensions of other work specified in other Sections that relates to hydraulic elevators, including pit ladders; electrical service; and electrical outlets, lights, and switches in hoistways, pits, and machine rooms. Include other trades as necessary for a complete modernization.

1.12 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

2. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 HYDRAULIC ELEVATOR CONTROL MANUFACTURERS

A. SMARTRISE ENGINEERING, INC

B. MOTION CONTROL ENGINEERING, INC.

C. ELEVATOR CONTROLS, INC.

2.02 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with ASME A17.1/CSA B44 “Safety Code for Elevators and Escalators”.

B. Accessibility Requirements: Comply with Section 407 in the United States Access Board's 2010 ADA- ABA Accessibility Guidelines and with ICC A117.1.

2.03 ELEVATOR DESCRIPTION

A. Elevator System, General: Elevator modernization includes the replacement of controller (VA controls), pump unit, and associated piping and wiring. Existing jack assembly is to be examined and reconditioned. Existing elevator car and frame assemblies, hoistway steel and related car support structures are to be are to be refurbished.

B. Elevator Descriptions:

1. Elevators:holeless oil hydraulic passenger elevator

2. Stops:
   a. Elevator – 3 stops, front opening (Floors Ground, First and Second)

3. Travel Distance: 23’-4" (V.I.F)

4. Power Supply: Refer to Electrical Drawings and Specifications for power requirements and conditions.

5. Rated Load: 3,500 lb.

6. Rated Speed: 125 fpm.

7. Operation System: Selective, collective.

8. Auxiliary Operations:
   a. Battery-powered lowering.
   b. Automatic operation of lights and ventilation fans.

9. Security Features: Access control card operation.

10. Car Enclosures:
    a. Existing cab is to be reused and refurbished. All finishes to be replaced.
    b. Existing cab overall dimensions 6'-9 5/8” width x 5’-2 5/8” depth (V.I.F)
    c. Front Walls (Return Panels): Satin stainless steel, No. 4 finish
    d. Car Fixtures: Satin applied stainless steel, No. 4 finish.
    e. Side and Rear Wall Panels: Satin stainless steel, No. 4 finish.
    f. Door Faces (Interior): Satin stainless steel, No. 4 finish.
    g. Door Sills: Retain and recondition existing.
    h. Ceiling: Stainless steel, see 2.07, B. below.
    i. Handrails: Rectangular satin stainless steel, located at sides and rear of car, see 2.07, B. below.
    j. Floor prepared to receive resilient flooring (specified in Section 09 65 19 "Resilient Flooring").

11. Hoistway Entrances:
    a. Existing hoistway entrances are to be reused. Existing openings approximately 42" wide x 84" tall.
    b. Type: Single Speed Side Opening.
    c. Doors: Provide new code compliant. UL listed door. Stainless steel, No. 4 finish.
       1) Door Operation: Automatic, D.C. Powered
    d. Frames: Reface existing with new. Stainless steel, No. 4 finish.
    e. Sills: Retain and recondition existing.

12. Hall Fixtures Satin stainless steel, No. 4 finish
    a. Hall fixtures are to be new, and replace existing floor push buttons, access controls, and fire emergency key switches.
    b. Provide new code compliant signage at all floors, including 4" tactile Braille jamb plates and emergency evacuation signage.

13. Additional Requirements:
    a. Provide inspection certificate, mounted under acrylic cover with frame made from satin stainless steel, No. 4 finish.
    b. Infrared curtain unit (ICU) door protection
    c. Emergency cab lighting and alarm.
    d. Locate all fixtures to comply with ADA
    e. Exhaust fan – 2 speed

2.04 MACHINE ROOM SYSTEMS AND COMPONENTS

A. Pump Units (New): Remove and replace existing unit with new positive displacement type with a maximum of 10 percent variation between no load and full load and with minimum pulsations.

1. Pump shall be submersible type with submersible squirrel-cage induction motor and shall be suspended inside oil tank from vibration isolation mounts. Provide appropriate sized AC pump motor, and pressure compensated hydraulic flow control valve.

2. Motor shall have wye-delta starting.

3. Motor shall have variable-voltage, variable-frequency control.

4. Remove and dispose of all existing hydraulic oil lines, mufflers. victaulic couplings and connectors.

B. Hydraulic Silencers (New): System shall have hydraulic silencer containing pulsation- absorbing material in blowout-proof housing at pump unit.

C. Piping (New): Provide new 2" or greater schedule 80 piping, flexible oil lines and tank hoses with 2" or greater Victaulic couplings, seals and connectors.

D. Hydraulic Fluid (New): Elevator manufacturer's standard fire-resistant fluid with additives as needed to prevent oxidation of fluid, corrosion of cylinder and other components, and other adverse effects.

E. Car Frame and Platform: Existing frame and platform assemblies are to be retained. Recondition and align existing car sling, platform and car sill.

1. Replace missing car sling assembly hardware as required.

2. Provide new:
   a. 48" code compliant steel toe guards.
   b. Sound isolation, steady plates and mounting hardware.
   c. Piston platen plates and steel bolster assemblies as required.
   d. Spring tension car roller guides (Basis of design Model B by Elsco).

F. Pit equipment:

1. Provide new:
   a. Automatic oil recovery unit and related return line.

2. Recondition existing:
   a. Car and counterweight spring buffers.
   b. Steel pit channels and buffer stands.

G. Hoistway Steel and related Car Support Structures

1. Thoroughly clean and remove all debris

2. Secure/tighten all existing fasteners. Replace missing mounting hardware as required.

3. Clean and paint all:
   a. Existing steel fascias, toe guards and dust covers at all landings.
   b. New steel pit channels, buffer stands, pit ladders and repairs to concrete flooring as required by hydraulic cylinder replacement.
   c. All main rail sections and fishplate adapters.

2.05 OPERATION SYSTEMS

A. General: Provide new replacement computerized microprocessor operation system as required to provide type of operation indicated. Include computer based logic dispatching capabilities, interface software and factory wiring.

1. Provide new lockable wall mounted NEMA class 1 controller cabinet enclosures.

B. Auxiliary Operations:

1. Provide manual lowering devices

2. Provide battery-powered emergency descent units: When power fails, car is lowered to the lowest floor, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.

C. Security Features: Security features shall not affect emergency firefighters' service.

1. Key Card Access Control Operation: Push buttons are activated and deactivated by card reader security at hall push-button stations.

D. Replace existing starter panel with new size 2 relay starter control panels with electronic "soft start" in-line Wye/Delta starters.

E. Provide associated transformers, overload protection devices, control fuses. All electrical wiring from fused main line disconnect switches is to be replaced, including all conduit, trough work and raceway throughout the elevator machine room and hoistway and from the controls to appropriate car, hoistway, and halt signal destinations. Provide junction boxes, terminal blocks and connectors as required.

2.06 DOOR-REOPENING DEVICES

A. Infrared Array: Provide door-reopening device with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more light beams shall cause doors to stop and reopen.

B. Nudging Feature: After car doors are prevented from dosing for predetermined adjustable time, through activating door-reopening device, a loud buzzer shall sound and doors shall begin to close at reduced kinetic energy.

2.07 CAR ENCLOSURES

A. General: Existing car enclosure is to be reused. Protect from damage during the modernization period. Cab interior finishes are to be replaced with new.

B. Materials and Finishes: Manufacturer's standards, but not less than the following:

1. Floor Finish: Resilient flooring as Specified in Section 09 6519

2. Interior Cab Finish: SS #4 wall finish with 3” flat bar handrail attached to stainless steel band.

3. Utilize car recesses and cutouts for signal equipment.

4. Fabricate car door frame integrally with front wall of car.

5. Doors:
   a. Clad with No. 4 stainless steel.
   b. Car door components and related operating devices are to be replaced. Provide and install new:
      1) Car door tracks and hangers.
      2) Neoprene car door rollers, track eccentrics and oilers.
      3) Closed loop car door operators and motors.
      4) Door linkages, drive arms and door belts.

5) Zone-locking car door mechanical clutches.
6) Mechanical car door restrictors.
7) Electro-mechanical car door gate switches and assoc. elec. wiring.

6. Sight Guards: Provide sight guards on car doors.

7. Sills: Clean and refurbish existing sills.

8. Ceiling: modular downlight ceiling – six stainless steel panels with #4 finish and one downlight in each panel. Equivalent systems by other manufacturers will also be considered acceptable.

C. Replace existing Car Top Inspection Station and Positioning Selector. Provide new:

1. Digital landing device and positioning encoder.

2. Steel hoistway selector tape, car top reader and guides.

3. Code compliant car top inspection station equipped with 110 volt receptacle outlet and lighting.

4. Mechanical hoistway limit switches.

5. Mounting brackets, installation adaptors and associated hardware.

2.08 HOISTWAY ENTRANCES

A. General: Existing Hoistway Entrance Assemblies are to be refurbished and reclad with No. 4 stainless steel. Protect from damage during the modernization period.

B. Materials and Fabrication: Manufacturer's standards, but not less than the following:

1. Frames: Existing frames are to be re-faced (clad) with new satin finish no. 4 stainless steel. Field verify existing dimensions prior to fabrication. Minimize disturbance of existing VCT flooring and resilient wall base to limit patching.

2. Doors: Hoistway door components and related operated operating devices are to be replaced.
   a. Provide and install new:
      1) One speed, side sliding hoistway doors. Satin finish No.4 stainless steel.
      2) Hoistway door tracks and hangers.
      3) Neoprene hoistway door rollers, track eccentrics and oilers.
      4) Electrical interlocks, relating cables and engaging roller mechanisms.
      5) Electrical door lock wiring, flexible conduit and associated connectors.
      6) Mechanical door sill closures and/or spirator closers.
      7) Nylon door gib inserts, brackets, fire rated door restrictor plates and door eccentrics.
   b. Provide new floor identification stencils on interior surface of hoistway doors
   c. Provide and install new Mechanical operating devices and mounting hardware as required to properly secure all door panels in strict compliance with approved industry standards and national ANSI code regulations.

3. Sight Guards: Provide sight guards on doors matching door edges.

4. Sills: Clean and refurbish existing sills.

2.09 SIGNAL EQUIPMENT

A. General: Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Provide vandal-resistant buttons and lighted elements illuminated with LEDs.

B. Car-Control Stations: Provide recessed car-control stations. Mount in return panel adjacent to car door unless otherwise indicated.

1. Mark buttons and switches for required use or function. Use both tactile symbols and Braille.

2. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it. with text and graphics as required by authorities having Jurisdiction.

C. Emergency Communication System: Approved manufacturer: K-Tech Connect. Provide new replacement two-way voice communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.

1. Connect existing telephone wiring in machine room to new two way communication system.

2. Contractor shall provide 24/7 monitoring service of communication system for duration of elevator warranty, for two (2) years in this instance.

3. County shall supply and maintain a dedicated phone line to the machine room.

D. Car Position Indicator: Provide illuminated, digital-type car position indicator, located above car door or above car-control station. Also, provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors serviced. Include travel direction arrows if not provided in car-control station.

E. Hall Push-Button Stations: Provide one hall push-button station at each landing.

1. Provide new replacement jamb-mounted units.

2. Equip units with buttons for calling elevator and for indicating applicable direction of travel.

F. Hall Lanterns: Units with illuminated arrows; however, provide single arrow at terminal landings. Provide the following:

1. Replacement corridor directional lantern.

G. Hall Annunciator: With each hall lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.

1. At manufacturer's option, audible signals may be placed on cars.

H. Emergency Pictorial Signs: Fabricate from materials matching hall push-button stations, with text and graphics as required by authorities having jurisdiction, indicating that in case of fire, elevators are out of service and exits should be used instead. Provide one sign at each hall push-button station unless otherwise indicated.

2.10 FINISH MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, commercial steel, Type B, exposed, matte finish.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, commercial steel, Type B, pickled.

C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.

D. Stainless-Steel Bars: ASTM A 276, Type 304.

E. Stainless-Steel Tubing: ASTM A 554, Grade MT 304.

F. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063.

G. Nickel Silver Extrusions: ASTM B 151/B 151M, Alloy UNS No. C74500 or No. C77600.

H. Plastic Laminate: High-pressure type complying with NEMA LO 3, Type HGS for flat applications.

PART 3 • EXECUTION

3.01 EXAMINATION

A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Verify critical dimensions and examine supporting structure and other conditions under which elevator work is to be installed.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Examine exterior surface conditions of existing hydraulic jacks and pistons. Inspect piston seams for irregularities and repair same. Remove surface scars from piston exteriors and hone same.

B. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS workmanship and welding operator qualification standards.

C. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts to minimize vibration transmission to structure and structure-borne noise due to elevator system.

D. Install new oil piping above the floor.

E. Lubricate operating parts of systems as recommended by manufacturers.

F. Alignment: Coordinate existing hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with car. Where possible, delay installation of sills and frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.

G. Leveling Tolerance: 1/4 inch, up or down, regardless of load and travel direction.

H. Locate hall signal equipment for elevators as follows unless otherwise indicated:

1. At locations of existing removed hall signal equipment.

3.03 FIELD QUALITY CONTROL

A. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.

B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times that tests are to be performed on elevators.

3.04 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate elevator(s).

B. Check operation of elevator with Owner's personnel present before date of Substantial Completion and again not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

3.05 MAINTENANCE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 24 months' full maintenance by skilled employees of elevator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Perform maintenance during normal working hours.

2. Perform emergency callback service during normal working hours with response time of two hours or less.

3. Include 24-hour-per-day, 7-day-per-week emergency callback service with response time of two hours or less.

B. Maintenance contract is to be executed independently from modernization contract. Within the elevator modernization bid, include a line item for maintenance costs. Maintenance contract will be executed based off cost submitted within Modernization bid.

END OF SECTION

SECTION 210500 - COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.

B. QUALITY ASSURANCE

1. Installer Qualifications: Installation and alterations of fire protection piping, equipment, specialties, and accessories, and repair and servicing of equipment shall be performed only by a qualified installer. The term qualified means experienced in such work (experienced shall mean having a minimum of 5 years of experience in the design and instalation of projects similar in size and scope to this project), familiar with all precautions required, and has complied with all the requirements of the authority having jurisdiction. Upon request, submit evidence of such qualifications to the Architect. Refer to Division 1 Section: "Definitions and Standards" for definitions for "Installers."

2. Qualifications for Welding Processes and Operators: Comply with the requirements of AWS D10.9, Specifications for Qualifications of Welding Procedures and Welders for Piping and Tubing, Level AR 3."

PART 2 - PRODUCTS

2.1 SLEEVES

A. Mechanical Sleeve Seals: Modular rubber sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

B. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

C. Galvanized-Steel Pipe Sleeves: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

D. PVC Pipe: ASTM D 1785, Schedule 40.

2.2 ESCUTCHEONS & FLOOR PLATES

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Stamped-Steel Type: With spring clips and chrome-plated finish.

C. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed or exposed-rivet hinge, and spring-clip fasteners.

D. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

E. Split-Casting Floor Plates: Cast brass with concealed hinge.

2.3 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

2.4 SEISMIC-RESTRAINT DEVICES

A. Channel Support System: MFMA-4, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.

B. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face and matched to type and size of attachment devices used.

C. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.

1. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

PART 3 - EXECUTION

3.1 GENERAL PIPING INSTALLATIONS

A. Install piping free of sags and bends.

B. Install fittings for changes in direction and branch connections.

C. Sleeves:

1. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
2. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
3. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

D. Escutcheons & Floor Plates:

1. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
2. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
3. Install floor plates for piping penetrations of equipment-room floors.

4. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

E. Install unions at final connection to each piece of equipment.

END OF SECTION 210500

SECTION 211000 - WATER-BASED FIRE-SUPPRESSION SYSTEMS

PART 1. - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data for valves, sprinklers, specialties, and alarms, for wet sprinkler systems.

2. The existing sprinkler system shall be modified per new Lobby layouts (Terrace and First thru fifth floors).

3. Submit sprinkler system drawings identified as "working plans" and calculations according to NFPA 13. Submit required number of sets to authorities having jurisdiction for review, comment, and approval. Include system hydraulic calculations.

4. Submit test reports and certificates as described in NFPA 13.

B. Design and Installation Approval: Acceptable to authorities having jurisdiction.

C. Hydraulically design sprinkler systems according to NFPA 13.

D. Comply with NFPA 13 and NFPA 70.

E. UL-listed and -labeled and FMG-approved pipe and fittings.

PART 2. PRODUCTS

2.1 PIPE AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795.

B. Copper Tube: ASTM B 88, Type L or M; drawn temper.

C. Cast-Iron Threaded Flanges: ASME B16.1, Class 250, raised ground face, bolt holes spot faced.

D. Cast-Iron Threaded Fittings: ASME B16.4, Class 250, standard pattern.

E. Grooved-End Fittings: UL-listed and FMG-approved, ASTM A 536, Grade 65-45-12 ductile iron or ASTM A 47 Grade 32510 malleable iron, with grooves or shoulders designed to accept grooved couplings.

F. Grooved-End Couplings: UL 213, ASTM A 536 ductile-iron or ASTM A 47 malleable-iron housing, with enamel finish. Include gaskets, bolts, and accessories.

G. Wrought-Copper Fittings: ASME B16.22, streamlined pattern.

H. Steel Press-Seal Fittings: UL 213, FMG approved, 175-psig pressure rating, for use with Schedule 5, plain-end, steel pipe and fittings; with butylene O-rings, and pipe stop.

I. Provide hangers, supports, and seismic restraints with UL listing and FMG approval

for fire-protection systems.

2.2 VALVES

A. Gate Valves: UL 262, cast bronze, threaded ends, solid wedge, outside screw and yoke, rising stem.

B. Swing Check Valves, NPS 2 and Smaller: UL 312 or MSS SP-80, Class 150; bronze body with bronze disc and threaded ends.

C. Swing Check Valves, NPS 2-1/2 and Larger: UL 312, cast-iron body and bolted cap, with bronze disc or cast-iron disc with bronze-disc ring and flanged ends.

2.3 SPRINKLERS

A. Automatic Sprinklers: With heat-responsive element complying with the following:

1. UL 1767, for early-suppression, fast-response applications.

B. Sprinkler Types and Categories: Nominal ½-inch orifice for "Ordinary" temperature classification rating, unless otherwise indicated or required by application.

C. Sprinkler types include the following:

1. Upright, pendent, and sidewall sprinklers.

2. Extended coverage and quick-response sprinklers.

3. Pendent and sidewall, dry-type sprinklers.

D. Sprinkler Finishes: Chrome-plated and bronze.

E. Sprinkler Escutcheons: Chrome-plated steel, one piece, flat; with finish to match sprinklers.

F. Sprinkler Guards: Wire-cage type, including fastening device.

G. Sprinkler Cabinets: Finished steel cabinet and hinged cover, with space for minimum of 6 spare sprinklers plus sprinkler wrench, suitable for wall mounting. Include number of sprinklers required by NFPA 13 and one wrench for sprinklers. Include separate cabinet with sprinklers and wrench for each style sprinkler on Project.

2.4 PIPING SPECIALTIES AND ALARM DEVICES

A. Water-Flow Indicators: UL 346; electrical-supervision, vane-type water-flow detector; with 250-psig pressure rating; and designed for horizontal or vertical installation. Include 2 single-pole, double-throw, circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.

B. Pressure Switches: UL 753; electrical-supervision-type, water-flow switch with retard feature. Include single-pole, double-throw, normally closed contacts and design that operates on rising pressure and signals water flow.

C. Valve Supervisory Switches: UL 753; electrical; single-pole, double throw; with normally closed contacts. Include design that signals controlled valve is in other

than fully open position.

D. Pressure Gages: existing pressure gages shall be tested. Any malfunction shall be reported and replaced with pressure gage. The pressure gages shall be UL 393, 3-1/2- to 4-1/2-inch- diameter dial with dial range of 0 to 250 psig.

PART 3. EXECUTION

3.1 PIPE AND FITTING APPLICATION

A. Use steel pipe with threaded, press-seal, roll-grooved, or cut-grooved joints; copper tube with wrought-copper fittings and brazed joints; or CPVC plastic pipe and fittings and metal-to-plastic transition fittings with solvent-cemented joints.

1. For steel pipe joined by threaded fittings, use Schedule 40.

2. For steel pipe joined by welding or roll-grooved pipe and fittings, use Schedule 10.

3. For steel pipe NPS 2 and smaller, joined by press-seal fittings, use Schedule 5 pipe, fabricated with manufacturer's press-seal tools.

3.2 PIPING INSTALLATION

A. Install "Inspector's Test Connections" in sprinkler piping, complete with shutoff valve.

3.3 SPRINKLER APPLICATIONS

A. Rooms without Ceilings: Upright sprinklers.

B. Rooms with Suspended Ceilings: Pendent sprinklers with escutcheon.

C. Wall Mounting: Sidewall sprinklers with escutcheon.

D. Sprinklers Subject to Freezing: Pendent dry-type, and sidewall dry-type sprinklers with escutcheon.

E. Sprinkler Finishes: Chrome plated in finished spaces exposed to view, rough bronze in unfinished spaces not exposed to view, and dull chrome in residential spaces.

F. Install sprinklers in suspended ceilings in center of long dimension of ceiling panels.

3.4 TESTING

A. Flush, test, and inspect sprinkler piping systems according to NFPA 13, Chapter "System Acceptance."

END OF SECTION 211000

SECTION 221413 - FACILITY STORM DRAINAGE PIPING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.
2. For solvent cements and adhesive primers, documentation including printed statement of VOC content.
3. Elevator sump pump discharged drain pipe is part of this section.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Minimum Pressure Requirement for Storm Drainage: 10-foot head of water.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Comply with NSF/ANSI 14, "Plastics Piping System Components and Related Materials," for plastic piping components.

2.2 PIPES AND FITTINGS

A. PVC Plastic, DWV Pipe and Fittings: ASTM D 2665, Schedule 40, with PVC socket type fittings made to ASTM D 3311, drain, waste, and vent patterns.

1. Adhesive Primer: ASTM F 656.

a. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Solvent Cement: ASTM D 2564.

a. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Comply with requirements in Section 220513 "Common Work Results for Plumbing" for basic piping installation requirements.

B. Install wall penetration system at each pipe penetration through foundation wall. Make installation watertight. Comply with requirements in Section 220513 "Common Work Results for Plumbing" for wall penetration systems.

1. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

C. Make changes in direction for storm drainage piping using appropriate branches, bends, and long-sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

D. Install storm drainage piping at the following minimum slopes unless otherwise indicated:

1. Building Storm Drain: 1 percent downward in direction of flow for piping.
2. Horizontal Storm-Drainage Piping: 2 percent downward in direction of flow.

E. Install PVC storm drainage piping according to ASTM D 2665.

F. Install underground PVC storm drainage piping according to ASTM D 2321.

G. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

H. Comply with requirements in Section 220513 "Common Work Results for Plumbing" for basic piping joint construction.

I. Comply with requirements in Section 220513 "Common Work Results for Plumbing" for pipe hanger and support devices.

3.2 INSPECTION

A. Inspect and test piping systems following procedures of authorities having jurisdiction.

3.3 PIPE SCHEDULE

A. Aboveground Applications: PVC plastic, DWV pipe and fittings with solvent-cemented joints.

B. Belowground Applications: PVC plastic, DWV pipe and fittings with solvent-cemented joints.

END OF SECTION 221413

SECTION 221429 – ELEVATOR SUMP PUMPS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.

a. Include rated capacities, operating characteristics, electrical characteristics, furnished specialties, accessories., and motor horsepower,.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 778 for motor-operated water pumps.

2.2 ELEVATOR SUMP PUMPS

A. Submersible Elevator Sump Pumps: Factory-assembled and -tested, end-suction, centrifugal sump pumps as defined in HI 1.1-1.2 and HI 1, for automatic operation..

1. Manufacturers:
   a. Stancor, Inc.
   b. Liberty Pumps.
   c. Zoeller Company.

2. The Elevator Sump Pumps shall be: Refer to plumbing drawings P-1 for specifications.

B. Basins: Refer to floor plans.

2.3 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 220513 "Common Motor Requirements for Plumbing Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
2. Motor shall be non-overloading within full range of pump performance.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install elevator sump pumps according to applicable requirements in HI 1.4.

B. Install pumps with access for periodic maintenance, including removal of motors, impellers, couplings, and accessories.

C. Support pumps and piping so weight of piping is not supported by pump volute.

D. Install electrical connections for power, controls, and devices.

E. Submersible Elevator Sump Pumps: Set pumps in elevator pits. Make connections to storm drainage piping.

F. Install swing check valve and gate or ball valve on each elevator sump pump discharge. Include spring-loaded or weighted-lever check valves for piping NPS 2-1/2 and larger.

END OF SECTION 221429

SECTION 230500 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Hangers and Supports for Plumbing Piping Equipment:

1. Structural Performance: Hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

a. Design supports for multiple pipes capable of supporting combined weight of supported systems, and system contents.
b. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
c. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

2.2 SLEEVES AND SLEEVE SEALS

A. Galvanized-Steel Pipe Sleeves: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

B. PVC Pipe: ASTM D 1785, Schedule 40.

C. Galvanized-Steel Sheet: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.

D. Modular rubber sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Carbon steel.
3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

E. Stack-Seal Fitting: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring, bolts, and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with setscrews.

2.3 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

2.4 ESCUTCHEONS AND FLOOR PLATES

A. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.

B. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

C. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

2.5 HANGERS AND SUPPORTS FOR HVAC

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

C. Fastener Systems:

1. Verify suitability of fasteners in this article for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick.
2. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
3. Mechanical-Expansion Anchors: Insert-wedge-type, [zinc-coated] [stainless-]steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

D. Miscellaneous Materials:

1. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
2. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

a. Properties: Nonstaining, noncorrosive, and nongaseous.
b. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.1 GENERAL PIPING INSTALLATIONS

A. Install piping free of sags and bends.

B. Install fittings for changes in direction and branch connections.

C. Sleeves:

1. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
2. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

    a. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

3. Install stack-sleeve fittings in new slabs as slabs are constructed.
4. Exterior Wall, Pipe Penetrations: Mechanical sleeve seals installed in steel or cast-iron pipes for wall sleeves.
5. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078446 "Penetration Firestopping."

D. Sleeve-Seal-System Installation:

1. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
2. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

E. Escutcheons & Floor Plates:

1. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
2. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
3. Install floor plates for piping penetrations of equipment-room floors.
4. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

F. Install unions at final connection to each piece of equipment.

G. Install dielectric unions and flanges to connect piping materials of dissimilar metals in gas piping.

H. Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals in water piping.

3.2 HANGERS AND SUPPORTS

A. Comply with MSS SP-69 and MSS SP-89. Install building attachments within concrete or to structural steel.

B. Install hangers and supports to allow controlled thermal and seismic movement of piping systems.

C. Install powder-actuated fasteners and mechanical-expansion anchors in concrete after concrete is cured. Do not use in lightweight concrete or in slabs less than 4 inches (100 mm) thick.

D. Load Distribution: Install hangers and supports so piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

E. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30 (DN 15 to DN 750).
2. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4 (DN 15 to DN 100), to allow off-center closure for hanger installation before pipe erection.
3. Adjustable Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8 (DN 15 to DN 200).
4. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8 (DN 15 to DN 200).
5. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2 (DN 15 to DN 50).

F. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20 (DN 20 to DN 500).
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20 (DN 20 to DN 500), if longer ends are required for riser clamps.

3.3 GENERAL EQUIPMENT INSTALLATIONS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

E. Mix and install grout for pump and other equipment base plates, and anchors. Place grout, completely filling equipment bases.

END OF SECTION 230500

SECTION 230700 - HVAC INSULATION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.
2. For adhesives and sealants, documentation including printed statement of VOC content.

B. Quality Assurance: Labeled with maximum flame-spread index of 25 and maximum smoke-developed index of 50 according to ASTM E 84.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics:

1. Indoor Insulation and related materials: To be factory labeled designating maximum flame-spread index of 25 or less, and smoke-developed index of 50 or less according to ASTM E 84.
2. Outdoor Insulation and related materials: To be factory labeled designating maximum flame-spread index of 75 or less, and smoke-developed index of 150 or less according to ASTM E 84.

2.2 INSULATION MATERIALS

A. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

B. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

C. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 INSULATION INSTALLATION

A. Comply with requirements of the Midwest Insulation Contractors Association's "National Commercial & Industrial Insulation Standards" for insulation installation on pipes and equipment.

B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

C. Insulation Installation at Fire-Rated Wall, Partition, and Floor Penetrations: Install insulation continuously through penetrations. Seal penetrations. Comply with requirements in Section 078413 "Penetration Firestopping."

D. Flexible Elastomeric Insulation Installation:

1. Seal longitudinal seams and end joints with adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
2. Insulation Installation on Pipe Fittings and Elbows: Install mitered sections of pipe insulation. Secure insulation materials and seal seams with adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.2 HVAC PIPING INSULATION SCHEDULE

A. Refrigerant Suction and Hot-Gas Piping: Insulation shall be the following:

1. Flexible Elastomeric: 1 inch thick.

B. Refrigerant Suction and Hot-Gas Flexible Tubing: Insulation shall be the following:

1. Flexible Elastomeric: 1 inch thick.

END OF SECTION 230700

SECTION 232300 - REFRIGERANT PIPING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop based on manufacturer's test data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIRMENTS

A. Line Test Pressure for Refrigerant R-22:

1. Suction Lines for Heat-Pump Applications: 325 psig (2241 kPa).
2. Hot-Gas and Liquid Lines: 325 psig (2241 kPa).

B. Comply with ASME B31.5, "Refrigerant Piping," and with ASHRAE 15, "Safety Code for Mechanical Refrigeration."

2.2 TUBES AND FITTINGS

A. Copper Tube: ASTM B 88, Types K and L (ASTM B 88M, Types A and B) and ASTM B 280, Type ACR.

B. Wrought-Copper Fittings and Unions: ASME B16.22.

C. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.

D. Brazing Filler Metals: AWS A5.8.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with requirements in Section 230500 "Common Work Results for HVAC" for basic piping installation requirements.

B. Install wall penetration system at each pipe penetration. Make installation watertight. Comply with requirements in Section 230500 "Common Work Results for HVAC" for wall penetration systems.

C. Install refrigerant piping and charge with refrigerant according to ASHRAE 15.

D. Insulate suction lines to comply with Section 230700 "HVAC Insulation."

E. Slope refrigerant piping as follows:

1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
2. Install horizontal suction lines with a uniform slope downward to compressor.
3. Install traps and double risers to entrain oil in vertical runs.
4. Liquid lines may be installed level.

F. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

3.2 PIPING SCHEDULE FOR REFRIGERANT R-410 A

A. Suction Lines: Copper, Type ACR, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

B. Hot-Gas and Liquid Lines: Copper, Type ACR, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

END OF SECTION 232300

SECTION 238119 - SELF-CONTAINED AIR-CONDITIONERS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.
2. Documentation indicating that units comply with ASHRAE 62.1, Section 5 - "Systems and Equipment."

B. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace refrigeration components that fail in materials or workmanship within five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."

C. Comply with applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - "Ventilation Rate Procedures," and Section 7 - "Construction and Startup."

D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

1. EER: Equal to or greater than that prescribed by ASHRAE/IESNA 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

2.2 PACKAGED UNITS

A. Description: Self-contained, factory-assembled, -tested, and -wired unit.

1. Acceptable Manufacturers: Mitsubishi, Daiken, LG
2. Basis-of-Design Product: Mitsubishi as specified on dwgs

B. Configuration: Horizontal, Ceiling mounted & Wall mounted.

C. Cabinet: Structural-steel frame and galvanized-steel panels with baked-enamel finish with access doors or panels. Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1. Minimum 1/2-inch- (13-mm-) thick, acoustic duct liner complying with ASTM C 1091 and having a microbial coating on cabinet interior and control panel on cabinet interior and control panel.

D. Discharge Plenum: Cabinet extension with directional louvers.

E. Evaporator Fan: Galvanized steel; double-width, double-inlet, forward-curved centrifugal fan; statically and dynamically balanced. Direct drive with fan and motor resiliently mounted. Cast-iron or steel sheaves, dynamically balanced, bored to fit shafts and keyed. Adjustable pitch selected so required rpm are obtained when set at midposition.

F. Motor, multispeed, PSC type, or single speed, ODP polyphase. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

G. Evaporator and Condenser Coil: Seamless copper tubes expanded into aluminum fins; leak tested to 425 psig (2930 kPa).

H. Remote Air-Cooled Condenser: Factory assembled and tested; consisting of condenser coil, fans and motors, and operating controls. Direct-drive propeller-type fans with permanently lubricated motors and built-in thermal-overload protection. Low-ambient control cycle fans and modulates condenser-fan damper assembly to permit operation down to 0 deg F (minus 18 deg C).

1. Annealed-copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; insulated suction line; appropriate fittings at ends, and service valves for both suction and liquid lines.

I. Compressor: Hermetic scroll], 3600 rpm maximum; resiliently mounted with positive lubrication and internal motor protection.

J. Refrigerant Circuits: Separate circuit for each compressor. Minimum two circuits for units larger than five nominal tons. Equalized expansion valve with replaceable thermostatic element, refrigerant filter-dryer, high- and low-pressure safety switches, thermal overload protection, anti-recycle timer, brass service and charging valves installed in hot-gas and liquid lines, and charged with R-410A refrigerant.

1. Mount coil assembly over stainless-steel drain pan complying with ASHRAE 62.1.

K. Water Coil: Copper tube, with mechanically bonded aluminum fins; two-position control valve; and leak tested to 300 psig (2070 kPa) underwater.

L. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors; manual-reset thermal cutout; airflow proving device; and fuses in terminal box for overcurrent protection.

M. Disposable Filters: 1-inch- (25-mm-) thick, glass-fiber, pleated panel filters. MERV rating to be 8.

N. Control Package: Factory wired and tested, including control-circuit transformer.

1. Thermostat: Remote, programmable for occupied/unoccupied periods and temperatures to cycle compressor or heating coil. Provide field wiring for condenser fan operation with compressor.
2. Supply fan runs continuous during occupied periods, and cycles for night setback when unoccupied.

2.3 CAPACITIES AND CHARACTERISTICS

A. Refer to dwgs for model numbers and capacities

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Anchor units to structure.

C. Mount cabinet and remote air-cooled condenser on rubber-in-shear pads for minimum 1-inch (25-mm)] static deflection.

D. Install piping adjacent to unit to allow service and maintenance.

E. Install refrigerant piping between self-contained air-conditioning unit and remote condenser.

F. Install condensate piping sloped @ 2%.

END OF SECTION 238119

SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For sleeve seals.
2. Shop Drawings: For seismic restraints, signed and sealed by a qualified professional engineer.

a. Preapproval and Evaluation Documentation: By an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval tests or calculations.
b. Design analysis to support selection and arrangement of seismic restraints.
c. Fabrication and arrangement details of all resiliently mounted equipment.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic-Restraint Loading:

1. Site Class as Defined in the IBC: C D E F.
2. Assigned Seismic Use Group or Building Category as Defined in the IBC: I.

a. Component Importance Factor: 1.5.
b. Component Response Modification Factor: 5.0.
c. Component Amplification Factor: 2.5.

3. Design Spectral Response Acceleration at Short Periods (0.2 Second): 80%.
4. Design Spectral Response Acceleration at 1.0 Second Period: 80%.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NFPA 70.

2.2 RACEWAYS

A. Raceways:

1. EMT: ANSI C80.3 and UL 797.
2. ENT: NEMA TC 13 and UL 1653.
3. FMC: UL 1; zinc-coated steel.
4. IMC: ANSI C80.6, zinc-coated steel, with threaded fittings.
5. GRC: ANSI C80.1 and UL 6, hot-dip galvanized.
6. LFMC: UL 360, zinc-coated, flexible steel with sunlight-resistant and mineral-oil-resistant plastic jacket.
7. RNC: UL 621 and NEMA TC 2, Type EPC-40-PVC, with NEMA TC3 fittings.

8. Raceway Fittings: Specifically designed for raceway type used in Project.

B. Wireways: Sheet metal sized and shaped, with screw covers.

C. Surface Raceways:

1. Metal: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.
2. Plastic: PVC, extruded and fabricated to size and shape indicated in color selected, with snap-on cover and mechanically coupled connections with plastic fasteners.

2.3 CONDUCTORS AND CABLES

A. Conductors:

1. Comply with NEMA WC70.
2. Conductors, No. 10 AWG and Smaller: Solid or stranded copper.
3. Conductors, Larger Than No. 10 AWG: Stranded copper.
4. Insulation: Thermoplastic, Type THHN-THWN or XHHW.
5. Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

2.4 GROUNDING MATERIALS

A. Conductors: Solid for No. 8 AWG and smaller, and stranded for No. 6 AWG and larger unless otherwise indicated.

1. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
2. Bare, Solid-Copper Conductors: Comply with ASTM B 3.
3. Bare, Stranded-Copper Conductors: Comply with ASTM B 8.

B. Ground Rods: Copper-clad steel, sectional type; 5/8 by 96 inches (16 by 2400 mm) in diameter.

C. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts with clamp-type pipe connectors sized for pipe.

D. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.5 ELECTRICAL IDENTIFICATION MATERIALS

A. Raceway Identification Materials: Snap-around, color-coding bands and Self-adhesive, color-coding vinyl tape.

B. Conductor Identification Materials: Color-Coding Conductor Tape: Self-adhesive vinyl tape 1 to 2 inches (25 to 50 mm) wide.

C. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, polyethylene tape with continuous metallic strip or core.

D. Tape Markers for Wire: Vinyl or vinyl-cloth, self-adhesive, wraparound type with circuit identification legend machine printed by thermal transfer or equivalent process.

E. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

F. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1.0-mm) galvanized-steel backing; and with colors, legend, and size required for application.

G. Equipment Identification Labels: Engraved, laminated acrylic or melamine label; punched or drilled for screw mounting. White letters on a dark-gray background; red letters for emergency systems.

H. Fasteners: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

2.6 SUPPORT AND ANCHORAGE COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly, and provide finish suitable for the environment in which installed.

1. Channel Dimensions: Selected for structural loading and applicable seismic forces.

B. Raceway and Cable Supports: As described in NECA 1.

C. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and fittings.

D. Mounting, Anchoring, and Attachment Components:

1. Powder-Actuated Fasteners: Threaded-steel stud.
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete.
3. Concrete Inserts: Steel or malleable-iron, slotted-support-system units similar to MSS Type 18; complying with MFMA-3 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, high strength; complying with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.7 SEISMIC-RESTRAINT COMPONENTS

A. Rated strengths, features, and application requirements shall be as defined in reports by an agency acceptable to authorities having jurisdiction.

1. Structural Safety Factor: Strength in tension, shear, and pullout force of components used shall be at least four times the maximum seismic forces to which they will be subjected.

B. Angle and Channel-Type Brace Assemblies: Steel angles or steel slotted-support-system components; with accessories for attachment to braced component at one end and to building structure at the other end.

C. Cable Restraints: ASTM A 603, zinc-coated, steel wire rope attached to steel or stainless-steel thimbles, brackets, swivels, and bolts designed for restraining cable service.

1. Seismic Mountings, Anchors, and Attachments: Devices as specified in "Support and Anchorage Components" Article, selected to resist seismic forces.
2. Hanger Rod Stiffener: Reinforcing steel angle clamped to hanger rod. Do not weld stiffeners to rods.
3. Bushings for Floor-Mounted Equipment Anchors: Neoprene units designed for seismically rated rigid equipment mountings, and matched to type and size of anchor bolts and studs used.
4. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for seismically rated rigid equipment mountings, and matched to type and size of attachment devices used.

2.8 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized-steel sheet.

D. Sleeve Seals: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Stainless steel. Include two for each sealing element.
3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.9 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining.

PART 3 - EXECUTION

3.1 GENERAL ELECTRICAL EQUIPMENT INSTALLATION REQUIREMENTS

A. Install electrical equipment to allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.

B. Install electrical equipment to provide for ease of disconnecting the equipment with minimum interference to other installations.

C. Install electrical equipment to allow right of way for piping and conduit installed at required slope.

D. Install electrical equipment to ensure that connecting raceways, cables, wireways, cable trays, and busways are clear of obstructions and of the working and access space of other equipment.

E. Install required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

F. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Comply with requirements in Section 083113 "Access Doors and Frames."

G. Install sleeve and sleeve seals of type and number required for sealing electrical service penetrations of exterior walls.

H. Comply with NECA 1.

3.2 RACEWAY AND CABLE INSTALLATION

A. Outdoor Raceways Applications:

1. Exposed or Concealed: IMC.
2. Underground, Single Run: RNC.
3. Connection to Vibrating Equipment: LFMC.
4. Boxes and Enclosures: Metallic, NEMA 250, Type 3R or Type 4.

B. Indoor Raceways Applications:

1. Exposed or Concealed: EMT.
2. Connection to Vibrating Equipment: FMC; in wet or damp locations, use LFMC.
3. Damp or Wet Locations: IMC.
4. Boxes and Enclosures: Metallic, NEMA 250, Type 1, unless otherwise indicated.

C. Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.

D. Install raceways and cables at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Locate horizontal raceway runs above water and steam piping.

E. Install raceways embedded in slabs in middle third of slab thickness where practical, and leave at least 1-inch- (25-mm-) thick concrete cover.

1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
2. Space raceways laterally to prevent voids in concrete.
3. Install conduit larger than 1-inch (27-mm) trade size, parallel to or at right angles to main reinforcement. Where conduit is at right angles to reinforcement, place conduit close to slab support.
4. Transition from nonmetallic tubing to Schedule 80 nonmetallic conduit, rigid steel conduit, or IMC before rising above floor.

F. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.

G. Install pull wires in empty raceways.

H. Connect motors and equipment subject to vibration, noise transmission, or movement with a 72-inch (1830-mm) maximum length of flexible conduit.

I. Install raceways and cables conceal within finished walls, ceilings, and floors unless otherwise indicated.

J. Install raceways and cables at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Locate horizontal raceway runs above water and steam piping.

K. Installation of Hangers and Supports:

1. Comply with NECA 1 and NECA 101 for installation requirements, except as specified in this article.
2. Separate dissimilar metals and metal products from contact with wood or cementitious materials, by painting each metal surface in area of contact with a bituminous coating or by other permanent separation.
3. Raceway Support Methods: In addition to methods described in NECA 1, EMT and RMC may be supported by openings through structure members, as permitted in NFPA 70.
4. Multiple Raceways or Cables: Install on trapeze-type supports fabricated with steel slotted channel.
5. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).
6. 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 or required by Code:

    a. To Wood: Fasten with lag screws or through bolts.
    b. To New Concrete: Bolt to concrete inserts.
    c. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
    d. To Existing Concrete: Expansion anchor fasteners.
    e. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts, Beam clamps MSS Type 19, 21, 23, 25, or 27. Complying with MSS SP-69 spring-tension clamps.
    f. To Light Steel: Sheet metal screws.
    g. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount on slotted-channel racks attached to substrate.

7. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 WIRING METHODS

A. Service Entrance: Type THHN-THWN, single conductors in raceway.

B. Exposed Feeders, Branch Circuits, and Class 1 Control Circuits, Including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

C. Feeders and Branch Circuits Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN, single conductors in raceway.

D. Feeders and Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and underground: Type THHN-THWN, single conductors in raceway.

E. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, and strain relief device at terminations to suit application.

F. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.4 GROUNDING

A. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches (600 mm) below grade.

B. Pipe and Equipment Grounding Conductor Terminations: Bolted.

C. Underground Connections: Welded.

D. Connections to Structural Steel: Bolted.

E. Install grounding conductors routed 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.

F. Install ground rods driven into ground until tops are 2 inches (50 mm) below final grade, or4 inches (100 mm) above, finished floor slab unless otherwise indicated.

G. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape.

H. Make connections without exposing steel or damaging coating if any.

I. Install bonding straps and jumpers in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

J. Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.

K. Bond to equipment mounted on vibration isolation hangers and supports so vibration is not transmitted to rigidly mounted equipment.

L. 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. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

M. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells.

1. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
2. Perform tests by fall-of-potential method according to IEEE 81.
3. Report measured ground resistances that exceeds 10 ohms.

4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

3.5 IDENTIFICATION

A. Power-Circuit Conductor Identification: For No. 3 AWG conductors and larger, at each location where observable, identify phase using color-coding conductor tape.

B. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring.

C. Warning Labels for Enclosures for Power and Lighting: Comply with 29 CFR 1910.145; identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.

D. Equipment Identification Labels:

1. Labeling Instructions:

a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
b. Outdoor Equipment: Engraved, laminated acrylic or melamine label, drilled for screw attachment.
c. Elevated Components: Increase sizes of labels and legend to those appropriate for viewing from the floor.

2. Equipment to Be Labeled:

a. Panelboards, electrical cabinets, and enclosures.
b. Electrical switchgear and switchboards.
c. Transformers.
d. Motor-control centers.
e. Disconnect switches.
f. Enclosed circuit breakers.
g. Motor starters.
h. Push-button stations.
i. Power transfer equipment.
j. Contactors.
k. Wireway, pullboxes, and junction boxes.
l. Raceway.

E. Verify identity of each item before installing identification products.

F. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

G. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.

H. Install system identification color banding for raceways and cables at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.

I. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Ungrounded service, feeder, and branch-circuit conductors.

1. Colors for 208/120-V Circuits:

    a. Phase A: Black.
    b. Phase B: Red.
    c. Phase C: Blue.

2. Colors for 480/277-V Circuits:

    a. Phase A: Brown.
    b. Phase B: Orange.
    c. Phase C: Yellow.

3. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points.

J. Underground-Line Warning Tape: Continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade.

3.6 SEISMIC REQUIREMENTS

A. Install seismic-restraint components using methods approved by the evaluation service providing required submittals for component.

B. Install bushing assemblies for anchor bolts for wall- and floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in substrate.

C. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, upper truss chords of bar joists, or at concrete members.

D. Accommodation of Differential Seismic Motion: Make flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross expansion and seismic-control joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to electrical equipment that is anchored to a different structural element than the one supporting them as they approach equipment.

3.7 SLEEVE AND SLEEVE-SEALS INSTALLATION

A. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

B. Cut sleeves to length for mounting flush with both wall surfaces.

C. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

D. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and cable unless sleeve seal is to be installed or unless seismic criteria require different clearance.

E. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

F. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Section 079200 "Joint Sealants."

G. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.

H. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

I. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between cable and sleeve for installing mechanical sleeve seals.

3.8 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Comply with requirements in Section 078413 "Penetration Firestopping."

END OF SECTION 260500

SECTION 260501 - ELECTRICAL GENERAL REQUIREMENTS

PART 1. GENERAL

1.1. DESCRIPTION OF WORK

A. The general conditions form a part of this specification and contract and shall be carefully examined by each bidder before submitting his proposal. Where general conditions clauses are repeated, in this section of the specification, it shall be understood as calling special attention to them, or as a further clarification, and shall not be assumed as negating any part of the general conditions clause. No general conditions clause referring to the work included herein shall be considered as waived unless stated herein.

B. The Contractor shall provide all supervision, labor, material, equipment, machinery, plant, and any and all other items necessary to complete the electrical systems. All items of equipment are specified in the singular; however, the Contractor shall provide the number of items of equipment as indicate on the drawings, and as required for complete systems.

C. The work "provide" as used in specifications and on plans shall mean furnish and install, complete and ready for use.

D. Singular reference to any item shall be construed to apply to as many devices as are required for the complete job.

E. Intent:

1. It is the intention of these specifications and drawings to call for finished work, tested, and ready for operation. Wherever the word "provide" is used, it shall mean "furnished and install complete and ready to use".

2. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work, the same as if herein specified or shown.

1.2. PERMITS, LICENSES, INSPECTIONS AND CERTIFICATES OF APPROVAL

A. All the work shall be performed in accordance with the latest applicable editions of the NEC, NFPA, and all local codes and regulations. Where any portion of the systems shown on the drawings is not in accordance with all applicable laws, ordinances, regulations or codes, this Contractor shall make all changes required by enforcing authorities in a manner approved by the Engineer and at no additional cost to the Owner.

B. This Contractor shall order and obtain all necessary tests, permits and certificates of approval and pay any required fees for same.

C. Upon completion of the entire system covered by these specifications, a certificate of approval from the different departments having jurisdiction, shall be obtained and then delivered to the Owner. This certificate will in no way relieve this Contractor from the terms of his warranty.

D. This Contractor is assumed to be skilled in the trade and is solely responsible for compliance with health and safety regulations, performing the work in a safe and

competent manner, and in installation procedures required for the work as outlined in these documents.

E. The Contractor shall give all necessary notices, obtain all permits and pay all government sales taxes, fees, and other costs, including utility connections or extensions, in connection with his work; file all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required certificates of inspection of his work and deliver same to the Architect before request for acceptance and final payment for work.

F. All material and equipment for the electrical portion of the mechanical systems shall bear the approval label or shall be listed by the Underwriter's Laboratories, Incorporated.

1.3. RESPONSIBILITY OF BIDDERS

A. This Contractor shall examine the drawings, specifications and job site and fully inform himself of all existing conditions and work required by the drawings and specifications before submitting his bid. Waiver of responsibility or request for additional payment based on lack of knowledge of conditions at the site will not be accepted or considered.

1.4. QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of Mechanical Equipment, of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: Firms with at least 5 years of successful installation experience with projects utilizing mechanical systems similar to those required for this project.

C. Should the Contractor discover any discrepancies between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Architect, and shall not proceed with his work until he has received instructions from the Architect.

D. The Contractor shall protect all work and material from damage and shall be liable for any damages caused.

E. The Contractor shall be responsible for work and equipment until finally inspected, tested, and accepted; he shall protect work against theft, injury or damage; and shall carefully store material and equipment received on site which are not immediately installed. Contractor shall close open ends of work with temporary covers or plugs during storage and construction to prevent entry of obstructing material.

F. Material and Workmanship: All materials and devices required for the work, except as otherwise noted on the plans, shall be new and shall be furnished and installed in strict conformance with manufacturer’s written instructions and shall be so selected an arranged as to fit properly into the allocated space. Where no specific kind or quality or material is given, a first-class standards article shall be furnished.

2.1 COOPERATION WITH OTHER TRADES:

A. Contractor shall give full cooperation to other trades and shall furnish in writing to the general contractor any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

B. Where required on the plans, Contractor shall prepare composite working drawings and sections at a suitable scale not less than ¼" = 1'0", clearly showing how work of all affected trades is to be installed, If work is installed before coordinating with other trades, or so as to cause any interference with work of other trades, then the necessary changes in work shall be made to correct the condition without extra charge.

C. The Contractor shall obtain and transmit between affected trades, all necessary templates, patterns, setting plans, and shop details for the proper installation of work and for the purpose of coordinating adjacent work.

2.1 QUESTIONS AND CLARIFICATIONS OF BID DOCUMENTS

A. Bidders shall not rely on any verbal clarification of the drawings or specifications. Any questions or clarifications shall be referred to the Architect/engineer at least five working days prior to bidding to allow for issuance of an addendum. After the five-day deadline, bidder shall make a decision and qualify the bid, if the bidder feels it necessary.

2.1 REQUIRED SUBMITTALS

A. Refer to the Conditions of the Contract (General and Supplementary) and Section "SUBMITTALS" for submittal definitions, requirements, and procedures.

B. Submittal of shop drawings, product data, and samples will be accepted only when submitted by this Contractor. Data submitted from subcontractors and material suppliers directly to the Architect/Engineer will not be processed.

C. Prior to starting any installation, submit six (6) copies (PDF format submittals are acceptable in lieu of hard paper copies) of items proposed for this work with necessary illustrations, drawings, and engineering data for review by the engineer. Submit in time to allow no less than 10 working days for checking and transmittal without delaying the construction schedule. Submit all items at one time no less than 30 days after award of the contract.

D. Submittal shall be clearly marked to show the intended item, with identification as to unit number or other marking to show location, service, and function. Submittal not marked to identify the equipment and applications will be rejected.

E. Any equipment installed without prior acceptance shall be subject to rejection unless such items were identified by name and model number in the bid documents.

F. The Contractor, by submitting the above, certifies that the materials or equipment proposed are satisfactory for the application intended, included adverse conditions that may prevail at the job site,and that the materials and equipment are in current production with no known plans to cease production.

G. The Contractor agrees that the submittals processed by the engineer are not change orders; that the purpose of submittal by Contractor is to demonstrate to the engineer that Contractor understands the design concept and that this understanding is demonstrated by indicating which equipment and materials Contractor intends to furnish and install and the fabrication and installation methods Contractor intends to use.

H. Contractor further agrees that if deviations, discrepancies, or conflicts between submittal and contract documents are discovered either prior or after submittal are processed by the engineer, the Contract Documents shall control and shall be followed.

I. Submittals shall include:

1. All equipment and materials provided under these specifications unless otherwise indicated on the plans.

2.1 SHOP DRAWINGS SUBMITTALS:

A. The Contractor shall submit for approval detailed shop drawings for all equipment and all material required to complete the project, and no material or equipment may be delivered to the job site or installed until the Contractor has in his possession the approved shop drawings for the particular material or equipment. The shop drawings shall be complete as described herein.

B. Prior to delivery of any material to job site, and sufficiently in advance of requirements to allow Architect ample time for checking, submit for approval detailed, dimensioned drawings or cuts, showing construction, size, arrangement, operating clearances, performance characteristics and capacity. Each item of equipment proposed shall be a standard catalog product of an established manufacturer and of equal quality, finish, and durability to that specified.

C. Samples, drawings, specifications and catalogs, submitted for approval, shall be properly labeled indicating specific service for which material or equipment is to be used, section and article number of specifications governing, Contractor's name, and name of job.

D. Catalogs, pamphlets, or other documents submitted to describe items on which approval is being requested, shall be specific and identification in catalog, pamphlet, etc. of item submitted shall be clearly made in ink. Data of a general nature will not be accepted.

E. Approval rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are approved, said approval does not mean that drawings have been checked in detail; said approval does not in any way relieve the Contractor from his responsibility or necessity of furnishing material or performing work as required by the contract drawings and specifications.

F. Failure of the Contractor to submit shop drawings in ample time for checking shall not entitle him to an extension of contract time, and no claim for extension by reason of such default will be allowed.

2.1 DRAWINGS:

A. Drawings are diagrammatic and indicate the general arrangement of systems and work included in the contract. The architectural drawings and details shall be examined for exact location of fixtures and equipment. Where they are not definitely located, this information shall be obtained from the owner's representative.

B. The Contractor shall coordinate his work with drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space conditions appear inadequate, the Architect shall be notified before proceeding with installation.

2.1 PRIOR APPROVAL AT BIDDING

A. Any equipment or components proposed for this project, other than model numbers named in the bid documents, shall have pertinent submittal data and descriptive cover

sheet submitted to the Architect with a copy (PDF format submittals are acceptable in lieu of hard paper copies) to the Engineer 10 days prior to the bid date for inclusion in an addendum if, and when, reviewed and accepted for bidding.

B. This submission is for the purpose of reviewing bids and is not to be regarded as a submittal required for construction.

C. Bidder shall base the bid on items of equipment actually named in bid documents or addendum issued prior to bidding. Verbal acceptance will not be recognized unless verified in writing. It is the bidders's responsibility to ascertain that all equipment has been accepted by requiring copies of the written acceptance from suppliers.

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Refer to the Instructions to Bidders and Section "SUBMITTALS" for requirements in selecting products and requesting substitutions.

B. When any material or equipment is identified on the plans or in the Specifications by reference to ONE manufacturer's name or model number it is intended to establish a required standard f design and quality, and it is not intended to limit competition. It is understood that the phrase "or approved equal" is hereby inserted following the one manufacturer's name, whether such phrase occurs or not.

C. When the drawings and/or Specifications indicate one or two manufacturer's names for material or equipment, the bidder may submit a bid based on material and equipment of manufacturers not named but considered by the bidder to be equal to the standard of design and quality specified; however, such substitution must be approved by the Architect/Engineer as equal.

D. When two or more items of same material or equipment are required (plumbing fixtures, pumps, valves, air conditioning units, etc.) they shall be of the same manufacturer. Product manufacturer uniformity does not apply to raw materials, bulk materials, pipe, tube, fittings (except flanged and grooved types), sheet metal, wire, steel bar stock, welding rods, solder, fasteners, motors for dissimilar equipment units, and similar items used in Work, except as otherwise indicated.

E. Provide products which are compatible within systems and other connected items.

2.1 EQUIPMENT AND MATERIAL DEVIATION

A. When it becomes necessary to digress from the design indicated, four sets of shop drawings showing all details of the proposed layout shall be submitted for approval. All such submitted data shall be approved before any work is performed.

B. Equipment Deviations:

1. Where the Contractor proposes to use an item of equipment other than that specified or detailed on the drawings, which requires any redesign of the structure, partitions, foundations, piping, wiring or any other part of the mechanical, electrical or architectural layout, all such redesign, and all new drawings and detailing required therefore shall be prepared by the contractor at his own expense as approved by the Architect.

2. Where such approved deviation requires a different quantity and arrangement of ductwork, piping, wiring, conduit and equipment form that specified or indicated on

the drawings, the Contractor shall furnish and install any such ductwork, piping, structural supports, insulation, controllers, motors, starters, electrical wiring, and conduit, and any other additional equipment required by the system, at no additional cost to the owner.

PART 2. PRODUCTS

2.1 WARRANTIES

A. This Contractor shall guarantee the entire installation to be free from defects for a minimum of two years from the date of acceptance by the Owner. Any defects in material or workmanship occurring during the guarantee period shall be corrected at no cost to the Owner.

B. Contractor's warranty shall include at least two inspections of the system to repair and replace any items found to be defective during this period. The first shall be approximately six months after the acceptance of the system and the second at the end of the first year. Provide inspection documentation in PDF format.

C. Compile and assemble the warranties specified in Division l5, in three ring binders, tabulated and indexed for easy reference.

D. Provide complete warranty information for each item to include: identification of product or equipment, date of beginning of warranty or bond, duration of warranty or bond and names, addresses, and telephone numbers and procedures for filling a claim and obtaining warranty services.

PART 3. EXECUTION

3.1 ELECTRICAL CONNECTIONS

A. Install and connect motor starters furnished under other Divisions, including all power wiring from power source through starters to equipment.

B. Furnish all thermal overload elements for each starter provided.

C. Verify current characteristics and rotation of all motors.

D. Provide wiring of pressure switches, flow and tamper switches furnished and installed by others.

E. Furnish all loose motor starters, combination starters and disconnect switches, and starters which are mounted in or on, shipped with, or otherwise a part of mechanical equipment.

F. Furnish and install all duct smoke detectors.

3.2 WORKMANSHIP

A. All work shall be performed by competent mechanics using proper tools and equipment to produce first- quality work. All work shall be neatly installed, accessible for maintenance, and complete with all accessories required.

3.3 WORK BY OTHER TRADES

A. Cutting, patching, furring, painting, electrical, plumbing, etc., shall be done by the affected trade at this Contractor's expense for changes required in work already installed or work required by other trades for changes made by this Contractor in type or size of equipment purchased.

3.4 WORK NOT INCLUDED

B. Openings in floors, walls, and roof shall be furnished by the general Contractor. This Contractor shall inform the general Contractor of the location and size required. This Contractor shall furnish all sleeves, frames, including framing between joist unless shown on the Architectural or Structural drawings, access doors, prefabricated curbs, and other accessories necessary for a complete installation. Only those items specifically shown and/or specified in other Sections are excluded.

3.5 EXISTING CONDITIONS

A. Examine all services, equipment, surfaces etc., which this work is any way dependent upon. Should this Contractor discover any conditions which will prevent following good practice or result in less than a first-class installation, this Contractor shall notify the Architect/Engineer immediately and shall not proceed with his work until he has received instructions from the Architect/Engineer.

B. Work shall be protected at all times from damage by persons or weather and all damaged work restores to a new condition before final acceptance.

C. This Contractor shall coordinate all his work with the General Contractor for the exact location of chases, furring spaces, dropped ceilings, structure penetrations, etc.

1.1 CUTTING AND PATCHING

A. This Contractor shall provide all cutting and patching necessary to install the work specified in this section. Patching shall match adjacent surfaces.

B. No structural members shall be cut without the approval of the structural engineer, and all such cutting shall be done in a manner directed by him.

1.2 OPERATING INSTRUCTIONS

A. Upon completion of all work and all tests, Contractor shall furnish the necessary skilled labor and helpers for operating his system and equipment for a period of three (3) days of eight (8) hours each, or as otherwise specified. During this period, instruct the Owner or his representative fully in the operations, adjustment and maintenance of all equipment furnished, Give at least forty-eight (48) hours notice to the Owner in advance of this period.

B. The Contractor shall furnish four (4) complete bound sets to the Architect of typewritten or blueprinted instructions for operating and maintaining all systems and equipment included in this contract. All instructions shall be submitted in draft, for approval, prior to final issue. Manufacturer's advertising literature or catalogs will not be acceptable for operating and maintenance instructions.

C. The Contractor, in the above mentioned instructions, shall include the maintenance schedule for the principal items of equipment furnished under this contract.

1.3 OPERATING INSTRUCTIONS

A. Thoroughly clean all equipment and remove all trash, cartons, etc., from the area. Make any necessary corrections to repair/replace any damaged materials or equipment. Leave the entire system in a thoroughly clean and orderly manner.

B. Any finished surfaces that have been scratched or discolored shall be touched up or repainted with paint to match the original color. If any part has been bent, broken, or otherwise damaged, it shall be replaced prior to final review.

1.4 ACCEPTANCE AND SERVICE

A. Final acceptance will not be made until all work has been completed, Warranties, Operation and Maintenance Manuals and Balancing reports have been submitted, and heating and air conditioning systems have been in operation for a minimum of fifteen days.

END OF SECTION 26501

SECTION 260510 - DEMOLITION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. The work under this section shall conform to the requirements of "Division 1, General Requirements," "Conditions of the Contract" and " Supplementary Conditions".

1.2 WORK INCLUDED

A. Provide all labor, rigging, cranes, trucking and disposition of all equipment and other items no longer required for the electrical system of the building

PART 2 - PRODUCTS – Not Applicable

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Demolish and remove portions of electrical equipment necessary to make way for new construction indicated or specified, or as may become necessary to accomplish desired results. No extra charge may be made for demolition work not specifically indicated or specifies unless, in the Architect's opinion, it is beyond scope of Contract Documents.

B. Demolition shall be carried out with care so that portions of the week that are to remain will be undamaged. Clear away debris and demolished material at frequent intervals. Do not allow debris to accumulate to extent it will interfere with week or passage of workmen.

C. Cooperate with and coordinate demolition with work of other trades. Supervise and assist removing and replacing of existing materials for installation of mechanical and electrical items. Remove and replace or replace-route electrical installations as indicated and specified or required for installation of new work or remodeling.

D. Connecting work and new work in extension of existing work shall correspond in all respects with that to which it connects, or similar existing work, unless otherwise indicated or specified. Existing work shall be cut drilled, altered or temporarily removed and replaced as necessary for performance of Contract. No structural member shall be cut or altered without authorization of Architect. Work remaining in place that is damaged or defaced by work under this Contract shall be restored equal to the condition oat time of award of Contract.

3.2 SALVAGE

A. Owner assumes no responsibility for loss or damage to materials or structures on site, salvage value of which Contractor may have reflected in is bid.

B. All existing electrical equipment no longer required, located in renovated or altered areas of the project, shall be carefully removed Equipment shall be removed from the site and disposed of by the Contractor.

3.3 COOPERATION

A. The Contractor shall provide, install and maintain safety and dust barriers as required by applicable health and safety regulations.

B. The Contractor shall give twenty four (24) hours advance notice to the authorities when work is to be performed which might endanger traffic.

3.4 TEMPORARY CONSTRUCTION, STORAGE OR SAFETY FENCE

A. Contractor shall provide, install and maintain temporary fencing in accordance with all applicable health and safety regulations, and as he may deem necessary, at his own expense.

3.5 EXISTING WORK

A. The contractor shall be responsible for keeping all life safety, elevators, heating and cooling equipment operational at all times during the demolition and replacement of electrical equipment. Temporary power shall be provided as required and where required as part of this contract.

B. Protection of existing work: existing work to remain and existing work to be relocated shall be protected from damage. Work damaged by the contractor shall be repaired at no additional cost to the owner. Cover equipment as necessary to protect is from dust and debris. Floors to remain shall be covered to protect them from damage. At the end of each working day and during inclement weather, close exterior openings with weather proof covers.

C. Prior to starting the work, contractor shall perform a circuit tracing to test the existing work to remain (outlets, lighting, light switches wiring etc.) For proper operation and branch circuit origination. A written report shall be prepared indicating any deficiencies and recommended repairs. Submit four (4) copies of this report to the architect/owner for review. No additional charges will be considered after completion of the work, to repair/connect existing outlets unless these were described in the report.

D. The continuity of all existing circuits which are to remain operational shall be maintained throughout the facility. Contractor shall identify all circuits that supply power to areas to remain, mark these circuits and make sure their power is not interrupted due to demolition and new construction.

E. Contractor shall x-ray or use ground penetrating radar to determine the location of steel reinforcement, electrical conduits, water piping etc. in the concrete floor slab prior to core drilling, cutting the slab or chiseling to install new sleeves, conduits, floor boxes etc. Detection of concrete embedded items (steel, piping or conduits) shall be performed prior to purchasing any devices affected by this work.

3.6 CONNECTIONS

A. Reconnect conduit as may be required.

B. Provide blank cover plates on all existing outlets not reused.

3.7 CLEANING

A. Clean all construction dirt after demolition as occurred.

B. Clean up: remove debris and rubbish from the site at the end of each working day.

3.8 TEMPORARY POWER

A. Provide temporary service as necessary for lighting and power equipment. coordinate temporary requirements with general contractor. temporary lighting and power shall meet OSHA requirements and local codes. temporary power voltage shall be as required.

B. Due to the fact that the existing panelboards directories are incomplete in many cases, contractor shall make a careful inspection of all of the existing electrical power and systems prior to the modification of the existing space. Physically verify and label all existing panels to remain and associated branch circuits.

C. Contractor shall remove all abandoned power and communications wiring and conduit from existing receptacles, telephone, data, cctv and cable tv outlets to be removed under the demolition phase.

3.9 DEMOLITION

A. Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.

B. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.

C. Abandoned Work: Cut and remove raceways and wiring, indicated to be abandoned in place, 2 inches (50 mm) below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.

D. Remove demolished material from Project site.

E. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

3.10 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

C. Cut and patch existing surfaces to match adjacent surfaces.

END OF SECTION 260510

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. 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.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of [**five**] <**Insert number**> times the applied force.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.

2. Nonmetallic slotted support systems.

B. Shop Drawings:[**Signed and sealed by a qualified professional engineer.**] Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.
3. Nonmetallic slotted channel systems. Include Product Data for components.
4. Equipment supports.

C. Welding certificates.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

1.7 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. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. 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.
h. <**Insert manufacturer's name**>.

3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.

6. Channel Dimensions: Selected for applicable load criteria.

B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- (14-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c., in at least 1 surface.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. 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. Fabco Plastics Wholesale Limited.
d. Seasafe, Inc.
e. <**Insert manufacturer's name**>.

3. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
4. Fitting and Accessory Materials: Same as channels and angles[**, except metal items may be stainless steel**].
5. Rated Strength: Selected to suit applicable load criteria.

C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

D. Conduit and Cable Support Devices: [**Steel**] [**Steel and malleable-iron**] hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

E. 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.

F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

G. 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. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Hilti Inc.
2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
3) MKT Fastening, LLC.
4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
5) <**Insert manufacturer's name**>.

2. Mechanical-Expansion Anchors: Insert-wedge-type, [**zinc-coated**] [**stainless**] steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

   a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Cooper B-Line, Inc.; a division of Cooper Industries.
      2) Empire Tool and Manufacturing Co., Inc.
      3) Hilti Inc.
      4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      5) MKT Fastening, LLC.
      6) <**Insert manufacturer's name**>.

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. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as [**required by**] [**scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in**] NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted [**or other**]support system, sized so capacity can be increased by at least [**25**] <**Insert number**> percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with [**two-bolt conduit clamps**] [**single-bolt conduit clamps**] [**single-bolt conduit clamps using spring friction action for retention in support channel**].

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, [**EMT**] [**IMC**] [**RMC**] [**EMT, IMC, and RMC**] may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To 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 (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
6. To Steel: [**Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts**] [**Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69**] [**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[**by means that meet seismic-restraint strength and anchorage requirements**].

E. 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 (100 mm) 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 (20.7-MPa)**] <**Insert value**>, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03 Section "[**Cast-in-Place Concrete**] [**Cast-in-Place Concrete (Limited Applications)**]."

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.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or roll to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Touchup: Comply with requirements in Division 09 [**painting Sections**] [**Section "High-Performance Coatings"**] for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

2.2 COMMERCIAL-GRADE DEVICES

A. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:

1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
2. Devices shall comply with the requirements in this Section.

B. Device Color:

1. Wiring Devices Connected to Normal Power System: Ivory or as selected by Architect unless otherwise indicated or required by NFPA 70 or device listing.
2. Wiring Devices Connected to Emergency Power System: Red.

C. Convenience Receptacles: NEMA WD 1, NEMA WD 6, Configuration 5-20R, and UL 498.

1. Products:

a. Pass & Seymour; 5361 (single), 5362 (duplex) or approved equal

b. Hubbell; HBL 5351 (single), CR 5362 (duplex).

c. Leviton; 5891 (single), 5352 (duplex).

D. Duplex GFCI Convenience Receptacles: 125 V, 20 A, straight blade, [feed] [non-feed]-through type. NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

1. Products:

a. Pass & Seymour; 2095, PT2095 with PTRA6STR prewired pigtail connector

b. Cooper; GF20.

E. 'Toggle Switches: NEMA WD 1 and UL 20. Single-pole, 120/277 V, 20 A.

1. Products:

a. Hubbel; CS1221.

b. Leviton; 1221-2.

c. Pass & Seymour; 20ACI

d. Cooper; 2221

2.3 DECORATOR-STYLE DEVICES

A. Device Color:

1. Wiring Devices Connected to Normal Power System: Ivory or as selected by Architect.
2. Wiring Devices Connected to Emergency Power System: Red.

2.4 WALL PLATES

A. Wall Plates, Finished Areas: Off-white or white Maxi Metal Wall Plates or to match existing fastened with metal screws having heads matching plate color.

B. Wall Plates, Unfinished Areas: Off-white or white Maxi Metal Wall Plates or to match existing.

C. Wall Plates, Damp Locations: Thermoplastic or Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet locations.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. 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.

C. Select device colors and wall plates as follows:

1. Off-white or white Maxi Metal Wall Plates or to match existing 0.035 – inch thick.

D. Mount devices flush, with long dimension vertical, and grounding terminal of receptacles on top unless otherwise indicated.

END OF SECTION 262726

SECTION 262813 - FUSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data.
2. Maintenance Material Submittals: Quantity equal to 20% of each fuse type and size, but no fewer than 3 of each type and size.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NEMA FU 1 for cartridge fuses.

2.2 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

2.3 SPARE-FUSE CABINET

A. Cabinet: Gray, baked-enamel finish; wall-mounted, steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.

1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.

PART 3 - EXECUTION

3.1 FUSE APPLICATIONS

A. Service Entrance: **Class L, Class RK1, Class RK1, Class J.**

B. Feeders **Class L, Class RK1, Class RK1, Class J.**

C. Motor Branch Circuits: **Class RK1, Class RK5, Class J, time delay.**

D. Other Branch Circuits: **Class RK1, time delay**, **Class RK5, time delay, Class J.**

E. Control Circuits: Supplemental Class Fuses.

3.2 INSTALLATION

A. Install fuses so rating information is readable without removing fuse.

B. Install labels indicating fuse replacement information on inside door of each fused switch and adjacent to each fuse block and holder.

C. Install spare-fuse cabinet(s).

END OF SECTION 262813

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMNTS

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.

2.2 FUSIBLE AND NONFUSIBLE SWITCHES

A. Fusible Switches, 600 A and Smaller: UL 98 and NEMA KS 1, [**Type GD**] [**Type HD**], that accommodate specified fuses, and with lockable handle interlocked with cover in closed position.

B. Nonfusible Switches, 600 A and Smaller: UL 98 and NEMA KS 1, [**Type GD**] [**Type HD**], with lockable handle interlocked with cover in closed position.

C. Shunt Trip Switches: Comply with[**ASME A17.1,**] UL 50, and UL 98, with 200-kA interrupting and short-circuit current rating when fitted with Class J fuses.

2.3 MOLDED-CASE CIRCUIT BREAKERS

A. Description: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with field-adjustable instantaneous trip settings.
3. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller and let-through ratings less than NEMA FU 1, RK-5.
4. GFCI Circuit Breakers: Single- and two-pole configurations with 5-mA trip sensitivity.
5. GFEP Circuit Breakers: Single- and two-pole configurations with 5-mA trip sensitivity.

B. Features and Accessories:

1. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
2. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.

2.4 ENCLOSURES

A. NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Outdoor Locations: NEMA 250, Type 3R.
2. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

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 Section 260500 "Common Work Results for Electrical."

C. Install fuses in fusible devices.

D. Comply with NECA 1.

3.2 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

END OF SECTION 262816