

EXECUTIVE BUILDING ELEVATOR UPGRADE

**For the
State of Oregon
Department of Administrative Services
Enterprise Asset Management (DAS EAM)**

155 Cottage Street NE
Salem, Oregon 97301

Project No. 19-002

PROJECT SPECIFICATIONS Bid Set



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SECTION 01 10 00 – SUMMARY

PART 1 - GENERAL

1.1 PROJECT

- A. Owner's Name: State of Oregon, Department of Administrative Services, Enterprise Asset Management (DAS EAM)
- B. Project Name: Executive Building Elevator Upgrade
 - 1. The project consists of:
 - a. Replacing two five-stop, hydraulic passenger elevators.
 - b. Bringing the machine room up to current code requirements.
 - c. Installation of a mini-split unit in the machine room, along with associated electrical and piping connections.
 - d. Lighting upgrades to the space immediately adjacent the elevator doors.
 - e. Installation of a 1-hour fire rated suspended ceiling system in the machine room, along with relocation of fire sprinkler heads, smoke detector, and other ceiling mounting elements.
 - f. Interior patch & repair work for wall and ceiling installations.
 - 2. Refer to the drawings and specifications for base bid work.
- C. Project Address: 155 Cottage Street NE, Salem, Oregon 97301

1.2 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a lump sum price as described in the Project Manual.

1.3 OWNER OCCUPANCY

- A. The owner intends to continue existing operations throughout the construction period. This building is occupied during normal business hours, with the occasional staff member working after hours. This facility is to be protected from disruptions to the best extent possible.
- B. One elevator is to remain operational at all times during normal business hours.
- C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- D. Schedule the Work to accommodate Owner occupancy.

1.4 CONTRACTOR'S USE OF PREMISES

- A. Except as otherwise stipulated herein, Contractors will have partial use of the Premises within the boundaries of the project as shown on the Drawings for the execution of the Work. All activities must be coordinated with the Owner.
- B. The possession, use, or distribution of illicit drugs and alcohol on the Owner's premises is prohibited. Prescription medications brought to the project site shall be in the original container bearing the name of the drug, the name of the physician, and the prescribed dosage.
- C. NO SMOKING POLICY. Smoking is not allowed on the construction site and as additionally limited by city, county, and state ordinance.

1.5 PROTECTING EXISTING UTILITIES

- A. The Drawings indicate approximate locations of known utilities lines perceived to be effected by the Work. Before starting work, Contractor shall determine exact location on any of these lines that could be damaged by Contract Work.
- B. Contractor shall assume that other unknown utility do existing, and Contractor shall proceed with caution when working in areas that could conceal other unknown utilities.
- C. If such utility lines are encountered, immediately request disposition instructions from Architect.
- D. If utility lines are damaged; removed, repair, or replace lines as directed. Additional compensation and/or extension of time, if any, caused by removing, repairing, or replacing utility lines will be determined in accordance with General Conditions.

1.6 PROTECTING EXISITNG STRUCTURE

- A. Contractor shall protect against damage, existing building parts not scheduled for repair or remodel under this contract.
- B. Where necessary to accomplish required protection, provide additional Temporary barricades, crushing, or other approved Cover material to be protected.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 01 10 00

SECTION 01 20 00 – PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Schedule of Values
- B. Procedures for preparation and submittal of applications for progress payments.
- C. Payments for products stored off site.
- D. Documentation of change in Contract Sum and Contract Time.
- E. Modification procedures.
- F. Correlation of Contractor submittals based on changes.
- G. Procedures for preparation and submittal of application for final payment.

1.2 SCHEDULE OF VALUES

- A. Submit a printed schedule on AIA Form G703 – Application and Certificate for Payment Continuation Sheet.
- B. Submit Schedule of Values in duplicate within 10 days after date of Owner-Contractor Agreement.
- C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization, demobilization, bonds and insurance.
- D. Content: as a basis for computing Progress Payment values, separately list installed value of each of the following:
 - 1. Each major Work item.
 - 2. Each subcontracted Work item. For each major Subcontract, list products and operations of that Subcontract as separate Line items.
 - 3. Any Products to be stored, for which separate payments will be requested.
- E. Include within each line item, a direct proportional amount of Contractor's overhead and profit.
- F. Revise schedule to list approved Change Orders, with each Application for Payment.
- G. Round off Values to nearest Dollar.

- H. Sum of Values listed shall equal total Contract Sum.
- I. Substantiating Data: When requested by Architect, submit justifying Substantiating Data and Line Item Amounts in question.

1.3 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Monthly
- B. Forms filled out by hand will not be accepted.
- C. Present required information in typewritten form.
- D. Form: AIA G702 – Application and Certificate for Payment and AIA G703 – Continuation Sheet.
- E. Execute certification by signature of authorized officer.
- F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored Products.
- G. Round off Values to nearest Dollar.
- H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.
- I. Submit one copy of each Application for Payment.
- J. Include the following with the application:
 - 1. Continuation Sheet.
 - 2. Sub-Contractor Invoices or Application for Payment.
 - 3. Receipts for Products stored, if any.
- K. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date and line item by number and description.
- L. Submit Application for Payment to Architect at time stipulated above.
- M. When Architect finds Application properly completed and correct, architect will transmit one original Certificate for Payment to owner for approval of payment, and one retained for files.
- N. Submit a preliminary draft to the Architect three weeks prior to the submittal for the first Application. The purpose of the preliminary draft is to confirm the level of detail required by the Design Team. The Contractor is to make adjustments requested by Architect. The level of detail may include values as separate lines (entities) for each Specification Section. The

Architect will not review any Application submitted until changes requested by the Architect to the preliminary draft have been incorporated.

1.4 PAYMENTS FOR PRODUCTS STORED OFF THE PROJECT SITE

- A. When delay or added cost to Owner can be avoided by storing Products off Site, Owner will make payment to Contractor for said Products.
- B. Contractor shall:
 - 1. Locate Storage Facilities within 20 miles of the Project Site.
 - 2. Make Storage Facilities available for Architect's or Owner's visual inspection.
 - 3. Segregate and label Stored Products for specified Project.
 - 4. Assume all risk for loss.
 - 5. Assume responsibility for exceeding Product 'Shelf-Life'.
 - 6. Protect Stored Products and provide applicable Insurance against their damage, discoloration, and theft. List Owner and any Mortgagee as Additional Named Insured.
 - 7. Submit itemized Inventory and Schedule of Values for Stored Products together with Certificate of Insurance.
 - 8. Submit payment requests to Owner as part of Contractor's regular Progress Payment.
 - 9. Reimburse Owner for damages sustained if Stored Products are not delivered to Jobsite when needed.
 - 10. Submit to Owner, with copy to Architect, a written Waiver of Lien insuring Owner against claims for unpaid Storage Costs.
 - 11. Upon receipt of payment from Owner, prepare and issue to Owner, with a copy for Architect, and any Mortgagee, a Bill of Sale for Stored Products.

1.5 PREVAILING WAGE PAYMENT CERTIFICATION

- A. Submit Prevailing Wage Payment Certificate Forms as required by Contract.

1.6 APPLICATION PAYMENT SCHEDULE

- A. Refer to Payments section in the General Conditions.

1.7 MODIFICATION PROCEDURES

- A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to the Contract Documents.
- B. For minor changes not involving an adjustment to the Contract Price or Contract Time, Architect will issue instructions directly to Contractor.

- C. Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract by issuing supplemental instructions on AIA Form G710 or approved equal.
- D. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 - 2. Promptly execute the change.
- E. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Unless agreed to otherwise in writing Contractor shall prepare and submit a fixed price quotation within seven calendar days.
- F. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitution in accordance with Section 01 60 00 and with the State of Oregon General Conditions for Public Improvement Contracts.
- G. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 - 1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
 - 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect and by Owner.
 - 3. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specific for Time and Material work.
- H. Substantiation of Costs: Provide full information required for evaluation.
 - 1. Provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 - 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.

- d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 - 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
 - I. Execution of Change Orders: Owner will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
 - J. After execution of Change Order, promptly revise Schedule of Values and Applications for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
 - K. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust time for other items of work affected by the change, and resubmit.
 - L. Promptly enter changes in Project Record Documents.
- 1.8 APPLICATION FOR FINAL PAYMENT
- A. Prepare Application for Final Payment as specified for progress payments, identified total adjusted Contract Sum, previous payments, and sum remaining due.
 - B. Application for Final Payment will not be considered until the following have been accomplished:
 - 1. All closeout procedures specified.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 01 20 00

SECTION 01 30 00 – ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Preconstruction Meeting.
- B. Progress Meetings.
- C. Construction Progress Meetings.
- D. Submittals for Review, Information, and Project Closeout.
- E. Number of Copies of Submittals
- F. Submittal Procedures.

1.2 CONSTRUCTION ORGANIZATION & START-UP

- A. Responsible Parties:
 - 1. Immediately following Contract execution, Owner will and Contractor shall identify who, within their respective organizations, will be responsible for Project Coordination.
- B. The Contractor will Schedule and conduct Preconstruction Meeting as specified in Section 01 32 00.
- C. The Contractor shall establish on-site Lines of Authority and Communications including the following:
 - 1. Schedule attendance at Preconstruction Meeting and schedule and conduct Progress Meeting as specified in Section 01 32 00.
 - 2. Establish procedures for Intra-project Communications including:
 - a. Submittals.
 - b. Reports & Records.
 - c. Recommendations.
 - d. Coordination.
 - e. Schedules.
 - f. Resolution of Conflicts.
 - 3. Technical Documents Interpretation:
 - a. Consult with Architect to obtain interpretation.
 - b. Assist in resolution of questions or conflicts which may arise.
 - c. Transmit written interpretation to Subcontractors and to other concerned parties.
 - 4. Permits & Approvals:

- a. Verify that Subcontractors have obtained required Permits and Inspections for Work and for Temporary Facilities.
- 5. Control use of Site:
 - a. Supervise Field Engineering and Project Layout.
 - b. Allocate Field Office Space and Work and Storage Areas for use of each.

1.3 COORDINATING SUBCONTRACTOR'S WORK

- A. Coordinate the Work of all Subcontractors and make certain that, where the Work of one Trade is dependent upon the Work of another Trade, the Work first installed is properly placed, installed, aligned, and finished as specified or required to properly receive subsequent Materials applied or attached thereto.
- B. Direct Subcontractors to correct defects in Substrates they install when Subcontractors of subsequent Materials have a reasonable and justifiable objection to such surfaces.
- C. Do not force Subcontractors to apply or install Products to improperly placed or improperly finished Substrates that would result in an unsatisfactory or unacceptable finished Product.

1.4 COORDINATING WORK WITH WORK OF OWNER OR OTHER CONTRACTS

- A. Coordinate, and make certain that, where Work of either party is dependent upon the other party, the Work first performed is properly placed, installed, aligned, and finished as required to permit the proper installation of the Work following.
- B. If the Owner's Work in any way interferes with the Contractor's Work, so notify the Owner sufficiently in advance so that the Owner has reasonable time to make necessary adjustments.
- C. If the Contractor's Work in any way interferes with the Owner's Work, so notify the Owner as soon as possible. IF the Contractor's Work must be modified to accommodate the Owner's Work, except as described elsewhere in this Specification, the Contract Sum and/or the Contract Time will, when necessary be adjusted by a Change Order.

1.5 CLOSE-OUT DUTIES

- A. Mechanical & Electrical Equipment Start-up:
 - 1. Coordinate check-out of Utilities, Operational Systems, and Equipment.
 - 2. Assist in initial start-up and testing.
 - 3. Record starting dates of Systems and Equipment operation.
- B. At completion of Work of each Subcontractor, conduct inspection to assure that:
 - 1. Work is acceptable.
 - 2. Specified cleaning has been accomplished, and Temporary Facilities and Debris has been removed from Site.

C. Substantial Completion:

1. Conduct inspection and prepare list of Work to be completed or corrected.
2. Assist Architect in review of contractor's inspection list and generation of substantial completion punch list.
3. Supervise correction and completion of Work as established in Architect's Observation Reports and substantial completion punch list.
4. Apply for and receive Final Occupancy Permit from Building Department.
5. Complete submittal of Operations and Maintenance Manuals.
6. Complete submittal of Record Drawings.
7. Complete Owner Training.

D. Final Completion:

1. Assist Architect in checking that all identified deficiencies have been corrected.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via email to Architect, Owner, Contractor, and appropriate Sub-Contractors.
1. This procedure applies to all submittals for review, information, close-out documents, Request For Information (RFI), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's corrections, and any other document any participant wishes to make part of the project record.
 2. Contractor and Architect are required to keep document logs.
 3. It is Contractor's responsibility to submit documents in PDF format.
 4. Sub-Contractor need an email address, Internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, Bluebeam PDF Revu).
 5. Paper document transmittals will not be reviewed, unless specifically requested.
 6. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Cost: The cost of the email service, internet access, PDF review software will be the responsibility of each project participant.

3.2 PRECONSTRUCTION MEETING

- A. Contractor will schedule a meeting within seven days after receiving Notice to Proceed. Prepare a meeting agenda and preside over the meeting.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
 - 4. Contractor's Superintendent.
 - 5. Major Subcontractors.
 - 6. Buildings Tenant Representative.
- C. Agenda (at a minimum):
 - 1. Introductions of persons attending meeting.
 - 2. Submission of executed Owner-Contractor Agreement
 - 3. Submission of executed bonds and insurance certificates.
 - 4. Distribution of Contract Documents.
 - 5. Submission of list of Subcontractors.
 - 6. Designation of personnel representing the parties of the Contract.
 - 7. Scheduling.
 - 8. Building permit status.
 - 9. Prevailing wage requirements.
 - 10. Communications.
 - 11. Role of Owner's Representative.
 - 12. Request for Clarification of Design.
 - 13. Schedule of regular Construction Progress Meetings.
 - 14. Safety and Emergency Procedures.
 - 15. Mandatory Drug Testing Program.
 - 16. Daily Clean-up
 - 17. Tour of Project by Owner's staff and guest (if applicable).
 - 18. Additional Comments.
- D. Contractor will record minutes and distribute copies within three days after meeting to participates, with copies to Owner, participates, and those affected by decisions made.

3.3 PROGRESS MEETINGS

- A. The Contractor will schedule and administer meetings throughout progress of the Work at a maximum of bi-weekly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participates, and preside at meetings.
- C. Attendance Required: Job Superintendent, Owner, Architect, and other as appropriate to agenda topics for each meeting.
- D. Agenda (at a minimum):

1. Review minutes of previous meeting.
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 Submittal Log.
6. Review of RFI Log
7. Review of off-site fabrication and delivery schedule.
8. Corrective measures taken, if any.
9. Planned progress during succeeding work period.
10. Maintenance of quality and work standards.
11. Effect of proposed changes on progress schedule and coordination.
12. Other business relating to Work.

- E. The Contractor will record minutes and distribute copies within five days after meetings to participants, with copies to Architect and Owner and Other Participants, and those affected by decisions made.

3.4 PRE-INSTALLATION CONFERENCES

- A. When required in individual specification sections, the Contractor shall convene a pre-installation meeting prior to commencing work of that section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect / Owner minimum four days in advance of meeting date.
- D. The Contractor shall be responsible to prepare agenda and preside at meeting:
1. Review conditions of installation, preparation, and installation procedures.
 2. Review coordination with related work.
- E. The Contractor shall be responsible to record minutes and distribute copies within four days after meeting to participants, with copies to Architect, Owner's Representative, participants, and those affected by decisions made.

3.5 CONSTRUCTION PROGRESS SCHEDULE – SEE SECTION 01 32 00

3.6 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.
 5. Other information required in individual specification sections.
- B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with Submittal Procedures section below and for record document purposes described in Section 01 78 00.

3.7 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 information required in individual specification sections.
 - 8. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.8 SUBMITTALS FOR PROJECT CLOSE-OUT

- A. When the following are specified in individual sections, submit them at project close-out:
 - 1. Project Record Documents.
 - 2. Operations and Maintenance Manuals.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other information required in individual specification sections.
 - 6. Other types as indicated.
- B. Submit for Owner's benefit during and after project completion.
- C. Project Close-out Documents shall be submitted as paper copies.

3.9 NUMBER OF COPIES OF SUBMITTALS

- A. Documents for Review:
 - 1. Small size sheets, not larger than 8 ½ x 11 inches for cutsheets or similar deliverables and 11 x17 inches for plans, elevations, or similar deliverables:
 - a. Submit digital copies at a minimum of 400 DPI PDF documents.
- B. Samples: submit the number specified in individual specification sections; two of which will be retained by Architect.
 - 1. After review, procedure duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.
 - 3. Show full range of color, texture, and pattern.

3.10 SUBMITTAL PROCEDURES

- A. Transmit each submittal with a printed transmittal form that clearly describes submittal contents and the quantity of items delivered.
- B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- C. Identify Project, Contractor, Subcontractor, and/or Supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Product required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- E. Deliver submittals to Architect at business address.
- F. Schedule submittals to expedite the Project, and coordinate submission of related items.
- G. For each submittal for review, allow 14 calendar days excluding delivery time to and from Contactor.
- H. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- I. Notify Architect in writing, at submission time, of any deviations in Submittals from Contract Document requirements.
- J. Provide space for Contractor and Architect review stamps.
- K. When revised for resubmission, identify all changes made since previous submission.
- L. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- M. Submit Shop Drawings, Product Data, and Samples only for those items specifically required. The Architect will not be obligated to review Shop Drawings, Product Data, or Samples other than those required by the Contract Documents.
- N. Product Data:
 - 1. Clearly mark each copy to identify pertinent Products.
 - 2. Show performance characteristics and capacities.
 - 3. Show dimensions, field dimension, and required clearances.
 - 4. Show wiring and piping diagrams, and controls.
 - 5. Show standard schematic drawings and diagrams:
 - a. Modify to delete information not applicable to Work.

- b. Supplement standard information to provide information specifically applicable to Work.
- c. Assure that any photo copied material is clearly legible or provide all original material.
- d. Perform no Work or Fabrication requiring Submittal until Architect approves Submittal.

END OF SECTION 01 30 00

SECTION 01 32 00 – CONSTRUCTION SCHEDULE DOCUMENTATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The work progress schedule requirement is established to ensure adequate planning, scheduling, management, and execution of the work by the Contractor, and to enable the State to evaluate work progress and make contract time adjustments. The work specified in this section consists of submitting a contract schedule, monthly updates, four-week schedules for progress meetings, and a final as-built schedule. The planning, scheduling, management, and execution of the work in accordance with the contract is the responsibility of the Contractor.

1.2 SUBMITTALS

- A. Except as modified in this section, the procedures required by Section 01 30 00 subsection 3.10, Submittal Procedures, shall be observed.
- B. Submit a statement of CPM capability within 10 days following the State's delivery of the fully executed contract, stating that the Contractor has in-house capability, or if not, naming a scheduling subcontractor to be employed by the Contractor to prepare the schedules required. Include with this submittal scheduler's name and list of qualifications demonstrating that the scheduler has performed scheduling for projects of the same magnitude and complexity of this project. Failure to provide this information may result in disqualification of the proposed scheduler.
- C. At the preconstruction meeting, submit for review by the State, a work progress schedule meeting the requirements below.
- D. Within five business days of receipt of review comments from the State, incorporate the State's comments, finalize, and re-submit the work progress schedule for State approval.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 CONTRACT SCHEDULE SUBMITTAL REQUIREMENTS

- A. The contract schedule submittal shall be developed in Critical Path Method (CPM) format using Suretrack, Microsoft Project, or pre-bid approved equal. It shall include:
 - 1. A CPM Network Diagram:
 - a. Time-scaled (by week, starting Monday), grouped by work areas and sorted by early start dates.

- b. The diagram shall be clear, neat, and legible. It shall be submitted on sheets at least 22 inches by 24 inches to allow for 50 percent reduction printing. Each sheet shall contain a title block, a revision block, project name and contract number, Contractor, type of tabulation (initial, update, project status), project duration, scheduled substantial completion date, and a legend explain the basic notation, terms, and codes used.
 - c. Identify critical path activities, including critical paths to contract milestone dates.
 - d. Activity durations shall not exceed 15 business days. Should an activity require more than 15 business days, it shall be subdivided to define appropriate activities. The State may approve using longer durations on such non-construction activities as the procurement and fabrication of materials and equipment.
 - e. All activity descriptions shall clearly define location and type of work to be performed.
 - f. Show schedule critical deliverables (i.e. permits, submittals, etc...)
 - g. Schedule fabrication and delivery of all materials and equipment.
 - h. Schedule start and completion dates imposed on the schedule by the Contractor shall be consistent with contract milestone and completion dates and shall be clearly identified and connected to the appropriate activities.
 - i. Schedule shall include contingencies for normal weather delays and seasonal periods of heavy traffic flow.
 - j. Schedule shall list resources required to perform work within duration shown.
 - k. Failure to include any element of work required for performance of this contract shall not excuse the Contractor from timely completion of work required to achieve the contract milestones, notwithstanding the acceptance of the contract schedule submittal.
 - l. The contract duration shall be the duration specified in the contract documents and awarded by the State.
 - m. Schedules extending beyond the contract completion date will not be accepted.
 - n. Schedules showing the work completed in less than the contract duration may be found by the State to be impractical, requiring re-submittal.
 - o. Schedules showing the work completed in less than the contract duration, if practical to the State, shall be considered to have Float. Float is the time between the scheduled duration of the work and the contract duration. Float is a resource available to both the Contractor and the Owner, and is non-compensable. Acceptance of a schedule showing the work completed in less than the contract duration shall not constitute a change to the contract completion date.
 - p. Schedule shall be coded by activity identifying shift work, restricted hours, etc...
2. Narrative: The contract schedule submittal shall include a 'stand-alone' document that conveys, in writing:
- a. The Contractor's schedule assumptions; constraints; critical path / critical activities and why they are critical; permit requirements; coordination required with the State, other contractors, utilities or any other parties; and long lead delivery times.

- b. Basis for resources. Include anticipated quantities of work for each activity and the production rates used in determining resource allocation for activities.
- 3. The contract schedule submittal shall include a thumb drive containing a copy of the project files. All data shall be written to Microsoft Project 2013, or pre-bid approved equal.
- B. The final, accepted work progress schedule shall be baseline from which changes in duration and logic shall be determined and shall be the basis for planning, scheduling, managing, and executing the work.

3.2 MONTHLY UPDATE REPORT

- A. No later than 30 calendar days after acceptance of the contract schedule and monthly thereafter, the Contractor shall submit a Monthly Update Report.
- B. The Monthly Update Report shall consist of:
 - 1. An updated CPM Network Diagram of the schedule, format as previously specified herein, and a thumb drive containing an exact copy of the submittal. All data shall be written to disk via Microsoft Project 2013 or pre-bid approved equal utility.
 - 2. A narrative which identifies the work actually completed and reflects the progress along the critical path in terms of days ahead of or behind the contract milestone dates. Specific requirements if the narrative are as follows:
 - a. If the Monthly Update Report indicates an actual or potential delay to the contract milestone dates, the narrative shall identify the problem, cause, and the activities affected.
 - b. The narrative shall also address the following:
 - 1) A detailed change in duration of any activity and/or logical changes to activities which were performed in a sequence different from the accepted contract schedule.
 - 2) Activities proposed to be added to or deleted from the contract schedule.
 - 3) Identification of executed change orders.
 - 3. Incorporation of all State accepted schedule revisions.
 - 4. The mutually agreed to Monthly Update Report shall be the basis for evaluating the Contractor's progress. Documents in a single Monthly Update Report shall have the same data date irrespective of the dates of preparation of the individual documents.
 - 5. If the latest completion time for any required contract milestone state as indicated by the current Monthly Update Report does not fall within the time allowed by the contract, the Contractor shall prepare and submit a plan to recover the lost time.
- C. The State may call for more frequent status meeting (weekly, biweekly, etc...) at no additional cost to the State, at which the Contractor shall provide the required information.
- D. Review of Monthly Update Report:
 - 1. The State will review the monthly report and respond within 7 days after receipt.

2. If necessary, the Contractor shall re-submit within 7 days of receipt of review comments.

- E. Applications for Payment: Submission of monthly schedule updates shall accompany application for progress payments, and will be a condition of payment.

3.3 PROGRESS MEETING SCHEDULES

- A. During on-site construction, at each progress meeting, the Contractor shall provide a one week back and three week forward activity schedule. This schedule shall be in Gantt bar chart form and include, but not limited to, reporting of the following:
 1. Detailed listing of specific work items, duration of work items, actual work hours, resources to be used in accomplishing work items, work area closing and opening dates and times, operational impacts, and other pertinent items.
 2. The weekly progress meeting schedules shall be submitted no less than 24 hours in advance of the schedule progress meeting.

3.4 SCHEDULE MONITORING

- A. If the progress of critical path activities fall behind the time lines shown on the latest, accepted version of the CPM schedule by 7 days, the Contractor shall document the means he will employ to bring the work back on schedule and will be a condition of payment.

3.5 CONTRACT SCHEDULE REVISIONS

- A. Proposed revisions to the accepted contract schedule shall be submitted to the State on a separate fragnet for review and acceptance prior to incorporation into the current contract schedule. This fragnet must clearly outline the impact of the revision within the context of the contract schedule. Each proposed revision shall be submitted with the following minimum components:
 1. A CPM Network Diagram showing revised and affected activities.
 2. An Activity Report and Predecessor / Successor Report for all revised and affect activities.

3.6 CONTRACT TIME ADJUSTMENTS

- A. Float is not for the executive use or benefit of either the State or the Contractor. Extensions of time for contract performance as specific in the contract will be granted only to the extent that time adjustments to the affected work items exceed the total float time along the affected path(s) of the contract schedule current at the time of the delay.

3.7 AS-BUILT SCHEDULE AND DOCUMENTATION

- A. Within 15 business days after substantial completion, the Contractor shall submit for the State's acceptance a final, as-built COM Network Diagram.

3.8 SUSPENSION OF PAYMENTS

- A. If the Contractor falls at any time to submit a schedule or update as noted above, the State reserves the right to suspend progress payments wholly or in part until the Contractor submits a schedule which is accepted by the State.

END OF SECTION 01 32 00

SECTION 01 40 00 – QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having a minimum of five years as a certified / licensed experience on projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency

qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

- F. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- I. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.3 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1.4 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 ACTION SUBMITTALS

- A. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
 - 2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, telephone number, and email address of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
 - 1. Statement on condition of substrates and their acceptability for installation of product.
 - 2. Statement that products at Project site comply with requirements.
 - 3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.

4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 5. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Statement that equipment complies with requirements.
 2. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 3. Other required items indicated in individual Specification Sections.

1.8 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - d. When testing is complete, remove test specimens and test assemblies, and mockups; do not reuse products on Project.
 - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.9 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 - 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 - 1. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 - 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.

3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013000 subsection 3.10 "Submittal Procedures."
- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.

3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 6. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.

4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.
 1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017000 "Execution Requirements."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS**PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Temporary telecommunication services.
- B. Temporary sanitary facilities.
- C. Temporary controls: Barriers and Enclosures
- D. Waste removal facilities and services.

1.2 TEMPORARY UTILITIES – SEE SECTION 01 51 00**1.3 TELECOMMUNICATION SERVICES**

- A. Telecommunication services shall include:
 - 1. Cell phone service with voice mail for the project superintendent.
 - 2. Windows-based computer (or laptop).
 - 3. Digital camera at the job site capable of taking pictures of job conditions and sending .jpg images via e-mail to Architect and Owner, as needed.

1.4 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Permanent facilities may not be used during construction operations.
- C. Maintain daily in clean and sanitary condition.
- D. At end of construction, return facilities to same or better condition as originally found.

1.5 BARRIERS

- A. Provide barriers to protect workers on the site, the building tenants, and the public against injury.
- B. Provide barriers to prevent unauthorized entry to construction areas, to allow for owner's use of site, and to protect existing facilities and adjacent property from damage from construction operations and demolition.
- C. Emergency Egress. The door that is identified as the emergency egress door and path must be maintained for use at all times. This door and/or path must be able to be used during all hours for emergency egress. Submit a plan for maintaining this door and/or path for emergency egress.

1. Submit a plan for maintain this door and/or path to include:
 - a. Drawings
 - b. Narrative
 - c. Schedule
 - D. Provide protection for plants designated to remain, replace damaged plants.
 - E. Protect non-owner vehicular traffic, stored materials, site, and structures from damage.
- 1.6 VISITOR PERSONAL PROTECTION EQUIPMENT
- A. Provide Personal Protection Equipment (PPE) for use by official visitors to the project site during construction. Visitor PPE shall include as a minimum, hard hat, and protective eye goggles. Provide high visibility garments when moving vehicles are in use on the construction site. Store in Field Office and reserve for use by visitors to the project site.
 - B. Maintain in good condition through the course of the project and replace equipment that does not meet personal safety requirements.
- 1.7 TAMPORARY FIRE PROTECTION
- A. Provide and maintain necessary facilities and equipment to safeguard Project against Fire Damage.
- 1.8 INTERIOR ENCLOSURES
- A. Provide temporary partitions and ceiling as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- 1.9 SECURITY – SEE SECTION 01 56 50
- 1.10 VEHICULAR ACCESS AND PARKING
- A. Coordinate access and haul routes with Owner.
 - B. Provide and maintain access to fire hydrants, free of obstructions.
 - C. The Contractor shall park vehicles on the site only in designated parking areas as directed by the Owner. No other parking is provided by Owner.
 - D. Do not use Owner's Parking Lots for overnight vehicle storage.
- 1.11 MATERIAL STORAGE SPACE
- A. Maintain within Project Limits in accordance with Architect's and Owner's instructions. Do not block exitways or overload structure.

1.12 WASTE REMOVAL

- A. See Section 01 73 20 – Waste Management, for additional requirements.
- B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- C. Encourage the separation of waste materials and sorting and disposal at a local recycling center.
- D. Provide containers with lids. Remove trash from site periodically throughout the day and, at a minimum, at the end of each work shift.
- E. If materials to be recycled or re-used on the project must be stored on-site, provide suitable noncombustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- F. Open free-fall or other types of chutes are not permitted.

1.13 PROJECT IDENTIFICATION

- A. A project sign is not required for this project.
- B. No other signs are allowed without Owner permission except those required by law.

1.14 FIELD OFFICES

- A. A Field Office is not required for this project.
- B. Project Progress Meetings: Owner will furnish a conference room.

1.15 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing facilities used during construction to original condition.
- D. Restore new permanent facilities used during construction to specified condition.

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SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 01 50 00

SECTION 01 51 00 – TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Temporary Electricity.

1.2 RELATED SECTIONS

- A. Section 01 50 00 – Temporary Facilities and Controls
 - 1. Temporary telecommunication services.
 - 2. Temporary sanitary facilities.

1.3 CONSERVATION

- A. It is the Owner's practice to utilize natural resources responsibly. Exercise appropriate energy and water conservation measures at all times.

1.4 TEMPORARY ELECTRICITY

- A. Cost: By Owner
- B. Provide all labor and material necessary to set up a temporary power service at the site, including any systems required from utility source.
- C. Contractor may connect to Owner's existing power service.
- D. Complement existing power service capacity and characteristics as required.
- E. Provide power outlets for construction operations, with branch wiring and distribution boxes located required. Provide flexible power cords as required.
- F. Provide main service disconnect and over-current protection at convenient location and meter, if necessary.
- G. Permanent convenience receptacles may be utilized during construction.
- H. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 01 51 00

SECTION 01 55 00 – VEHICULAR ACCESS AND PARKING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Parking.
- B. Existing pavements and parking areas.
- C. Maintenance.
- D. Removal, repair.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 CONSTRUCTION AREA ACCESS

- A. Use of designated existing on-site streets, parking area, and sidewalks for construction traffic is permitted with the following requirements:
 - 1. Acquire and pay the cost of all necessary permits.
 - 2. Acquire and pay the cost of use of existing parking spaces that may need to be used for construction access.
 - 3. Provide all necessary safety measures to protect the public.
 - 4. Repair and replace all existing surfaces damages by construction traffic.
 - 5. Photo document existing surfaces where construction traffic will cross walks, curbs, and sidewalks prior to starting work. Provide the photographs as a required submittal.
- B. Provide unimpeded access for emergency vehicles. Maintain 20 feet of width at driveways with turning space between and around combustible materials.

3.2 PARKING

- A. Use of designated areas of existing parking facilities by construction personnel is permitted.
- B. Locate as indicated.

3.3 MAINTENANCE

- A. Maintain traffic and parking areas in a sound condition free of removal debris, materials, construction equipment, products, mud, snow, and ice.

- B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

3.4 REMOVAL, REPAIR

- A. Repair existing facilities damaged by use, to original condition. This includes, but not limited to:
 - 1. Lawn and landscape
 - 2. Irrigation systems
 - 3. Sidewalks
 - 4. Curbs
 - 5. Asphaltic concrete
- B. Repair damage caused by installation.

END OF SECTION 01 55 00

SECTION 01 56 50 – SECURITY MEASURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Security measures including formal security program, entry control, personnel identification, and miscellaneous restrictions.

1.2 RELATED SECTIONS

- A. Section 01 10 00 – Summary
- B. Section 01 50 00 – Temporary Facilities and Controls

1.3 SECURITY PROGRAM

- A. Protect Work, existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
- B. Initiate program in coordination with Owner's existing security at project mobilization.
- C. Maintain program throughout construction period until Owner acceptance precludes the need for Contractor security.

1.4 ENTRY CONTROL

- A. Restrict entrance of persons and vehicles into Project site and existing facilities.
- B. Allow entrance only to authorized persons with proper identification.
- C. Maintain log of workers and visitors, make available to Owner on request.
- D. Owners operations will include employee parking, contractor to coordinate vehicle traffic in and around private vehicles related to Owner's operations.
- E. Coordinate access for Owner's personnel on site in coordination with alternate (separate) construction access.
- F. At Owner's request, a Criminal Record Check (CRC) shall be run for each Contractor and Subcontractor's employees before that employee will be allowed access to Owner premises or be authorized to perform any Services under the Contract. A list of names for all Contractor and all Subcontractor's employees who will be on the job site for more than one day must be submitted to: Department of Administrative Services, attention: Mr. Bill Miller, 503-373-2318. These employees shall fill out the CRC forms as provided by the Owner and return to Mr. Miller, by mail, common carrier or hand carry. Do not submit completed CRC forms by email or fax. CRCs will be run through the Department of Administrative Services as provided for in ORS 326.603. The Owner shall bear the cost of processing such criminal records checks.

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SECTION 01 56 50

SECURITY MEASURES

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 01 56 50

SECTION 01 60 00 – PRODUCT REQUIREMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Product option requirements.
- D. Transportation, handling, storage, and protection.
- E. Substitution limitations and procedures.
- F. Procedures for Owner-supplied products.
- G. Spare parts and maintenance materials.

1.2 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 15 business days after date of agreement.
 - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepares specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for services for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard range of materials, colors, textures, and patterns.

PART 2 - PRODUCTS

2.1 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.

- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor, and remove from site.
- D. Reused Products: Reused products include materials and equipment previously used in this or other construction, salvaged and refurbished as specified.

2.2 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Do not use products having any of the following characteristics:
 - 1. Made using or containing CFC's or HCFC's
 - 2. Made of wood from newly cut old growth timber.
- C. Where all other criteria are met, Contractor shall give preference to products that:
 - 1. Are extracted, harvested, and/or manufactured closer to the location of the project.
 - 2. Have longer documented life span under normal use.
 - 3. Result in less construction waste.
 - 4. Are made of vegetable materials that are rapidly renewable.
- D. Regionally-Sourced Products:
 - 1. Overall Project Requirement: Provide materials amounting to a minimum of 10 percent of the total value of all materials that have been extracted, harvested, or recovered, as well as manufactured, within a radius of 500 miles from the project site.
 - 2. Specific Product Categories: Provide regionally-sourced products as specified elsewhere.
- E. Urea-Formaldehyde Prohibition:
 - 1. Overall Project Requirement: Provide composite wood and agrifiber products having no added urea-formaldehyde resins.
 - a. Require each installer to certify compliance and submit product data showing product content.
 - 2. Specific Product Categories: Comply with limitation specified elsewhere.
- F. Adhesives and Joint Sealants:
 - 1. Definition: This provision applies to gunnable, trowable, and liquid-applied adhesives, sealants, and sealant primers used anywhere on the interior of the building inside the weather barrier, including duct sealers.
 - 2. Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No. 1168.
 - 3. Specific Product Categories: Comply with limitations specified elsewhere.

G. Aerosol Adhesives:

1. Provide only products having lower volatile organic compound (VOC) content than required by GreenSeal GS-36.

H. Provide interchangeable components of the same manufacture for components being replaced.

2.3 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.4 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Provide spare parts, maintenance, and extra products of types and in quantities specified in individual specification sections.
- B. Deliver to and place in location as directed; obtain receipt prior to final payment.

PART 3 - EXECUTION

3.1 SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restriction for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- D. A request for substitution 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.
 2. Will provide the same warranty for the substitution as for the specified product.
 3. Will 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. Will reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
 6. Each request for substitution approval shall include:
 - a. Identity of Product for which substitution is requested; include Specification page and line number.
 - b. Identify of substitution; include complete Product description, drawings, photographs, performance and test data, and any other information necessary for evaluation.
 - c. Quality comparison of proposed substitution with specified product.
 - d. Changes in other Work required because of substitution.
 - e. Effect on construction progress schedule.
 - f. Cost of proposed substitution compared with specified product.
 - g. Any required license fees or royalties.
 - h. Availability of maintenance services.
 - i. Source of replacement materials.
- E. Substitutions will not be considered when they are indicated or implied on shop drawings or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- F. Substitution Submittal Procedure:
1. Submit three copies of request for substitution for consideration. Alternatively, submit one PDF copy of request for substitution by email to Architect and Owner's Project Manager for consideration. Limit each request to one proposed substitution.
 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
 3. The Architect will notify Contractor in writing of decision to accept or reject request.
 4. Architect will be sole judge of acceptability of any proposed substitution.

3.2 SUBSTITUTION DURING BIDDING PERIOD

- A. No request for substitution approval will be considered unless written request has been submitted on the Substitution Request Form bound hereinafter, as described in the Instructions of Bidder.
- B. Owner will issue Addenda prior to Bid opening listing all approved substitutions.

3.3 SUBSTITUTION AFTER CONTRACT AWARD

- A. Approval will be granted only when:

1. Specified Product can be delivered without Project delay, or
2. Specified Product has not been discontinued, or
3. Specified Product has been replaced by a superior Product, or
4. Specified Product can be guaranteed as specified, or
5. Specified Product will perform properly, or
6. Specified Product will fit within designated space, or
7. Specified Product complies with governing codes, or
8. Substitution will be clearly in Owner's interest.

- B. Owner will issue Change Order authorizing approved by Architect substitutions and revising Contract Sum where appropriate.

3.4 CONTRACT COMPLIANCE

- A. Substitution approval does not relieve Contractor from responsibility for proper execution of the Work and for compliance with other Contract requirements.

3.5 TRANSPORTATION AND HANDLING

- A. Designate receiving / storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due excessive materials handling and misapplication.
- B. Transport and handle products in accordance with manufacturer's instructions.
- C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.6 STORAGE AND PROTECTION

- A. Designate receiving / storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive material handling and misapplication.
- B. Store and protect products in accordance with manufacturer's instructions.
- C. Store with seals and labels intact and legible.

- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground and separated from soil and pavement.
- F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- H. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION 01 60 00

SECTION 01 70 00 – EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alternations work, including selective demolition, and forming openings in existing construction for all work including mechanical and electrical work.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Cleaning and protection.
- F. Starting of systems and equipment.
- G. Demonstration and instruction of Owner personnel.
- H. Closeout procedures, expect payment procedures.
- I. Substantial completion.
- J. Final completion.
- K. Additional fees for delays in completing work.

1.2 RELATED SESCTIONS

- A. Section 01 10 00 – Summary
- B. Section 01 30 00 – Administrative Requirements
- C. Section 01 40 00 – Quality Requirements
- D. Section 01 50 00 – Temporary Facilities and Controls
- E. Section 01 51 00 – Temporary Utilities
- F. Section 01 73 20 – Waste Management
- G. Section 01 78 00 – Closeout Submittals

1.3 SUBMITTALS

- A. See Section 01 30 00 – Administrative Requirements, for submittal procedures.
- B. Cutting and Patching: Submit written request in advance of cutting or alternation that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.

4. Visual qualities of sight exposed elements.
5. Work of Owner or separate Contractor.
6. Include in request:
 - a. Identification of Project.
 - b. Location and description of affected work.
 - c. Necessity for cutting or alteration.
 - d. Description of proposed work and products to be used.
 - e. Alternatives to cutting and patching.
 - f. Effect on work of Owner or separate Contractor.
 - g. Written permission of affected separate Contractor.
 - h. Date and time work will be executed.

1.4 PROJECT CONDITIONS

- A. Ventilate enclosed areas to assist curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into building interior atmosphere.
- C. Noise Control: provide methods, means, and facilities to minimize noise produced by construction operations.
- D. Pest & Rodent Control: provide methods, means, and facilities to prevent pests and rodents from damaging the work and accessing or invading the premises.
- E. Pollution Control: Provide methods, means, and facilities to prevent contamination of atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.5 COORDINATION

- A. See Section 01 10 00 for occupancy related requirements.
- B. Coordinate work of alternations and renovations to expedite completion sequentially and to accommodate occupancy requirements.
- C. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- D. Notify affected utility companies and comply with their requirements.
- E. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service , such equipment.

- F. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- G. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- H. Coordinate completion and clean-up of work of separate sections.
- I. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 - PRODUCTS

2.1 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or mis-fabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work,

assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

- A. Clean substrate surface prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 PRE-INSTALLATION MEETINGS

- A. When required in individual specification sections, convene a pre-installation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect four business days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
- E. Record minutes and distribute copies within five business days after meeting to participants, Architect, Owner, and those affected by decisions made.

3.4 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessary for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.5 ALTERATIONS

- A. The stability and integrity of the existing structure during demolition and selective demolition shall be maintained at levels generally acceptable within the construction industry by the use of temporary bracing, shoring, and underpinning until the proposed structure modifications are completed. In no case shall the existing structure be allowed to become unsafe during construction.

- B. Provide Ground Penetrating Radar (GPR) of concrete walls to locate reinforcing steel prior to cutting, coring, and / or drilling into existing concrete walls. DO NOT CUT ANY EXISTING REINFORCING STEEL.
- C. The design, installation, and removal of shoring and bracing systems required to provide temporary support of the existing structure during construction shall be the responsibility of the Contractor and shall be designed to support the dead, live, earthquake, and wind loads that may be imposed on the structure during construction in accordance with industry standards and generally accepted engineering principals. Provide the service of a registered professional engineer to design these systems when required of Oregon State Statute and the building code.
- D. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as shown.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- E. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 50 00 in locations indicated on drawings.
 - 2. Provide appropriate temporary signage including signage for exit or building egress.
- F. Comply with regulatory requirements for Alteration Work:
 - 1. Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection.
 - 2. Obtain required permits from authorities.
 - 3. Do not close or obstruct egress from any building exit or site exit.
 - 4. Do not disable or disrupt building fire or life safety systems without three business days' prior notice.
 - 5. Conform to applicable regulatory procedures when hazardous or contaminated materials are discovered. Stop all work in the area and notify Owner's representative.
 - a. Owner will provide verification, abatement, and removal as required to complete the work.
- G. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove items indicated on drawings.
 - 2. Relocate items indicated on drawings.
 - 3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 - 4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

- H. Services: Remove, relocate, and extend existing systems to accommodate new construction.
 - 1. Notify affected utility companies before starting work and comply with their requirements.
 - 2. Mark location and termination of utilities.
 - 3. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 - 4. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Owner. Provide temporary services during interruption of existing utilities, as acceptable to the Owner.
 - 5. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 - 6. 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.
 - 7. Verify that abandoned services serve only abandoned facilities.
 - 8. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceiling; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- I. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work at no additional cost to the Owner.
 - 4. Patch as specified for patching new work.
 - 5. Cover finished floors to remain.
 - 6. Use only rubber tired vehicles for conveying materials in building.
- J. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
- K. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
- L. When removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceiling to a smooth plane without breaks, steps, or bulkheads.
- M. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.

- N. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- O. If mechanical or electrical work is exposed accidentally during the work, re-cover and re-finish to match.
 - 1. Patch as specified for patching new work.
- P. Clean-up:
 - 1. Clean existing systems and equipment.
 - 2. Clean remaining structure, equipment, and facilities of all dirt, dust, and debris caused by demolition work. Return areas to conditions existing prior to the start of the work.
 - 3. Remove demolition debris and abandoned items from alterations areas and dispose of off-site, do not burn or bury.
- Q. Do not begin new construction in alterations areas before demolition is complete.
- R. Comply with all other applicable requirements of this section.

3.6 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetrations of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required conditions.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-conforming work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Saw cutting:
 - 1. Employ experienced saw cutting contractor to make all holes.
 - 2. Do not use water saws in occupied areas., unless otherwise approved.
 - 3. Cut openings square and plumb with sharp edges. Minimize over cutting at corners.
 - 4. Verify location of existing utilities in work area and make proper precautions to protect, disconnect and relocate, or terminate services as directed.

- F. Cut rigid materials using masonry saw or core drill. Minimize overcut at corners. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with industry standard, to full thickness of the penetrated element.
- J. Patching:
 - 1. Finish patch surfaces to match finish that existing prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patch work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
- K. Maintain adequate Temporary Support necessary to ensure structural integrity of affected Work.
- L. Protect other portions of Project Work against damage and discoloration.
- M. Protect Work exposed by cutting against damage and discoloration.
- N. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
- O. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.
- P. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.7 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remoted spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

- D. Collect and remove waste materials, debris, and trash / rubbish from site periodically and dispose off-site; do not burn or bury.

3.8 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.9 SYSTEMS STARTUP

- A. A factory or manufacturer representative shall be present during systems start-up.
- B. Coordinate schedule for start-up of various equipment and systems.
- C. Notify Architect and Owner seven calendar days prior to start-up of each item.
- D. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- E. Verify tests and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- F. Verify that winning and support components for equipment are complete and tested.
- G. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturer's instructions.
- H. When specified in individual specification sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- I. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate product to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate start-up, operational, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- C. For equipment or systems requiring periodic maintenance, perform demonstration of periodic maintenance.
- D. Provide a qualified person who knowledgeable about the Product to perform demonstration and instruction to Owner's personnel.
- E. Utilize Operations and Maintenance Manuals as basis for instruction. Review contents of manual with Owner's personnel.
- F. Prepare and insert additional data in Operations and Maintenance Manual when need for additional data becomes apparent during instruction.

3.11 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.12 FINAL CLEAN

- A. Use cleaning materials that are nonhazardous.
- B. Clean all surfaces exposed to view, remove temporary labels, stains and foreign substances, polish glossy surfaces, vacuum carpeted and soft surfaces.
- C. Clean and wax new interior concrete floors not scheduled to receive other finishes.
- D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- E. Clean filters of operating equipment.
- F. Remove and clean debris from site.
- G. Remove waste, surplus materials, trash / rubbish, and construction facilities from site; dispose of in a legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing authorities.
 - 1. Provide copies to Architect and Owner.

3.14 SUBSTANTIAL COMPLETION

- A. Notify Architect when work is considered ready for Substantial Completion.
- B. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's review.
- C. Contractor shall complete all required maintenance work prior to the date of Substantial Completion.
- D. When Contractor considers Work Substantial Complete, as defined in General Conditions, Contractor shall submit to the Architect:
 - 1. Written notice that Work, or designated portion thereof, is substantially complete.
 - 2. List of Items to be completed or corrected.
 - 3. Copy of Final Occupancy Permit.
- E. Architect will, as soon as possible thereafter, make an observation visit to the site to determine completion status.
- F. Should Architect determine that Work is not substantially complete:
 - 1. Architect will promptly notify Contractor in writing, giving reasons therefore.
 - 2. Contractor shall remedy Work deficiencies, and send second notice of Substantial Completion to Architect.
 - 3. Architect will review the corrected work.
- G. When Architect concurs that Work is Substantially Complete, Architect will:
 - 1. Prepare Certificate of Substantial Completion using AIA Form G704, accompanied with Contractor's list of items to be completed or corrected, as verified and amended by Architect.
 - 2. Submit Certificate to Owner and Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.
- H. Owner will occupy portions of the building as specified in Section 01 10 00.
- I. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.
- J. Notify Architect when work is considered Finally Complete.
- K. Complete items of work determined by Architect's final inspection.

3.15 FINAL ACCEPTANCE

- A. When Contractor consider Work complete, Contractor shall submit written certification that:
 - 1. Contract Documents have been reviewed.

2. Contractor has inspected Work for compliance with Contract Documents.
 3. Work has been completed in accordance with Contract Documents.
 4. Equipment and Systems have been tested in presence of Owner's Representative and are Operational.
 5. Work is complete and ready for final inspection.
- B. Architect will observe the complete Work to verify completion status as soon as possible after receipt of Contractor's Certification.
- C. Should Architect consider Work incomplete or defective:
1. Architect will promptly notify Contractor in writing, listing incomplete or defective Work.
 2. Contractor shall immediately remedy deficiencies, and send second written certification to Architect that Work is complete.
 3. Architect will review the corrected Work.
- D. When Architect finds Work acceptable under Contract Documents, Architect will request Contractor to make closeout submittals.

3.16 ADDITIONAL FEES FOR DELAYS IN COMPLETING THE WORK

- A. Architect will make two final visits to the project site, one to determine any Work Deficiencies and issue the Substantial Completion Form, and second to ascertain that Deficiencies have been corrected.

END OF SECTION 01 70 00

SECTION 01 73 20 – WASTE MANAGEMENT

PART 1 - GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash / waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Required Recycling, Salvage, and Reuse: the following may not be disposed of in landfills or by incineration:
 - 1. Aluminum and plastic beverage container.
 - 2. Corrugated cardboard.
 - 3. Wood pallets.
 - 4. Clean dimensional wood.
 - 5. Metals, including package banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - 6. Glass
 - 7. Plastic buckets.
 - 8. Fluorescent lamps (light bulbs).
- E. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.
- F. Methods of trash / waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
 - 5. Use of Owner's trash receptacles.
- G. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, State, and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair, and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e. ignitibility, corrosivity, toxicity, or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e. ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: the ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating, and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- M. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- N. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- O. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.3 SUBMITTALS

- A. See Section 01 30 00 – Administrative Requirements

- B. Submit Waste Management Plan within ten business days after receipt of Notice of Award of Bid, or ten business days prior to any trash or waste removal, whichever is agreed in writing to between Owner and Contractor; submit projection of all trash and waste that will require disposal and alternatives to landfilling.
- C. Waste Management Plan: Include the following information:
 - 1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
 - 2. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

- A. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project management.
- B. See Section 01 50 00 for additional requirements related to trash / waste collection and removal facilities and services.
- C. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01 70 00 for trash / waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash / waste management goals and issues at project meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.

1. As a minimum, provide:
 - a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
 - b. Separate dumpsters for each category of recyclable.
 2. Provide containers as required.
 3. Provide adequate space for pick-up and delivery and convenience to subcontractors.
 4. Keep recycling and trash / waste bin areas neat and clean and clearly marked in order to avoid contamination of materials and use by building tenants.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- H. Reuse of Materials On-Site: Set aside, sort, and protect separate products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

3.3 CONSTRUCTION WASTE MATERIALS LOG

- A. Contractor use, fill in, and return provided to waste materials log to Owner at closeout.
- B. Owner will provide an .xls spreadsheet for Contractor use post contract.
- C. Example waste materials log shown below:

[illegible]

END OF SECTION 01 73 20

SECTION 01 78 00 – CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and Bonds.

1.2 RELATED SECTIONS

- A. Section 01 30 00 – Administrative Requirements
- B. Section 01 70 00 – Execution Requirements
- C. Individual Product Sections: Specific requirements for operation and maintenance date, warranties required for specific products or Work.

1.3 SUBMITTALS

- A. Substantial Completion will not commence before the Operations and Maintenance Manuals, Warranties, and the Record Drawings are submitted in accordance with Section 01 70 00.
- B. Project Record Documents: Submit documents to Architect prior to Substantial Completion.
- C. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents 60 calendar days before the anticipate date of Substantial Completion. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into services during construction and operation by Owner, submit completed documents within ten business days after acceptance.
 - 3. Submit one copy of completed documents 45 calendar days to Substantial completion. This copy will be review and returned with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two copies of revised final documents in final form prior to Substantial Completion.
- D. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten business days after acceptance.

2. Make other submittals within ten business 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 ten business days after acceptance, listing the date of acceptance as the beginning of the warranty period.
 - a. Description

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 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 Order and other modifications to the Contract
 5. Reviewed shop drawings, product data, and samples.
 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Maintenance of documents and samples.
 1. Store in Contractor's Field Office apart from documents used for Construction.
 2. Provide files, shelving, and cabinets as necessary to safely and securely store Documents and Samples.
 3. Maintain Documents clean, dry, legible, and in good order.
 4. Do not use Record Documents for Construction Purposes.
 5. Make Documents available at all time for Architect's and / or Owner's inspection.
- C. Ensure entries are complete and accurate, enabling future reference by Owner.
- D. Store documents separate from documents used for construction.
- E. Record information concurrent with construction progress. Use waterproof, felt-tip pens.
- F. Color code recorded information, unless otherwise directed or approved.
 1. Red: Document Changes
 2. Green: Work Deleted
 3. Blue: Dimensional and other notations.
- G. 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.
- H. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
1. Measured elevation depths in relation to finish first floor datum.
 2. Measured locations of internal utilities and appurtenance concealed in construction, referenced to visible and accessible features of the Work.
 3. Field changes of dimension and detail.
 4. Details not on original Contract Drawings.
- I. Project Documents: Provide one hard copy of all the project documents in a binder including but not limited to:
1. Requests For Information
 2. Construction Change Orders
 3. Supplemental Instructions
 4. Change Order Requests
 5. Field Reports
 6. Test Reports

3.2 OPERATION AND MAINTENANCE DATA – GENERAL

- A. For Each Product or System: List names, addresses, email address, and telephone numbers of Subcontractors and Suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. 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.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE DATA – MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
1. Product data, with catalog number, size, composition, and color and texture designations.
 2. Information for re-ordering custom manufactured products.

- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Additional information as specified in individual product specification sections.

3.4 OPERATION AND MAINTENANCE DATA – EQUIPMENT AND SYSTEMS

- A. In addition to requirements called for in other sections of this manual, provide the following for Each Item of Equipment and Each System:
 - 1. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions.
 - 2. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting.
 - 3. Provide servicing and lubrication schedule.
 - 4. Include manufacturer's printed operation and maintenance instructions.
 - 5. Provide original manufacturer's part list, illustrations, assembly drawings, and diagrams required for maintenance.
 - 6. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
 - 7. Additional Requirements: As specified in individual product specification sections.

3.5 OPERATION AND MAINTENANCE MANUALS

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- B. Prepare data in form of an instructional manual.
- C. Binders: Commercial quality, 8 ½ x 11 inch three, D size, ring binders with durable plastic covers, two inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with types or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.
- F. Text: manufacturer's printed data, or type written data.
- G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

- H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
 - 1. Part I: Directory, listing names, addresses, email addresses, and telephone numbers of Architect, Contractor, Subcontractor, and major equipment suppliers.
 - 2. Part II: Operation and maintenance instructions, arranged by system and sub-divided by specification section. For each category, identify names, addresses, email addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant Design Criteria.
 - b. List of Equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - 3. Part III: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Photocopies of warranties and bonds.
- J. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
- K. Table of Contents: Provide title of Project; names, address, email addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.6 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten business 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 the Date of Substantial Completion is determined.
- B. Verify that documents are in proper form and contain fill information.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Manual: Bind in commercial quality 8 ½ x 11 inch three ring binders with durable plastic covers.

- F. Cover: identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address, and telephone number of Contractor and equipment supplier; and name of responsible company.
- G. Table of Contents: neatly typed, in sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of the product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

3.7 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

- A. Contractor shall submit the following:
 - 1. Contractor's Affidavit of Payment of Debts and Claims, AIA Document G-706.
 - 2. Contractor's Affidavit of Release of Liens, AIA Document G-706A is to include the following:
 - a. Consent of Contractor's Surety to Final Payment, AIA Document G707A.
 - b. Contractor's Release or Waiver of Liens.
 - c. Separate releases or waivers of lien for Subcontractors, Suppliers, and others with lien rights against Owner's Property, together with list of those parties.
 - 3. Duly sign and execute all Submittals, before delivery to Architect.

3.8 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ARCHITECT

- A. Certificate of Insurance for Products and Completed Operations: See Contract Requirements.
- B. Wage Certification: See Contract Requirements.
- C. Building Official's Certificate of Mechanical and Electrical Inspections.
- D. Building Official's Certificate of Occupancy.

3.9 SPARE PART AND MAINTENANCE MATERIAL SUBMITALS TO OWNER

- A. All spare parts and extra material are to be delivered to the owner prior to the date of substantial completion. Provide written confirmation of delivery, noting quantity and description as well as storage location. Obtain written acceptance from Owner for receipt of stored items.
- B. Specific Requirements: See Specification Sections.
- C. Storage Location: Where directed by Owner.

- D. Required Submittals: See Specification Sections.

3.10 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit final statement of accounting to Architect, including the following:
 - 1. Original Contract Sum.
 - 2. Additions and Deductions resulting from:
 - a. Previous Change Orders
 - b. Adjustments to Cash Allowances
 - c. Other adjustments
 - d. Deductions for uncompleted Work and Re-inspection Payments
 - 3. Total Contract Sum, as adjusted.
 - 4. Previous Payments.
 - 5. Sum remaining due.
- B. Architect will review and make a recommendation to the Owner who will then prepare and issue final Change Order, reflecting approved adjustments to Contract Sum not previously made by Change Orders.

3.11 FINAL APPLICATION FOR PAYMENT

- A. Follow procedures specified in Section 01 20 00.

END OF SECTION 01 78 00

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.

1.2 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.3 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.

1.4 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of selective demolition activities with starting and ending dates for each activity.
- C. Predemolition photographs or video.
- D. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician.

1.5 CLOSEOUT SUBMITTALS

- A. Inventory of items that have been removed and salvaged.

1.6 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work, unless otherwise stated in manual.
 - 1. Hazardous materials will be removed by Owner before start of the Work.
 - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.
- G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Perform a survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
- C. Inventory and record the condition of items to be removed and salvaged.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. Arrange to shut off utilities with utility companies.
 - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

- f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
- g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 4. Maintain fire watch during flame-cutting operations.
 - 5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 6. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 73 20 "Construction Waste Management and Disposal."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
 - 1. Clean salvaged items.

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

D. Removed and Reinstalled Items:

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

- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 CLEANING

- A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 01 73 20 "Construction Waste Management and Disposal." Do not allow demolished materials to accumulate on-site.
1. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 2. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 3. Comply with requirements specified in Section 01 73 20 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.
- C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board for wall and ceiling.
 - 2. Texture finishes.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Gypsum Wallboard: ASTM C1396/C1396M.
 - 1. 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:
 - a. American Gypsum.
 - b. CertainTeed Gypsum.
 - c. Georgia-Pacific Gypsum LLC.
 - d. National Gypsum Company.
 - e. USG Corporation.
 - 2. Thickness: Match Existing.

3. Long Edges: Tapered.

B. Gypsum Board, Type X: ASTM C1396/C1396M.

1. 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:
 - a. American Gypsum.
 - b. CertainTeed Gypsum.
 - c. Georgia-Pacific Gypsum LLC.
 - d. National Gypsum Company.
 - e. USG Corporation.
2. Thickness: 5/8 inch.
3. Long Edges: Tapered.

C. Gypsum Ceiling Board: ASTM C1396/C1396M.

1. 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:
 - a. American Gypsum.
 - b. CertainTeed Gypsum.
 - c. Georgia-Pacific Gypsum LLC.
 - d. National Gypsum Company.
 - e. USG Corporation.
2. Thickness: Match Existing
3. Long Edges: Tapered.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 4. Finish Coat: For third coat, use setting-type, sandable topping compound.

2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.
 1. 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:
 - a. Accumetric LLC.
 - b. Everkem Diversified Products, Inc.
 - c. Franklin International.
 - d. Grabber Construction Products.
 - e. Hilti, Inc.
 - f. Pecora Corporation.
 - g. Specified Technologies, Inc.
 - h. USG Corporation.

2.7 TEXTURE FINISHES

- A. Primer: As recommended by textured finish manufacturer.

- B. Non-Aggregate Finish: Premixed, vinyl texture finish for spray application.
 - 1. 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:
 - a. CertainTeed Corporation.
 - b. National Gypsum Company.
 - c. USG Corporation.
 - 2. Texture: Match Existing.
- C. Acoustical Finish: Water-based, chemical-setting or drying-type, job-mixed texture finish for spray application.
 - 1. 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:
 - a. International Cellulose Corp.
 - b. Monoglass Incorporated.
 - c. USG Corporation.
 - 2. Application Thickness: Match Existing.
 - 3. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 75 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 4. NRC: 0.55 according to ASTM C423.

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS

- A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- B. Comply with ASTM C840.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- E. Prefill open joints, rounded or beveled edges, and damaged surface areas.

- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
 - 1. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

3.2 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.

3.3 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 09 29 00

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for continuous, wall-to-wall interior ceilings.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each type of product.
- B. Samples: Minimum 6 inch x 6 inch of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and cross tees for each exposed product and for each color and texture specified.
- C. Delegated-Design Submittal: For seismic restraints for ceiling systems.
 - 1. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, and coordinated with each other, using input from installers of the items involved.
- B. Product test reports.
- C. Research reports.
- D. Field quality-control reports.
- E. Fire Resistance / Performance data sheets.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.
- B. Extra Materials: Deliver extra materials to Owner. Furnish extra materials that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
 - 1. Ceiling panels: Furnish quality of full-size panels equal to 25 percent of amount installed.

2. Suspension System Components: Furnish quantity of each suspension component equal to 25 percent of amount installed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE 7-16.
- B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame-Spread Index: Class C according to ASTM E1264.
 2. Smoke-Developed Index: 450 or less.

2.2 ACOUSTICAL PANELS

- 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:
 - a. American Gypsum
 - b. Armstrong World Industries, Inc.
 - c. CertainTeed Corporation
 - d. Rockfon (Rockwool International)
 - e. Tectum, Inc.
 - f. USG Corporation
- B. Acoustical Panel Standard: Manufacturer's standard panels according to ASTM E1264.
- C. Classification: 1-hour fire resistant rated.
- D. Color: White.
- E. Light Reflectance (LR): ASTM E1477; 0.81
- F. Ceiling Attenuation Class (CAC): ASTM C1414; Classified with UL label on product carton, 35
- G. Noise Reduction Coefficient (NRC): ASTM C423; Classified with UL label on product carton, 0.55.
- H. Edge/Joint Detail: Square.
- I. Thickness: 5/8 inch.
- J. Modular Size: 24 by 48 inches.

2.3 METAL SUSPENSION SYSTEM

- 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:
 - a. American Gypsum
 - b. Armstrong World Industries, Inc.
 - c. CertainTeed Corporation
 - d. Rockfon (Rockwool International)
 - e. Tectum, Inc.
 - f. USG Corporation
- B. Metal Suspension-System Standard: Manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C635/C635M.
- C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
 - 1. Structural Classification: Heavy-duty system.
 - 2. End Condition of Cross Runners: (stepped) type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Cold-rolled steel.
 - 5. Cap Finish: Painted white.

2.4 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Hold-Down Clips: Manufacturer's standard hold-down.
- C. Impact Clips: Manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.
- D. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical panels in place during a seismic event.

2.5 METAL EDGE MOLDINGS AND TRIM

- 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:
 - a. American Gypsum
 - b. Armstrong World Industries, Inc.
 - c. CertainTeed Corporation
 - d. Rockfon (Rockwool International)
 - e. Tectum, Inc.
 - f. USG Corporation

- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated.
- B. Layout openings for penetrations centered on the penetrating items.

3.2 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C636/C636M, seismic design requirements, and manufacturer's written instructions.
- B. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
 - 3. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 - b. Install panels with pattern running in one direction parallel to short axis of space.
 - c. Install panels in a basket-weave pattern.
 - 4. Install hold-down, impact, and seismic clips in areas required; space according to panel manufacturer's written instructions unless otherwise indicated.

3.3 QUALITY ASSURANCE

- A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.
 - 1. Fire Performance: Identify ceiling components with appropriate markings of applicable testing and inspecting organization.
 - 2. Surface Burning Characteristics: As follows, tested per ASTM E84 and complying with ASTM E1264 Classification.
 - 3. Fire Resistance: As follows, tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory.

- B. Panels: As with other features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern through possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Installers are advise to consult a fire protection engineer, NFPA 12, or local codes for guidance where automatic fire detection and suppression systems are present.
- C. Coordination of Work: Coordinate ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

3.4 ADJUSTING AND CLEANING

- A. Replace damaged and broken panels.
- B. Clean exposed surfaces of suspended ceiling system, including trim, edge moldings, and suspension members. Comply with manufacturer's instruction for cleaning and touch up of minor finish damage. Remove any ceiling products that cannot be successfully cleaned and/or repaired. Replace with attic stock or new product to eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on interior substrates.
 - 1. Concrete.
 - 2. Steel and iron.
 - 3. Gypsum board.

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of paint system and in each color and gloss of topcoat.

PART 2 - PRODUCTS

2.1 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. Miller Paint.
 - 2. Or appropriate equal.
- B. Products: Subject to compliance with requirements, provide product listed in the Interior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: Match existing and adjacent surfaces. Paint corner to corner of walls for seamless transition. Color for elevator door trim to be determined.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Fiber-Cement Board: 12 percent.
 - 3. Masonry (Clay and CMUs): 12 percent.
 - 4. Wood: 15 percent.
 - 5. Gypsum Board: 12 percent.
 - 6. Plaster: 12 percent.

- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. 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.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Traffic Surfaces:
 - 1. Latex Floor Enamel System MPI INT 3.2A:
 - a. Prime Coat: Floor paint, latex, matching topcoat.
 - b. Intermediate Coat: Floor paint, latex, matching topcoat.
 - c. Topcoat: Floor paint, latex, low gloss (maximum MPI Gloss Level 3), MPI #60.
 - 2. Location:
 - a. At room 111-floor only.
- B. Steel Substrates:
 - 1. Alkyd System MPI INT 5.1EE:
 - a. Prime Coat: Primer, alkyd, anti-corrosive, for metal, MPI #79.
 - b. Topcoat: Alkyd, interior, semi-gloss (MPI Gloss Level 5), MPI #47.
 - 2. Location:
 - a. At all elevator door frames.

C. Gypsum Board Substrates:

1. Alkyd over Latex Sealer System MPI INT 9.2C:
 - a. Prime Coat: Primer sealer, latex, interior, MPI #50.
 - b. Intermediate Coat: Alkyd, interior, matching topcoat.
 - c. Topcoat: Alkyd, interior (MPI Gloss Level 3), MPI #51.
2. Location:
 - a. At all wall and ceilings as required throughout scope.

END OF SECTION 09 91 23

SECTION 14 24 00 - HYDRAULIC ELEVATOR

PART 1 - GENERAL

1.1 SUMMARY

- A. Elevator Contractor shall furnish, provide and install all Work required to complete the Elevator Modernization as stated in the Contract Documents for Two (2) existing Hydraulic Passenger Elevators. Project also includes all requirements of Firefighters' Emergency Operation, Seismic, and ADA requirements. The project location is DAS-Executive Building, 155 Cottage Street NE, Salem, Oregon 97301.
- B. Applicable Documents
 - 1. Americans with Disabilities Act Accessibility Guidelines (ADAAG), and the standards; whichever are more stringent.
 - 2. ICC/ANSI A117.1-latest edition Accessible and Usable Buildings and Facilities, and the equivalent State and City Codes, whichever are more stringent.
 - 3. ASME A17.1/CSA B44-latest adopted edition. Safety Code for Elevators and Escalators including Elevator Safety Requirements for Seismic Risk Zone 3 or Greater and applicable City or State Amendments.
 - 4. ASME A17.2-latest adopted edition - Guide for the Inspection of Elevators, Escalators and Moving Walks.
 - 5. ASME A17.3-latest adopted edition-Safety Code for Existing Elevators and Escalators and applicable City or State Amendments.
 - 6. ASME A17.7/CSA B44.7 (latest adopted edition) - Performance-based Safety Code for Elevators and Escalators.
 - 7. National Electrical Code-(NEC) NFPA 70-latest adopted edition.
 - 8. National Fire Code NFPA-13-latest adopted edition.
 - 9. NFPA 72 - latest adopted edition-National Fire Alarm and Signaling Code.
 - 10. International Building Code-(IBC)-latest adopted edition.
 - 11. ASTM A167, Steel, Sheet Stainless.
 - 12. ASTM A366, Steel, Sheet, Carbon, Cold Rolled, Commercial Quality.
 - 13. AWS D1.1, Structural Welding Code - Steel.
- C. Definitions
 - 1. AHJ: Regulatory Authority Having Jurisdiction.
 - 2. ASME: American Society of Mechanical Engineers.
 - 3. MCP: Maintenance Control Program.
 - 4. NFPA: National Fire Protection Association.

5. NRTL: Nationally Recognized Testing Laboratory.

D. Permits and Codes

1. All equipment and Elevator Modernization Work shall comply with requirements of the Elevator Safety Code and other applicable codes of the State Elevator Inspection Branch and their Inspectors.
2. Elevator Contractor shall give necessary notices, obtain licenses and permits, and pay fees and other costs, including making arrangements for all inspections and tests required by regulating agencies.
3. Elevator Contractor shall file necessary plans, prepare documents, and obtain necessary approval of governmental departments having jurisdiction and required certificates of inspection for the Work, and deliver it to the Consultant before requesting acceptance and final payment for Work.
4. Elevator Contractor is not relieved from furnishing and installing work shown or specified which may be beyond requirements of ordinances, laws, regulations and codes.
5. Elevator Contractor shall furnish, provide and install all equipment to comply with all Codes, Regulations and Rules for the completion of this elevator modernization and shall complete all items required by the State of Oregon Elevator Inspector at no additional cost to the Owner.

1.2 REPLACEMENT REQUIREMENTS:

A. Additional Work Required by General Contractor

1. Provide, erect, and maintain lights, barriers, weather protection, warning signs, and other items as required for proper protection of building tenants, visitors and all workers engaged in Elevator Modernization, either directly or indirectly for the Elevator Modernization.
2. Cover over all non-elevator related piping that passes through the machine room.
3. Provide machine room ventilation to maintain the temperature at not more than ninety-five degrees Fahrenheit (95° F) for ninety-five percent (95%) of the time, unless a lower temperature is specified by the elevator equipment manufacturer.
4. Provide illumination in the elevator machine rooms sufficient to meet code currently a minimum of 200 lx (19 fc). The light switch to be installed adjacent to the lock side of the machine room access door. Identify the location of the supply side of the overcurrent protective device as per NFPA-70, Article 620.
5. Provide new Mainline disconnects with shunt trip. Disconnects shall be tied to heat detector located in elevator machine room.
6. Provide auxiliary contacts on mainline Disconnect to accommodate battery lowering.
7. Provide and interface Recall Initiating Devices in all elevator lobbies, Elevator machine room, and elevator top of shaft.

8. Provide 20A 120VAC GFCI duplex receptacles in the elevator pit. Identify the location of the supply side of the overcurrent protective device as per NFPA-70, Article 620.
9. Provide illumination in the elevator pit sufficient to meet code currently a minimum of (10 fc). per NFPA-70, Article 620.
10. Provide new 15A car lighting fused circuit lockable disconnects in the elevator machine room. Provide all wiring from the new disconnect to the new elevator controller.
11. Provide sprinklers in pit, located 24" or less from pit floor.
12. Provide telephone lines to the elevator machine room. Provide a j-box in the elevator machine rooms to terminate the phone line. All wiring in the machine rooms must be in conduit or other approved raceway. Provide conduit and wiring from machine room j-box to elevator controller. Elevator Contractor to provide labor/material to hook up the telephone wires from J-box to new elevator controller. Owner to provide phone line to elevator machine room.
13. Provide new elevator cab flooring. Color and type to be selected during submittals.
14. Provide lighting in elevator lobbies sufficient to meet code required 10ftc in front of elevator openings.
15. Paint machine room and pit floors with light gray enamel.

1.3 ELEVATOR MODERNIZATION ITEMS

- A. All existing elevator equipment that is not being retained shall be removed from the job-site by Elevator Contractor at the sole cost to Elevator Contractor. This included all existing machine room, hoistway, and car elevator equipment. All non-retained equipment shall be disposed of, complying with all Federal, State, City, County rules/laws/regulations/codes.
- B. Elevator Contractor shall verify exact distances between points shown on their Shop Drawings by actual measurements at the site.
- C. Standard Products: Unless otherwise indicated, the equipment to be furnished under these Specifications shall be the standard products of manufacturers regularly engaged in the production of such equipment. Apparatus, equipment and systems furnished must be similar and equal thereto with respect to quality, functional performance, capacity and efficiency.
- D. Submittals: Submit Shop Drawings to Consultant within 22 working days from date that Elevator Contractor has been awarded the Contract or has been provided with the Notice to Proceed from the Owner, for Consultants review and approval. Shop Drawings shall contain detailed information to determine that the equipment conforms to the requirements of this Specification and not less than the following information:
 1. Plan view of the elevator machine room. Show location of machinery and controls in machine room.
 2. Include all clearance dimensions required by the Elevator Safety Code.
 3. The elevator equipment is to be arranged in a neat and professional manner so that all elevator equipment is readily accessible.

4. Submit layout drawings as required by the Authority Having Jurisdiction (AHJ). Submittals to the AHJ shall have all information pertinent to the Elevator Modernization to determine whether the Elevator Modernization complies with all applicable Codes.
5. Provide catalog cuts for all new Elevator Contractor furnished material and equipment, including but not limited to doors, car enclosure, car and hall fixtures, controls and motors.
6. Complete information on motor, electrical services, controls, and all other coordination information.
7. Wiring Diagrams: Provide complete "As Built and Installed" single-line wiring diagrams showing the electrical connections, functions, and sequence of operation of all apparatus connected with the elevator, in the machine room, hoistway and car. Provide two (2) electronic sets and one hard copy bound into a three (3) ring binder. Furnish one complete draft set for Owner review no later than one (1) week before issue of the permanent State Of Oregon Elevator Operating Permit.
8. Elevator Modernization Data: Provide "As Built and Installed" wireman's original pull sheets showing raceway, junction box, traveling cable wire nomenclature, and origination and termination locations. Provide a legible copy of the elevator adjuster's final control settings, such as feet per minute, door open, door close, car door nudging time, door dwell times, performance times and all other adjustable features and/or timers.
9. Operations and Maintenance Manuals
 - a. Furnish two (2) electronic and one (1) hard copy of the complete operation and maintenance manuals covering the stipulated mechanical/electrical systems and equipment. The manual shall comply with all requirements indicated in the Project Closeout section of the specifications. Furnish one (1) complete electronic draft manual for Consultant's review not later than one (1) week before issue of the permanent Elevator Operating Permit.
 - b. Furnish one (1) complete electronic "first draft" manual for Owner review not later than one (1) week before issue of the permanent State Of Oregon Elevator Operating Permit.
 - c. The manual shall be complete in all respects for all equipment furnished and installed, controls, accessories and appurtenances stipulated. Include as a minimum the following.
 - 1) MCP information/schedules.
 - 2) Drawing or diagram showing equipment location.
 - 3) The original factory Adjustor's Manual used to adjust the specific Elevator Modernization including "As Built, As Installed and As Adjusted" field notes.
 - 4) Step-by-step procedure for elevator start-up, operation and shutdown.
 - 5) Maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides for all elevator equipment.
 - 6) Preventive Maintenance schedule.
 - 7) Lubrication schedule including type, grade, temperature, range and frequency.

- 8) Safety precautions, including diagrams and illustrations as needed for clarity.
- 9) All testing procedures, including Seismic and Firefighters' Service.
- 10) Parts list, with manufacturers' names and catalog numbers. Lists shall be complete for the materials installed.
- 11) Serial number of all equipment furnished and installed.
- 12) Service organizations and sources of replacement parts with Company names, addresses, fax, e-mail and telephone numbers.
- 13) Provide all service and field technical bulletins or manuals normally supplied to the factory/field Adjustor including videotapes or other media.

1.4 GENERAL REQUIREMENTS

A. Work Included

1. Furnish, provide and install car station, hall stations, controller/selector, electrical wiring in machine room/car/hoistway, car door operator, car top inspection station, hoistway interlocks/door gibs, intercoms, Firefighters' Emergency Operation, all requirements of the Americans with Disability Act (ADA) and all other elevator components as listed in this Elevator Specification.
2. Retain existing car speed, capacity, and elevator entrance size.
3. Owner shall incur no extra cost for the Elevator Modernization stated in the elevator specifications. Provide any and all overtime work in order to complete the total Elevator Modernization on schedule. Cost, if any, to Owner for the above stated items shall be included in Base Bid.
4. All existing elevator equipment that is being retained/reused shall be placed in as-new operating condition by the Elevator Contractor at no extra cost to the Owner.
5. Cutting and Patching
 - a. All repairs shall be made as necessary to complete the entire Elevator Modernization in original condition, including all cutting, fitting and drilling of masonry, concrete, metal and other materials as specified or required for proper assembly, fabrication, installation and completion of all Work under the Contract, and including any patching and redecorating as may be necessary. This includes all work in the elevator machine rooms, hoistways, pits, cars, guide rails brackets/fastenings, lobby hall stations and all others areas of the Elevator Modernization.
 - b. Any provision that requires facilitating removal of existing equipment and installation of new equipment in the machine rooms, lobbies, pits, hoistways, cabs and repair thereof shall be the total responsibility of Elevator Contractor.
 - c. All holes/cracks in the hoistways shall be sealed. All hoistway sides of the hall station boxes shall be sealed with Fire Retardant material.
6. Main Line Electrical Power Requirements
 - a. Elevator Contractor shall verify, via their own power confirmation sheet, of their Electrical Power Requirements. Bidders shall verify that the main and auxiliary power feeders are adequately sized and designed for reuse within the moderni-

zation program. This information shall be submitted with the Elevator Contractors Bid. The contractor shall be responsible to make required changes in electrical system.

7. Welding
 - a. All welding shall comply with ASME A17.1-2010/CSA B44-10 Design for welding, repair, cutting or splicing of members upon which the support of the car, shall be prepared by a licensed professional engineer.
 - b. Welding shall be by welders qualified in accordance with the requirements of Section 5 of ANSI/AWS D1.1.
 - c. At the option of the Elevator Contractor, the welders may be qualified by one of the following.
 - 1) The manufacturer.
 - 2) A professional consulting engineer.
 - 3) A recognized testing laboratory.
 - d. Elevator Contractor shall furnish all required documentation before starting the Elevator Modernization.
8. Terms
 - a. Where, "as shows", "as indicated", "as detailed", or words of similar meaning are used, it shall be understood that reference to the Specifications are made unless otherwise stated. Where "as directed", "as required", "as authorized", "as reviewed", "as accepted", or words of similar meaning are used, it shall be understood that the direction, requirement, permission, authorization, review, or acceptance of Consultant is intended, unless otherwise stated.
 - b. When used in the Contract Documents, "provide" shall be understood to mean "provide complete, furnish and install".
 - c. Terms used are defined in the latest edition of the Safety Code for Elevators and Escalators, ASME A17.1-2010/CSA B44-10. Any reference to Code in the technical sections shall refer to ASME A17.1-2010/CSA B44-10 unless otherwise noted.
 - d. Reference to a device or a part of the equipment applies to the number of devices or parts required to complete the installation.
9. SDS Information
 - a. Elevator Contractor shall provide Owner and Consultant with Safety Data Sheets for products Elevator Contractor intends to employ under this Contract prior to commencement of the Elevator Modernization. It shall remain the responsibility of Elevator Contractor to inform and train Elevator Contractor's employees on the use of the SDS requirements.

1.5 MAINTENANCE CONTROL PROGRAM (MCP)

- A. Provide an MCP for the elevator. The MCP must be unique to this elevator and not simply a generic maintenance program for hydraulic elevators. The MCP shall include, but is not limited to the following.
 1. Examinations, maintenance, and tests of equipment at scheduled intervals in order to ensure that the installation conforms to the requirements of ASME A17.1-2010/CSA

B44-10 Section 8.6. The maintenance and testing procedures, and intervals shall be based on the following.

- a. Equipment age, condition, and accumulated wear.
 - b. Design and inherent quality of the equipment.
 - c. Usage.
 - d. Environmental conditions.
 - e. The manufacturer's recommendations for any SIL rated devices or circuits.
2. Cleaning, lubricating, and adjusting applicable components at regular intervals and repairing or replacing all worn or defective components where necessary to maintain the installation in compliance with the requirements of ASME A17.1-2010/CSA B44-10, Section 8.6.
 3. The instructions for locating the Maintenance Control Program shall be provided in or on the controller along with instructions on how to report any corrective action that might be necessary to Owner.
 4. The maintenance records required shall be kept at a central location agreeable and accessible to Owner and the Elevator Contractor's personnel.
 5. The Maintenance Control Program shall be accessible to elevator personnel and shall document compliance with ASME A17.1-2010/CSA B44-10 Section 8.6.
 - a. Procedures for tests, periodic inspections, maintenance, replacements, adjustments, and repairs for all Safety Integrity Level (SIL) rated Electrical/Electronic Programmable Electronic Systems (E/E/PES) electrical protective devices and circuits shall be incorporated into and made part of the Maintenance Control Program.
 - b. Where unique or product-specific procedures or methods are required to inspect or test equipment, such procedures or methods shall be included in the Maintenance Control Program.

1.6 MATERIAL AND EQUIPMENT

A. Transportation and Handling

1. Materials, products and equipment shall be properly packaged and protected to prevent damage during transportation and handling.
2. Storage and Protection
 - a. Provide suitable temporary weather-tight storage facilities as may be required for materials that may be damaged by storage in the open. Elevator Contractor to pay for all costs incurred.
 - b. If off-site storage of equipment is required, Elevator Contractor shall pay for all costs incurred.
 - c. Store and protect delivered materials from damage. Do not use any damaged material in the Elevator Modernization. Elevator Contractor to pay for all costs incurred to replace any damaged material/equipment.
3. Installation Requirements

- a. A complete Elevator Technical Specification shall be on-site, at all times, during the entire Elevator Modernization.
 - b. Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the respective manufacturer's instructions unless more stringent requirements are specified.
 - c. Elevator Contractor shall provide written documentation that Elevator Contractor has installed and adjusted the elevator controller/selector as specified in these Specifications. Elevator Contractor shall evidence, in writing, that Elevator Contractor's Adjustor has attended the controller/selector manufacturer's training. Elevator Contractor shall provide controller/selector installation/troubleshooting training to their on-site Journeymen/Apprentices that will be installing and servicing/maintaining all the elevator equipment.
 - d. On-site Installation and Maintenance Technicians shall always have, on-site, a working cell phone. The phone number(s) shall be provided to the Owner and Consultant before the Elevator Modernization begins.
4. Manufacturers' Names and Data Plates
- a. Manufacturers' data plates and other identifying markings shall not be affixed on exposed surfaces to public view unless approved by Owner.
 - b. Each major component of mechanical and electrical equipment shall have, on a securely attached plate, the manufacturer's name, address, model number rating and any other information required by governing codes.
 - c. This requirement does not apply to Nationally Recognized Testing Laboratories (NRTL) and code required data labels.
5. Colors of Factory-Finished Equipment
- a. All colors will be selected from the manufacturer's standard color charts.
 - b. Elevator Contractor shall submit samples of all colors available for review to the Owner.
 - c. Finishes to be selected during submittals.

1.7 PROJECT CLOSEOUT

A. Final Cleaning

1. Elevator hoistway and equipment shall be cleaned and free from rust, rubbish, loose plaster, mortar drippings, extraneous construction materials, dirt and dust at the end of each work day.
2. Care shall be taken by workers not to mark, soil, or otherwise deface existing surfaces. In the event that finished surfaces become defaced, clean and restore such surfaces to the original condition at the total cost of Elevator Contractor.
3. Clean areas in which painting and finishing work is to be performed just prior to the start of this Elevator Modernization, and maintain these areas in a clean condition. Cleaning includes the removal of rubbish, broom cleaning of floors, the removal of any

- plaster, mortar, dust and other extraneous materials from finish surfaces, and surfaces that will remain visible after the Elevator Modernization is complete.
4. Clean machine room equipment and floor of dirt, oil, and grease. Paint machine room floors with one (1) coat of gray enamel.
 5. Clean car, entrances, operating, signal fixtures and all elevator equipment of dirt, lint, oil, grease, and finger marks.
 6. Cleaning During the Elevator Modernization
 - a. Total project shall be cleaned on a daily basis by Elevator Contractor. Dust must be kept at a minimum at all times, especially in the hoistway.
 - b. Elevator Contractor shall use Shop Vac with HEPA filters to capture dust from concrete drilling or cutting work.
 7. Punch Listing, Final Observation and Review
 - a. Elevator Contractor shall complete the entire Elevator Modernization prior to requesting Consultants final inspection.
 - b. Consultant will attempt to schedule the final inspection during the same period the Elevator Inspector inspects the elevator. Provide Consultant with copies of the Elevator Inspectors Report within two (2) calendar days of the on-site Elevator Inspectors visit. Provide a written report of all items, which have been corrected by Elevator Contractor.
 - c. If a second (2nd) follow-up inspection is required of Consultant or Elevator Inspector, the Elevator Contractor shall pay all costs for such inspections/surveys including all expenses for both the Elevator Inspector and Consultant.

1.8 QUALITY ASSURANCE

- A. Elevator Contractor shall furnish Owner with all special tools, meters, diagnostic tools/devices, troubleshooting special hand-held tools/devices, printed information, adjusting information and all other special tools/devices/laptops to perform maintenance, troubleshooting, repairing and adjusting at conclusion of elevator modernization. If any special tool, meter, diagnostic tools/device/laptop requires readjusting or re-programming Elevator Contractor shall pay for all costs including freight for a period of one (1) years from date of elevator final acceptance by Owner and Elevator Consulting Services, Inc. Cost, if any, to Owner for the above stated items shall be included in Base Bid. After the initial one (1) year period all upgrades, readjustments or reprogramming of any or all diagnostic tools or devices will be provided as needed or required on a purchase order basis with the original Elevator Contractor that installed/manufactured the elevator equipment with the Owner.
- B. Elevator Contractor shall provide and install all software improvement up-grades for a period of one (1) years from date of elevator final acceptance by Owner, State of Oregon Elevator Inspector and Elevator Consulting Services, Inc. The up-grades are defined as improvements for the elevator operation. If any elevator safety software up-grades are designed or discovered by the elevator manufacturer, the up-grades shall be installed immediately. All costs of the software up-grades shall be paid by Elevator Contractor.

- C. Elevator Contractor shall provide the Owner the ability to purchase and receive all elevator replacement parts within twenty four (24) hours from date of parts order by Owner. Replacement and spare parts are defined as any and all items required to maintain, service, repair, adjust and operate the elevator as designed and installed, in a safe and trouble-free manner. Elevator Contractor shall sell any and all spare parts including proprietary parts to the Owner during the entire life cycle of the elevator equipment.
- D. Elevator Contractor shall supply a list, in writing, of all proprietary equipment that will be provided. A list of these items shall be provided together with a guarantee of availability. This guarantee shall specify that all proprietary parts shall be available for the life of the elevator equipment and within a twenty four (24) hour period of order placed. Owner may return the worn or defective part to Elevator Contractor after the replaced part is delivered to the Owner and the elevator has been placed in normal operation. Elevator Contractor shall submit a list of all proprietary equipment that is required in the elevator drive and control system. The list shall include individual item cost and part numbers or coding. Parts ordering information shall be provided.

1.9 ALTERATIONS

- A. Description
 - 1. General: Perform alterations and related Work in accordance with requirements of all Contract Documents.
- B. Scheduling
 - 1. Before commencing any alteration Work, submit for review and approval by Consultant and Owner, a schedule showing the material ship dates, time of material on-site, commencement of work, the order and the completion dates for the various parts of the elevator modernization.
 - a. Provide a bi-weekly updated schedule to Architect.
 - b. Provide a list of names of Adjustors, Journeymen, and Apprentices on-site.
 - c. All information shall be delivered to Architect.
 - d. Elevator Contractor is required to submit a full project schedule with each pay request.
- C. Protection
 - 1. Provide and maintain temporary protection of the existing structure designated to remain where removal and new work is being completed, connections made, materials handled or equipment moved.
 - 2. Take necessary precautions to prevent dust from rising by wetting removed masonry, concrete, plaster and similar debris. Protect unaltered portions of the existing building affected by the operations under this Section by dust-proof partitions and other adequate means.
 - 3. Provide adequate fire protection in accordance with Fire Department Rules and Requirements.

4. Do not close or obstruct walkways, passageways or stairways. Do not store or place materials in passageways, stairs or other means of egress. Conduct operations with minimum traffic interference.
5. Be responsible for any damage to the existing structure or contents by reason of the insufficiency of protection provided. Elevator Contractor shall repair or replace any damaged building equipment that is damaged by Elevator Contractor at their own cost.

1.10 QUALITY OF WORK

- A. Perform removal and alteration of Elevator Modernization as shown, with due care, including shoring, bracing, etc. Be responsible for damage, which may be caused by such Work, to any part or parts of existing structures or items designated for reuse. Perform patching restoration and new Work in accordance with the Contract Documents.
- B. Materials or items designated to be reinstalled, as stated in Section 14 24 00, shall be removed with care, under the supervision of the Elevator Contractor and protected and stored until reinstalled. Replace any material or items damaged in its removal or reinstallation.
- C. Materials or items removed and not designated to become the property of Owner shall be removed from the job site by Elevator Contractor.
- D. Execute the Elevator Modernization in a careful and orderly manner, with the least possible disturbance to the building occupants.
- E. Where alterations occur, or new and old Work join, cut, remove, patch, repair or refinish the adjacent surfaces or so much thereof as is required by the involved conditions, and leave in the condition, which existed prior to the commencing of the Elevator Modernization.
- F. Finish new and adjacent existing surfaces as specified for Elevator Modernization. Clean existing surfaces of dirt, grease, loose paint, etc. before refinishing. Where any existing equipment is to be re-used, repair/renovate such equipment to place in perfect working order.

1.11 WARRANTY

- A. Warranty the completed elevator in accordance with state law and regulation, but in no case less than complete coverage of parts and labor for one (1) year after substantial completion.
- B. Elevator Contractor shall furnish Owner with all special tools, meters, diagnostic tools/devices, troubleshooting special hand-held tools/devices, printed information, adjusting information and all other special tools/devices to perform maintenance, troubleshooting, repairing and adjusting at conclusion of Elevator Modernization. If any special tool, meter, diagnostic tools/device requires readjusting or re-programming Elevator Contractor shall pay for all costs including freight for a period of one (1) year from date of elevator substantial completion. Cost, if any to Owner, for the above stated items shall be included in Base Bid. After the initial one (1) year period all upgrades, readjustments or reprogramming of any or all diagnostic tools or devices will be provided as needed or required on a purchase order basis with the original Elevator Contractor that installed/manufactured the elevator equipment.

- C. Elevator Manufacturer shall provide and install all software improvement up-grades for a period of one (1) year from date of substantial completion. The up-grades are defined as improvements for the elevator operation. If any elevator safety software up-grades are designed or discovered by the elevator manufacturer, the elevator manufacturer shall install the up-grades immediately. Elevator Contractor shall pay all costs of software upgrades.
- D. Elevator Contractor shall provide a WARRANTY FULL PREVENTIVE MAINTENANCE service for a period of one (1) year after date of the one (1) elevator is accepted by the State of Oregon Elevator Inspector, Owner, Elevator Consultant and all punch list items have been completed and elevator is available for unconditional use by the Owner.
1. This includes all labor and material to perform routine Preventive Maintenance as well as any adjustments, lubrication, repairs, or parts replacements required to keep the equipment in good and safe operating order.
 2. Elevator Contractor shall provide once a month Warranty Preventive Maintenance visits to the elevator, for the one (1) year period.
 3. Total minimum Preventive Maintenance Hours shall be per required to effectively comply with MCP per month. This does not include any time for Repairs, Callbacks, or Testing.
 4. Elevator Contractor shall verify, in writing, that all Preventive Maintenance hours on-site have been provided to the Owner each and every month.
 5. Elevator Contractor shall furnish written reports of each service call, whether routine or emergency, describing services performed.
 6. Basic service work shall be performed during regular working hours of regular working days.
 7. Emergency callback service shall be available on a twenty four (24)-hour, seven (7)-day basis at no additional cost to the Owner.
 8. Elevator Call Back Response Time shall be as follows: After call is placed from Owner to Elevator Contractor and received by Elevator Contractor's Dispatching service and until the Elevator Contractor's service person is at the reported elevator:
Person trapped in elevator-all hours-all days = 30-45 minutes.
Elevator Trouble Call-Monday thru Friday-8:00 am to 5:00 pm = 1 hour.
Elevator Trouble Call-Monday thru Friday-off hours, 5:00 pm to 8:00 am = 2 hours
Elevator Trouble Call-Saturdays, Sundays and Holidays-all hours = 2 hours.
 9. In performance of this Work, Contractor agrees to carry out all Work in strict compliance with all laws, Codes, rules and regulations set forth with regard to the equipment by municipal, state or federal authorities having jurisdiction in effect on the date of this contract.
 10. Elevator Contractor shall protect all adjacent equipment, surfaces, etc. from damage and shall make good any damage thereto at Elevator Contractor's own expense.
 11. Elevator Contractor shall clean up all Work areas and shall remove from the premises all debris resulting from Elevator Contractor's operations.
 12. Elevator Contractor's service and repair personnel shall wear uniforms identifying them as employees of Elevator Contractor for ease of identification by Owner.

13. Elevator Contractor is to enforce strict discipline and order among their employees while on Owner's premises, and shall be subject to the rules and regulations established by Owner.
14. Personnel deemed unacceptable by Owner, for any reason, will not be allowed to perform Work under this contract with Owner.
15. Elevator Contractor will be issued keys for the elevator machine room. Duplication of any Owner key is not allowed.
16. Any and all costs occurring due to the loss of keys by Elevator Contractor, including the changing of locks, shall be borne at the sole cost and expense of Elevator Contractor.
17. All labor furnished by Elevator Contractor shall be completed by trained elevator mechanics, thoroughly skilled in elevator maintenance and directly employed and supervised by Elevator Contractor.
18. They will use all reasonable care to maintain the elevator equipment in a proper and safe operating condition and to extend the life of the equipment.
19. Maintain the hoistway, pit, machinery, machinery room and any assigned Elevator Contractor Work space in a clean, orderly condition, free of dirt, dust, oil and grease spills, trash and debris, at all times.
20. Replace burned out indicator lamps in cars and hall call stations during Preventive Maintenance visits.
21. Elevator Contractor shall conduct the following tests and any other tests required:
22. All tests required by the State of Oregon Elevator Inspection Department.
23. Written reports of these tests shall be submitted to Owner within five (5) days from completion and also as required to the Elevator Inspector. Seven (7) days prior notification shall be given so that a representative of Owner may witness said test or tests.
24. Elevator Contractor shall perform all required Firefighters' Service tests and maintain all required documentation. Written results of such testing shall be submitted to Owner one (1) week after such testing.
25. Elevator Contractor shall post a Preventive Maintenance Schedule and Work Log in the machine room.
26. The log shall include all entries for routine maintenance and repairs.
27. Entries shall include date Work is completed, brief description of Work completed and the Mechanic's name.
28. Owner may review and copy the log and maintenance schedule at any time.
30. Elevator Contractor shall maintain a complete set of wiring diagrams showing "as built" conditions with any changes or modifications to circuits resulting from control modifications, parts replacement or equipment upgrade.
31. Owner retains sole possession of these wiring diagrams.
32. The wiring diagrams shall be kept in a neat and orderly fashion and be located in the machine room.

33. Elevator inspection fees shall be paid by Owner. Fees for re-inspection due to failure to eliminate deficiencies, which are the responsibility of Elevator Contractor, shall be paid by Elevator Contractor.
34. EXCLUSIONS:
- a. Repairs required because of negligence, accident or misuse of the equipment by anyone other than Elevator Contractor, their employees, subcontractors, agents or other causes beyond Elevator Contractors control except ordinary use.
 - b. Repairs and replacement pertaining to the car enclosure including removable panels, door panels, car doors, suspended ceilings, light fixtures, tubes and bulbs for general lighting, handrails, car finish, and flooring coverings, hoistway enclosure, hoistway entrance frames and sills and emergency telephone instruments.
 - c. Mainline power disconnect switches and breakers, fuses and feeders to the switches.
35. Elevator Contractor shall not be required, under this agreement, to install new attachments or devices, after the elevator is accepted by Elevator Inspector, Elevator Consultant and Owner, as may be recommended or directed in the future by insurance companies, federal, state, municipal or governmental authorities unless compensated for such installation. This applies to possible changes in the ASME A17.1/CSA B44 Elevator Code.
36. All Work to be performed, which is not included in this One Year Warranty Period shall be authorized by Owner by written notification to Elevator Contractor prior to commencement of the Work. The hourly rates, and material mark up from cost, will be as follows:
- Straight Time
 - Straight Time + 70%
 - Straight Time + 100%
- MATERIAL MARKUP:

1.12 ELECTRICAL

- A. Provide electrical components of the elevator equipment and systems, including motors, motor starters, controllers, control instruments, switches, conduit, wire and relays as specified herein and as necessary for complete and operable systems.
- B. Furnish interconnecting wiring for components of equipment as an integral part of the equipment.
- C. Electrical equipment and wiring shall conform to NFPA 70 - National Electrical Code, current edition.
- D. For equipment with electrical components, provide an NRTL label on each component for which published standards exist.
- E. The frames of all motors, pump unit, controller, transformers, and the metal enclosures for all electrical equipment in or on the cars, hoistways and machine rooms shall be grounded in accordance with NFPA 70-Article 250.

- F. Provide daisy-chain electrical grounding for all machine room electrical cabinets.
- G. Provide required and adequate electrical wiring gauge sizing and number of electrical conductors to totally eliminate any voltage/amperage drop/variation for all the machine room equipment, hoistway switches; door interlocks; car operating fixtures; positions indicators; exhaust fans; car lighting; inspection stations; leveling devices, hall stations; position indicators, and all other elevator electrical equipment.
- H. Conductors and Connections
 - 1. Provide new wiring in machine rooms, hoistways and cars. Copper throughout with individual wires coded and connections on identified studs or terminal blocks.
 - 2. Use no splices or similar connections in wiring except at terminal blocks, control cabinets, and junction boxes.
 - 3. Provide ten percent 10% spare wires in all wiring runs. Separate and mark all spare wires. All spare wire ends shall be turned back or protected against accidental exposure to any live electrical circuit or electrical ground.
 - 4. Provide all material and labor to connect machine room telephone wires to elevator controller and to the in-car emergency telephone. Owner to provide telephone wires to elevator machine rooms. All wiring shall be enclosed in EMT.
 - 5. Conduit and Raceway
 - a. Provide new painted or galvanized steel conduit (EMT) and duct. Conduit size, one-half inch (1/2") minimum.
 - b. Do not use flexible conduit exceeding thirty-six inches (36") in length.
 - c. Flexible heavy-duty service cord may be used between fixed car wiring and car door switches for door protection devices.
 - d. Plastic wire ties shall not be allowed for conduit fastening.
 - 6. Traveling Cables
 - a. Traveling cables shall comply with NFPA 70, Article 400.
 - b. Provide new with flame and moisture-resistant outer cover.
 - c. Traveling cables shall terminate in the elevator machine room controllers and on the elevator car top junction boxes with marked terminals.
 - d. Prevent traveling cables from rubbing or chafing against hoistway or elevator equipment within hoistway.
 - e. Provide ten percent (10%) spare conductors in each traveling cable.
 - f. Provide two (2) spare conductors of coaxial traveling cables.
 - g. Provide four (4) spare pair of twisted/shielded traveling cables.
 - h. Provide two (2) spare pair of number fourteen (#14) conductors.
 - i. All spare wire ends shall be turned back or protected against accidental exposure to any live electrical circuit or electrical ground.
 - j. Tag all spare conductors indicating termination points at each end. Provide all wiring for car lighting, fan and emergency communication from elevator controller to car.

- k. Provide traveling cable for in-car lighting, fan, emergency communication device and intercom to main floor and elevator machine room.

1.13 PAINTING

- A. All exposed metal work furnished in these specifications, except as otherwise specified, shall be properly painted after Elevator Modernization.

1.14 LIGHTING

- A. All lights in car and operating fixtures shall be LED.

1.15 ACCEPTABLE ELEVATOR INSTALLERS/MANUFACTURERS

- A. Controls
 - 1. Motion Control Engineering, Inc. Motion 2000
 - 2. Elevator Controls Corp. Model H900
 - 3. OTIS HydroFit
 - 4. KONE KCM
 - 5. ThyssenKrupp Elevator Tac 32H
 - 6. Or Approved Equal
- B. Automatic Lowering Device
 - 1. Reynolds & Reynolds Electronics - UV2 Series
 - 2. Or Approved Equal
- C. Hydraulic Pump Unit (submersible), Limit Switches
 - 1. Canton Elevator Company
 - 2. EECO-Elevator Equipment Company, Inc.
 - 3. Minnesota Elevator, Inc.
 - 4. Otis Elevator Company
 - 5. KONE Elevator Company
 - 6. ThyssenKrupp Elevator Company
 - 7. Or Approved Equal
- D. Hydraulic Pump Unit Mounting Devices
 - 1. Lord Industrial Shock Mount Bracket-Part No. J-2919-1---1-800-657-0747
 - 2. Or Approved Equal
- E. Hydraulic Oil Line Isolation for Penetrating Hoistway/Machine Room Walls

1. Nelson Firestop Products CLK-Silicone Sealant---1-918-627-5530
 2. Or Approved Equal
- F. Hydraulic Oil Line Noise Suppressor/Muffler
1. MEI Silencer
 2. Or Approved Equal
- G. Hydraulic Oil Line Brackets
1. CQuiet 360 Pipe Isolation Brackets---C.E. Electronics---419-633-3178
 2. Or approved Equal
- H. Hydraulic Valve
1. Maxton Manufacturing Company
 2. Or Approved Equal
- I. Car Door Operator-Linear
1. G.A.L. Manufacturing Corporation Linear Door Operator
 2. Otis Elevator Company Linear Door Operator
 3. KONE Elevator Company Linear Door Operator
 4. ThyssenKrupp Elevator Company Linear Door Operator
 5. Or Approved Equal
- J. Car Door Finish
1. Stainless Steel #4 finish
- K. Hoistway/Car Door Tracks non integral, Hangers, Interlocks, Gate Switch
1. G.A.L. Manufacturing Corporation
 2. Otis Elevator Company
 3. KONE Elevator Company
 4. ThyssenKrupp Elevator Company
 5. Or Approved Equal
- L. Hoistway and Car Door Gibs
1. SEES-Enforcer Safety Door Gib
 2. Or Approved Equal
- M. Car Door Protective Device
1. Janus Panachrome-3D
 2. Or Approved Equal

- N. Fixtures-Vandal Resistant
 - 1. Hall Stations
 - a. Innovation Industries Incorporated, Bruiser Vandal Resistant
 - b. Or Approved Equal
- O. Car Fixtures, including In-Car Directional Lanterns
 - 1. Innovation Industries Incorporated, Bruiser Vandal Resistant
 - 2. Or Approved Equal
- P. Hoistway Access Door Safety Plugs
 - 1. Tri-Lok Manufacturing and Maintenance Corporation
- Q. Car/Hall Position Indicators/Signals
 - 1. C. E. Electronics, Inc.
 - 2. Or Approved Equal
- R. Emergency Communications
 - 1. Janus EMS
 - 2. Rath Microtech
 - 3. Or Approved Equal
- S. Intercoms
 - 1. Fillips, LLC
 - 2. Or Approved Equal
- T. Alarm Bell
 - 1. Nylube Model ELB-6
 - 2. Or Approved Equal
- U. In-Car Emergency Light
 - 1. Nylube Products Model EL-SS
 - 2. Or Approved Equal
- V. Roller Guides
 - 1. ELSCO, Inc. Model B

PART 2 - PRODUCTS

2.1 GENERAL

- A. The completed elevator modernization shall conform to the Elevator Safety Code except as specifically otherwise indicated or specified.
- B. The completed Elevator Modernization, including equipment, material, workmanship, design, and tests shall be in accordance with the standards, rules and Specifications referenced.
- C. All material and equipment shall be new.
- D. Electrical materials shall meet and bear evidence of meeting the requirements of a Nationally Recognized Testing Laboratory (NRTL).
- E. The equipment shall be the product of a manufacturer regularly engaged in the manufacture and modernization of this type of equipment.
- F. Working parts shall be accessible for inspection, servicing and repair.
- G. Adequate means shall be provided for the lubrication of all wearing parts that require lubrication.
- H. Existing Equipment Description. All information to be verified by the Elevator Contractor.

Type of Equipment	Two (2) In-Ground Cylinder Hydraulic Elevators
Year Installed	1979
Manufacturer	US Elevator
Controller/Selector Manuf.	US Elevator
Door Equipment Manuf.	US Elevator
Door Sizes	3' 6" X 7' 0"
Door Configuration	Single Speed, Side Slide
Number of Stops	2 Front, 3 Rear
Floor Designations	1, *2, 3, 4, 5
Electrical Power	240 VAC
Rated Speed	150 FPM
Capacity	2,500 LBS
Machine Room Location	Adjacent, Bottom Landing

2.2 MATERIALS

- A. Steel
 - 1. Sheet Steel-Furniture Steel for Exposed Work: Stretcher-leveled, cold-rolled, commercial-quality carbon steel, complying with ASTM A366, matte finish.

- a. Sheet Steel for Unexposed Work: Hot-rolled, commercial-quality carbon steel, pickled and oiled, complying with ASTM A569.
 - b. Structural Steel and Plates: ASTM A6, ASTM A36 AND ASTM A108.
2. Stainless Steel
- a. Type 302, 304 or 316 complying with ASTM A167, with standard tempers and hardness required for fabrication, strength and durability.
 - 1) Apply mechanical finish on fabricated Work in the locations shown or specified. Federal Standard and NAAMM nomenclature, with texture and reflectivity required matching sample. Protect with adhesive-paper covering until final inspection.
 - 2) No. 4: Bright directional polish (satin finish). Graining directions as shown or, if not shown, in longest dimension.
 - 3) All fixture fastenings devices shall be Vandal Resistant Stainless Steel.
3. Aluminum
- a. Extrusions per ASTM B221; sheet and plate per ASTM B209.
4. Baked Enamel
- a. Apply factory applied baked enamel in the selected solid color.
5. Plastic Laminate
- a. ASTM E84 Class A and NEMA LD3, Fire-Rated-FR-50, Type 7, 0.050" thick; color and texture as follows: Exposed Surfaces-Color and Texture selected by Owner. Concealed Surfaces-Manufacturer's standard color and finish.
6. Fire Retardant-Treated Particleboard Panels
- a. Minimum 3/4" thick backup for natural finished wood and plastic laminate veneered panels, edged and faced as directed. Provide with suitable anti-warp backing complying with ASTM E84 Class "I" rating with a flame-spread rating of 25 or less.
7. Fastening Screws
- a. Stainless Steel Tamper-Proof screws shall be used throughout for all operating fixture cover plates.
8. Bulbs
- a. All light bulbs shall be LED.
9. Keys
- a. All elevator keys, unless required otherwise by code, shall be installed to match the Owner standards. Provide three (3) keys of each type. Provide each set on a metal or plastic tag with markings for each key. Attach keys to each tag.

- b. Provide key box(s) as required by the State of Oregon Elevator Inspector and locate as directed by the Owner. Provide all required keys in box.

10. Signs

- a. Provide sign on outside of machine room and overhead access door stating "Authorized Personnel Only-Storage or Installation of Equipment Not Pertaining to the Elevator is Prohibited". Letters shall be not less than 3/8" high. Sign shall be plastic or metal and securely fastened so as not be readily removed without the use of special tools.

11. Finishes

- a. Structural members and other components for which finish is not otherwise specified shall have prime coat finish.

2.3 MACHINE ROOM EQUIPMENT

A. Hydraulic Pump Unit

- 1. Assembled unit consisting of a wet type of positive-displacement pump, induction motor, master-type control valves combining safety features, holding, direction, bypass, stopping and manual-lowering functions, shut-off valve, oil reservoir with protected-vent opening, oil gauge and outlet strainer, drip pan and connections all mounted on isolating pads.

B. Controller

- 1. Provide reduced voltage (solid state) motor starting circuits.
- 2. Provide Independent Service feature.
- 3. Provide viscosity control unit.
- 4. Provide battery-lowering device.
 - a. If normal electrical building power is not in operation, the car shall close the doors, return to the main lobby, and open the doors. All safety circuits shall be monitored.
 - b. Car shall remain out of service until normal electrical building power is restored.
- 5. Firefighters' Emergency Operation
 - a. Operate and recall elevator to designated floor during fire. Provide sensor signal wiring from hoistway or machine room's connection point to controller terminals. Operate visual/audible signal until return is complete or automatic operation restored. Provide Phase I key switch with engraved instruction at main recall floor hall station. Provide Phase II switch in the new COP.
- 6. Low Hydraulic Oil Control
 - a. In the event hydraulic oil level is insufficient for travel to the top floor, provide controls to return elevator to the main level and park with car doors open, until

hydraulic oil is added to the system and the elevator controller is manually re-set.

C. Hydraulic Noise Suppressor

1. A blowout-proof gas charged suppressor shall be installed in the discharge oil line near the hydraulic pump unit.
2. Suppressor shall be designed to dampen and absorb pulsation and noise in the flow of hydraulic oil fluid.

D. Piping and Oil

1. Provide new hydraulic oil lines.
2. Provide ISO 32 Environmentally Safe or hydraulic oil recommended for the system by the control valve manufacturer.
3. Provide new Victaulic couplings and seals at every connection.
4. Provide new isolation couplings between the pump unit and oil line.
5. Provide all new isolation brackets attached to wall or floor to eliminate sound/vibration from pump unit to building structure.
6. Provide isolation around piping in hoistway/machine room walls.
 - a. Provide Nelson Firestop Sealant (CLK) between hydraulic oil line and any penetrating wall. Oil line to not be in contact with any wall.

E. Hydraulic Control System

1. The hydraulic control system shall be designed suitable for operation under the required pressure and shall be mounted in the storage tank. The control valve will be a unit type with UP, DOWN and check valve included. All of the functions shall be fully adjustable for maximum smoothness and to meet contract conditions.
2. A manual-lowering valve will be provided to lower the elevator at slow speed.
3. The hydraulic valve shall have the capability of providing a smooth, comfortable acceleration, retardation and final stop.

F. Shutoff Valves

1. Provide shutoff ball valve in oil line in tank unit and elevator pit.

G. Noise and Vibration Control

1. To minimize noise and vibration, mechanically isolate elevator equipment from the structure; electrically isolate controller and motor. Limit noise level relating to elevator equipment and its operation to no more than 60 decibels in elevator car under any condition including door operation and exhaust fan on highest speed.

2.4 HOISTWAY EQUIPMENT

- A. Except as noted hereafter, existing equipment may be refurbished and retained if compatible with new operation and components. Provide any modification or addition necessary to meet Code standards.
1. Electrical Wiring and Wiring Connections
 - a. Electrical equipment and wiring shall conform to current NFPA 70-National Electrical Code requirements.
 - b. For equipment with electrical components, provide NRTL label on each component for which published standards exist.
 - c. Provide required and adequate electrical wiring gauge sizing and number of electrical conductors to totally eliminate any voltage/ampere drop/variation for all the machine room, hoistway switches/interlocks, and car operating fixtures/position indicators/exhaust fan/car lighting/ inspection station leveling devices, hall stations/position indicators and all other elevator electrical equipment.
 - d. Conductors and Connections
 - 1) Provide all new wiring in machine room, hoistway and car. Copper throughout with individual wires coded and connections on identified studs or terminal blocks. Use no splices or similar connections in wiring except at terminal blocks, control cabinets, junction boxes.
 - 2) Provide ten percent (10%) spare wires in all wiring runs. Separate and mark all spare wires. All spare wire ends shall be turned back or protected against accidental grounding. Tag all spare conductors indicating termination points at each end. Record all spare conductors in Adjuster's book.
 - 3) Conduit
 - (a) Provide painted or galvanized steel conduit and duct. Conduit size one half inch (1/2") minimum. Do not use flexible conduit exceeding 36" in length. Flexible heavy-duty service cord may be used between fixed car wiring and car door switches for door protection devices.
 - (b) Plastic wire ties shall not be allowed for conduit fastenings or support except flexible electrical cords to the car door detector control box.
 - (c) Any existing electrical gutter and conduit may be retained if such equipment complies with current ASME A17.1 2010/CSA B44-10 Safety Code for Elevators and Escalators and NEC Requirements.
 2. Hydraulic Cylinder/Plunger
 - a. Retain existing. Remove any marks/scratches/burrs on existing plunger. Install new packing after modernization is complete.
 3. Terminal Stopping Devices
 - a. Provide new upper and lower normal terminal stopping devices. Provide switches that will not cause high noise level when activated by car cam.
 4. Entrances
 - a. Existing entrances shall be retained. Clean all entrances of dirt.
 - b. Provide keyed hoistway access control at terminal landings.
 - c. Hoistway Door Panels

- 1) Retain existing.
 - 2) Doors shall be provided with stainless steel metal brackets including removable phenol gibs, which run in the sill slots with minimum clearance: one (1) at the leading edge and one (1) at the trailing edge.
 - 3) Provide a safety retainer plate between each of the two (2) door gibs. The steel safety retainer plate shall meet all of the requirements of A17.1-2010. When the doors are in the fully open position all gibs shall be within the sill groove-no gib shall be outside the sill groove.
 - 4) Provide hoistway door escutcheon and Safety Plug Locks at each entrance.
5. Hoistway Door Interlock Assemblies
 - a. Provide new door interlock assemblies for each hoistway door entrance.
 - b. Provide fire-rated wires from each interlock to hoistway electrical riser as required by NFPA 70. Conductors shall be flame-retardant and suitable for a temperature on not less than 392 degrees F. Conductors shall be Type SF or equivalent. Splices are permitted in the hoistway EMT, however all hoistway wiring shall be the Fire Rated electrical wires.
 - c. Provide green colored electrical ground wire from each interlock to the elevator controller to an electrical connection designated as an electrical ground by NFPA 70 requirements. Grounding to electrical conduit (EMT) is not approved.
6. Door Hangers
 - a. Retain existing door hangars. Provide new rollers.
7. Door Tracks
 - a. Retain existing door tracks.
8. Door Headers/struts/brackets
 - a. Retain existing door header, strut and brackets.
9. Door Closers
 - a. Provide new heavy duty reel closures for each door.
10. Fascia, Dust Covers
 - a. Retain existing.
11. Hoistway Sills
 - a. Retain and clean existing sills. Check all fastenings. Replace any damaged, broken or missing components.
12. Car Guide Rails & Brackets
 - a. Retain existing guide rails and brackets. Check all fastenings for tightness. Replace any missing or broken fastenings. Remove dirt, grease etc.
 - b. Realign guide rails to within one-sixteenth inch (1/16") vertical and one-thirty-second inch (1/32") tram. File all existing joints to provide a smooth guide rail fishplate joint. No disc sander shall be used in the filing of these joints.
 - c. Clean and paint all guide rail support beams, guide rails and brackets with one coat of light gray enamel.

- d. Provide bevel washers for any bolt/nut that is installed in a plane of five (5) degrees or greater.
- 13. Car Pit Equipment
 - a. Retain existing spring buffers. Clean and paint with one coat of light gray enamel. Install data plates as required by ASME A17.1 2010/CSA B44-10.
 - b. Retain all existing pit channels. Clean and paint with one coat of light gray enamel.
 - c. Replace any missing or broken fastenings.
 - d. Provide bevel washers for any bolt/nut that is installed in a plane of five (5) degrees or greater.
- 14. Pit Stop Switch
 - a. Provide new stop switch in the pit locate so as to be accessible from the hoistway access door and pit ladder.
 - b. Pit switch shall be of the maintaining type and marked to indicate the RUN and STOP positions.
- 15. Rupture Valve
 - a. Provide rupture valve adjacent to the existing hydraulic cylinder inlet. Adjust for code-required settings.
- 16. Pit Oil Line Shut-Off Valve
 - a. Provide new oil line shut off valve in pit.
- 17. Floor Numbers
 - a. Paint 100 mm (4-in.) high floor numbers within the hoistway, as required by ASME A17.1/CSA B44.
 - b. Numbers shall be located to be visible within 50 mm (2-in.) opening of the car doors.
- 18. Car Sling
 - a. The existing car sling shall be retained. Check all fastenings for tightness. Replace any missing or broken fastenings. Remove all dirt and lint.
 - b. Provide bevel washers for any bolt/nut that is installed in a plane of five (5) degrees or greater.
- 19. Platform
 - a. The existing platform shall be retained. Clean all components including underside of dirt and dust. Check all fastenings. Replace any damaged bolts, washers and nuts.
 - b. Provide bevel washers for any bolt/nut that is installed in a plane of five (5) degrees or greater.

2.5 CAR EQUIPMENT

- A. Except as noted hereafter, existing equipment may be refurbished and retained. Provide any modification or addition necessary to meet current Code standards.

1. Car Door Equipment
 - a. Door Protective Devices
 - 1) The car doors shall be provided with a new detector unit that detects an object in the path of the closing doors at such a distance that reversal of the doors can be provided without physical contact with the doors.
 - 2) Nudging Action
 - (a) If door opening is obstructed for a predetermined time (20 - 30 seconds), an audible device will sound and the doors will attempt to close. Door closing shall not exceed 3.5 J (2-1/2 ft-lbf) kinetic energy. If the detector is continuously obstructed during closing, the doors will stop or stop and reopen. Allow door to close after obstruction is removed as permitted by ASME A17.1 2010/CSA B44-10. The nudging time shall be adjustable through a range of at least 10 to 60 seconds.
 - 3) Differential Door Time: Adjust timers to enable varying time that doors remain open.
 - (a) Car Call: Hold open time adjustable between 3 and 5 seconds.
 - (b) Landing Call: Hold open time adjustable between 3 and 8 seconds. Use landing call timing when responding to coincidental calls.
 - (c) Door Re-Open: Same as for Car Call.
2. Car Roller Guides
 - a. Install new roller guides on Car #1.
 - b. Install new rollers on Car #2
3. Elevator Car Station
 - a. Provide one (1) vandal resistant elevator control station, with faceplate, consisting of a metal box containing the operating fixtures, mounted behind the non-swing car enclosure front panel. Install in-car to lobby and in car to machine room intercom as part of the elevator car station. Install ADA emergency phone as part of the new COP.
 - b. Faceplate Material and Finish: #4 Stainless Steel.
 - c. Provide car position indicator, 50 mm (2.0-in.) high digital type together with directional arrows located in the top area of both car operating stations. Provide 6 mm (0.25-in.) thick clear plastic lens cover or a type that shall be vandal resistant.
 - d. Provide emergency lighting unit. Device shall be built in and part of the car operating station at the upper section of the car station cover plate. Provide 6 mm (0.25-in.) thick clear plastic lens cover or a type that shall be vandal resistant over light fixture.
 - 1) The intensity of auxiliary lighting illumination shall be not less than 2 lx (0.2 fc), measured at any point between 1225 mm (48 in.) and 890 mm (35 in.) above the car floor and approximately 300 mm (12 in.) centered horizontally in front of a car operating panel.
 - e. Suitably identify floor buttons, lighted alarm button, door open button, door close button and keyed emergency stop switch by engraved and painted letters or symbols per ADA requirements.

- f. Provide flush inset, back fastened Braille plates. Locate operating controls as required by ADA requirements. Engrave below door open, door close and alarm in 6 mm (0.25-in.) letters-Door Open and Door Close and Alarm.
 - g. Provide 3 mm (0.125-in.) raised floor pushbuttons that illuminate to indicate LED call registration. Provide floor designation engraved plates to the left of each button.
 - h. Provide illuminated alarm button at bottom of station to sound distress signal alarm located on the car top. Provide a signal to the elevator controller at a terminal strip for monitoring purposes of alarm at a remote location.
 - i. Provide door open button to stop and reopen closing doors in car station. Make button operable while car is stopped at landing, regardless of special operational features, except ASME A17.1 2010/CSA B44-10 Code Firefighters' Emergency Operation.
 - j. Provide a Firefighters' Operation Panel as required by ASME A17.1 2010/CSA B44-10 Code.
 - k. Provide lockable service panel with recessed flush cover plate, in the car station. Include the following controls, with purpose and operating positions identified by engraved letters painted black:
 - 1) Car light switch and emergency light test switch. Test switch shall disconnect the electrical power to the main car lighting circuit.
 - 2) Emergency Stop switch.
 - 3) Three position fan switch-Low Speed-High Speed-Off.
 - 4) Independent service switch to permit selection of independent or automatic operation.
 - 5) Start button for closing doors and starting elevator when operating on independent service. Floor pushbuttons may be used for this function.
 - 6) Duplex 120 VAC electrical GFCI convenience outlet.
 - 7) Hoistway enable switch to activate keyed hoistway access control at terminal landings.
 - l. Elevator number engraved in car station, minimum one inch (1") high.
 - m. Inlaid capacity plate.
 - n. Install a new ADA compliant communication device as an integral part of the car operating panel. Identify HELP button and visual indication with the phone symbol.
 - o. Provide four inch (4") diameter engraved International No Smoking Symbol at the top of the car operating panel.
 - p. Engrave in one-fourth inch (¼") letters the State Elevator Inspectors requirement for addressing the location of the Elevator Operating Permit.
4. Car Top Inspection Station and Work Light
- a. Operating fixture shall be provided containing continuous pressure Up, Down and Safe buttons, emergency stop switch, inspection and run switch.
 - b. Toggle switches shall not be provided for the Stop, Run and Inspection switches unless the switches are guarded against accidental activation.

- c. Provide pendant style inspection operation station. Provide fixed metal bracket to store cord when not in use. Locate bracket to avoid stepping on cord when attached to bracket.
 - d. Provide 110 VAC outlet with a GFCI duplex receptacle.
 - e. Work light shall be encased in a total glass enclosure including a wire guard cover. Rating of lamp(s) to be at least that which will generate the amount of illumination required by ASME A17.1 2010/CSA B44-10.
 - f. Provide additional light fixture on a flexible cord. Length of cord to be eight feet (8'). Cord shall be hard wired into car top fixed work light. Provide fixed metal bracket to store cord when not in use. Locate bracket to avoid stepping on cord when attached to bracket. On-Off car top light switch shall control both fixtures. Provide guard on light. Rating of lamp(s) to be at least that which will generate the amount of illumination required by ASME A17.1 2010/CSA B44-10.
5. In-Car Communication Systems (Intercom)
- a. Provide new ADA approved in-car emergency communication device to be installed as an integral part of the COP. Provide all necessary wiring between the elevator car and the elevator machine room. Connect to the outside telephone line located inside the elevator controller. Provide all monitoring devices as required by Code.
 - b. Provide intercom system between elevator car and elevator Firefighters' Emergency Operation lobby hall station located at the designated level. On-Off activation is required only at lobby station. In car to lobby communication is voice activated. Provide all necessary wiring between elevator car and lobby. Provide switch for ON & OFF positions. Engrave "ON" and "OFF" and "Elevator 1" in position in one-fourth inch (¼") letters on plate.
 - c. Provide intercom between elevator car and elevator machine room. On-Off activation is required only at machine room station. In-car to machine room communication is voice activated. Provide all necessary wiring between elevator car and machine room. In car portion of both intercoms will be integrated into the Elevator Car Station
6. Car Door Operator
- a. Provide new linear door operator control to open and close the car and hoistway doors simultaneously.
 - 1) The package shall include the following: lifting rods, pickup rollers, coupler/clutch assembly, car door electrical switch and all related modernization hardware.
 - 2) Opening speed shall not be less than 2-1/2 feet per second.
 - 3) Closing speed shall not exceed the limitations set by the ASME A17.1 2010/CSA B44-10.
 - 4) Doors shall be adjusted to provide a smooth opening and closing without erratic motion or closing hard.
7. Door Coupler-Clutch
- a. A new mechanical coupler/clutch or vane shall be provided to connect the car and hoistway doors.

- 1) The operation of the coupler/clutch or vane shall provide driving motion of the hoistway doors for full open and full close direction.
 - 2) The drive rollers shall remain engaged throughout the entire door open travel and all but the last 6 mm (0.25 in.) in the door close travel. This is intended to prevent separation of the hoistway doors from the car doors.
- b. Include the car door restrictor device as required by ASME A17.1 2010/CSA B44-10.
8. Car Door Contacts
 - a. Provide new car door electrical switch. Locate switch so the elevator cannot operate unless the car doors are closed within the tolerance allowed by ASME A17.1 2010/CSA B44-10.
9. Alarm Bell
 - a. Furnish and install an audible signaling device located on top of the elevator adjacent to the car top inspection station.
10. Car Toe Guard
 - a. Provide new platform apron. The vertical distance of platform apron shall be a minimum of 1200 mm (48-in.) inches or the maximum permitted by the pit depth. The apron shall maintain the same running clearance as between the car and hoistway sills throughout its height.
 - b. Paint front and rear side with one (1) coat of rust resistant light gray enamel.
 - c. Provide bevel washers for any bolt/nut that is installed in a plane of five (5) degrees or greater.
 - d. Provide adequate brackets from toe guard to car platform to comply with ASME A17.1 2010/CSA B44-10.
11. Buffer Striking Plates
 - a. Retain existing buffer striking plates. Replace any missing or damaged components.
 - b. Paint with one (1) coat of rust resistant light gray enamel.
 - c. Provide bevel washers for any bolt/nut that is installed in a plane of five (5) degrees or greater.

2.6 CAR ENCLOSURE

A. Furnish/Provide/Install as follows.

1. Retain existing car enclosure.
2. Allow for a \$15,000 allowance, per car, for car interior finish. All labor and materials to install the new cab interior shall be included in the Cab Allowance. Interior to be selected from Elevator contractors standard selections to be determined during Submittals.
3. Car Doors
 - a. Provide new car doors.
 - b. Finish shall be Stainless Steel #4.

- c. The bottom of doors shall be provided with stainless steel metal brackets including fire tabs, removable phenol gibs, which run in the sill slots with minimum clearance: one (1) at the leading edge and one (1) at the trailing edge.
 - d. Provide a steel plate gib that will be installed between each of the two (2) standard stainless steel gibs. The steel plate gib shall span the entire distance between each of the standard gibs.
- 4. Provide new two (2) speed car exhaust fan.
- 5. Pad and Pad Studs
 - a. Provide #4 Finish Stainless Steel pad studs on all walls. Pad studs shall be through bolted to cab walls. Pad stud and mounting threads shall be one piece.
 - b. Provide one (1) set of three-section fire retardant pads with metal grommet holes for the pad stud fastening. Mark on backside of pad the left, back and right wall side.
- 6. In-Car Traveling Lantern
 - a. Provide one (1) traveling lantern in each entrance column. Provide Stainless Steel #4 finish cover plate with vandal-resistant fastening screws.
- 7. Provide Stainless Steel #4 blank plates to cover existing position indicators over car doors.
- 8. Car Top Emergency Exit
 - a. The emergency exit shall be so arranged that it can be opened from within the car by means of a keyed spring-return cylinder-type lock having not less than a five-pin or five-disk combination and operated from the top of the car without the use of a key.
 - b. The key required to open the emergency exit lock shall be kept on the premises in a location readily accessible to authorized persons, not available to the public. No other key to the building shall unlock the emergency exit lock.
 - c. The top emergency exit shall be provided with a car door electrical contact conforming to ASME A17.1 2010/CSA B44-10 and so located as to be inaccessible from the inside of the car. The opening of the electrical contact shall limit the car speed to not more than 150 feet per minute.
 - d. The electrical switch shall be positively opened by a lever or other device attached to and operated by the exit panel.
 - e. The switch shall be maintained in the open position by the action of gravity or by a restrained compression spring, or both, or by positive mechanical means.

2.7 LANDING CONTROL STATIONS

- A. Provide Surface Mounted one (1) hall station at each floor. LED's shall be provided to illuminate when the hall push button(s) are activated. Include pushbuttons for direction of travel. Main fire return landing shall have phase one fire recall feature in it.
- B. Engrave safety message "In Case of Fire..." (As required by ASME A17.1 2010/CSA B44-10 Code) on push-button faceplate. Height and width of the pictograph shall be scaled proportionally to fit

the hall station face plate. Provide Braille and UP & DOWN marking inserts to the left of each button. Locate each hall station forty-two inches (42") to center of buttons from floor level, or as required by ADA requirements.

- C. Lobby intercom speaker and selection switch shall be part of a separate Intercom Station near the Firefighters' Emergency Operation hall station located at the designated level. Provide switch to allow communication between lobby station and elevator.
- D. Install Firefighters Phase I service as required by Code and the State Elevator Inspector.
- E. Provide #4 Finish Stainless Steel cover plates. Provide #4 Finish Stainless Steel vandal resistant fastening screws on cover plate.

2.8 SIGNALS

A. Car Riding Lantern

- 1. Provide vandal resistant car riding lantern in return jamb of each car door. Lantern must be viewable from Hall call stations per ADA requirements.

2.9 DUPLEX AUTOMATIC OPERATION

- A. Automatic operation by means of a car button in the car for each landing served and an up and down button at each landing except for the terminal landing that shall have only one button.
- B. When elevator is idle, automatically start car and dispatch it to floor corresponding to registered car or hall call. Slow down and stop car automatically at floor corresponding to registered call.
- C. As slowdown is initiated for a hall call, automatically cancel the call and render the hall button for that direction of travel ineffective until the car leaves the floor.
- D. Cancel car calls in same manner.
- E. Hold car at arrival floor an adjustable time interval to allow passenger transfer.
- F. Illuminate appropriate button to indicate call registration.
- G. Extinguish light when call is answered.
- H. Door Operation
 - 1. Open doors automatically when the car arrives at a floor to permit transfer of passengers. Automatically close doors after a timed interval.
- I. Automatic Stopping Accuracy
 - 1. Two-way automatic leveling feature shall stop the car within one-fourth inch (1/4"), regardless of load or direction of travel. Landing level will be maintained within the leveling zone irrespective of the hoistway doors being open or closed.

PART 3 - EXECUTION

3.1 ELEVATOR MODERNIZATION OF ELEVATOR SYSTEMS

- A. General: Comply with manufacturer's instructions and the Elevator Safety Code for Work required during Elevator Modernization.
- B. Scheduling
 - 1. Before commencing any Work, submit for review and approval by Consultant, a schedule showing the material ship dates, time of material on-site, commencement of Work, the order and the completion dates for the various parts of the Elevator Modernization.
 - 2. Provide a weekly updated schedule to Consultant.
 - 3. Elevator Contractor is required to submit an updated schedule to Consultant with each pay request.
- C. Before beginning the modernization, the Elevator Contractor shall examine the hoistway and machine room to verify conditions and provide written notice to the Owner of any conditions which would substantially hinder or prevent proper execution of the work. The Elevator Contractor shall not proceed with the modernization until the cited conditions are corrected.
- D. Prior to modernization of the elevator equipment, a meeting of Elevator Contractor, Owner Construction Coordinator, and Elevator Consultant shall be held to review modernization approach and identify any special circumstances pertaining to this modernization.
- E. Welded Construction: Provide welded connections for Elevator Modernization of 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 standards of AWS D1.1 for workmanship and for qualifications of welding operators.
- F. Electrical Work: All Work shall conform to the requirements of NFPA 70. Requirements specific to Elevators include.
 - 1. Mark each component, including but not limited to relays, switches, timers, fuses and overload devices, with permanent identification that corresponds with the nomenclature of the wiring diagrams and the operations and maintenance manuals.
 - 2. Terminate all field wiring at each control cabinet on terminal strips suitable for the use. Field wiring shall not terminate on the studs of relays or other devices and equipment.
- G. Coordination: Coordinate elevator Work with Work of other trades for proper time and sequence to avoid Elevator Modernization delays.
- H. Sound Isolation: Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent transmission of vibrations to structure, and thereby eliminate sources of structure-borne noise from elevator system.
- I. Lubrication: Lubricate operating parts of systems.

3.2 FIELD QUALITY CONTROL

- A. Upon nominal completion of elevator replacement, and before permitting use of elevator (either temporary or permanent), perform acceptance tests as required and recommended by Code and governing regulations or agencies. Advise Owner and Elevator Consultant and inspection departments of governing agencies, in advance, of dates and times tests are to be performed on elevator. Owner and Elevator Consultant shall be notified seven (7) days in advance of these tests.
- B. Acceptance Tests: Conduct operational test of car before turning elevator over to Owner. Schedule with Owner and Consultant with not less than one (1) weeks' notice.

3.3 PERFORMANCE

- A. Speed: +/- 10% of contract speed in the down direction. Rated speed in the up direction under any loading condition.
- B. Stopping Accuracy: Level to \pm one-fourth inch ($\frac{1}{4}$ ") or less under any loading condition or direction of travel.
- C. Door Opening Time: Seconds from start of opening to fully open.
 - 1. 3.0 seconds
- D. Door Closing Time: Seconds from start of car door closing until car doors are in the fully closed position and the elevator can start.
 - 1. As per ASME A17.1-2010/CSA B44-10 requirements.
- E. Floor-to-Floor Performance Time: Seconds from start of car doors closing until car doors are 3/4 open and car level and stopped at next successive floor under any loading condition or travel direction.
 - 1. 15.0 seconds
- F. Provide a smooth start, acceleration, high speed operation, deceleration and final stop in both directions.
- G. Noise Level
 - 1. The measured noise level in the elevator cab of elevator equipment shall not exceed sixty (60) dBA during car operating conditions and a maximum increase of seven (7) dBA during door operation
 - 2. Maximum of eighty (80) dBA in machine rooms.
- H. Ride Quality
 - 1. Horizontal vibration, side-to-side and front to back with car during normal operation shall not exceed twenty five (25) mg in the 1-10 Hz range.

2. Vertical vibration not more than twenty (20) mg. Provide smooth and constant acceleration and deceleration of not more than 2.8 feet/second/second with an initial ramp between 0.5 and 0.75 second.
 3. Provide smooth and constant acceleration and deceleration of not more than 2.8 feet/second/second with an initial ramp between 0.5 and 0.75 second.
 4. Provide no more than 12 ft/sec³ of maximum jerk.
- I. Quality of Work and equipment comply with specifications.
- J. Performance of following are satisfactory
1. Door operation and closing force.
 2. Signal fixtures.
 3. Firefighters Service Emergency Operation.
 4. Performance times.
 5. Car speed.
- K. Conduct the following tests: one-hour running test stopping at each floor in up and down directions. The doors are to complete a full open and close cycle with the standard door dwell time operating.
1. Rated (full) capacity.
 2. Empty car.
- L. Protection
1. At time of final completion of elevator work (or portion thereof), provide suitable protective coverings, barriers, devices, signs or such other methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of modernization period. Elevator Contractor is responsible for damage and wear during the modernization period, and shall repair or replace, to the Owner's satisfaction, any components worn significantly or damaged before the Owner obtains beneficial use.

3.4 INSTRUCTION AND MAINTENANCE

- A. Instruct Owner's personnel in proper use, operations and maintenance of elevator. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation

3.5 CONDITIONS PRECEDENT TO FINAL ACCEPTANCE

- A. Instructions to Operators
1. Instruct Owner's personnel in proper use, operations and maintenance of elevator. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation.

2. Code Compliance
 - a. All Code compliance tests shall have been performed and acceptance certified by the authorities having jurisdiction and permanent elevator operating permit issued to the Owner.
3. Acceptance Tests
 - a. All acceptance tests shall have been completed and compliance certified by the Owner and Elevator Consultant.
 - b. Notify Consultant seven (7) days in advance when ready for final inspection. Final acceptance of Elevator Modernization shall be considered only after all field-quality control reviews have been completed, identified deficiencies have been corrected, all submittals and certificates have been received, all Punch list items completed and the following items have been completed to the satisfaction of Consultant.
4. Submittal of Maintenance Manuals
 - a. All manuals shall have been submitted and approved by the Owner and Elevator Consultant.
5. Submittal Of Construction Record Drawings
 - a. Drawings of the work shall have been marked to show changes and actual modernization conditions, sufficient to form a complete record for Owner's purposes. Give particular attention to work which will be concealed and difficult to measure and record at a later date, particularly items which may require servicing or replacement during the life of the projects.
6. Final Check
 - a. Make a final check of elevator operation, with Owner's personnel and Elevator Consultant present and just prior to date of substantial completion to determine that control systems and operating devices are functioning properly. Any and all damage and/or significant wear shall have been repaired.
7. Cleaning
 - a. The work site shall be clean. Elevator Contractor shall clear away all debris, surplus materials, etc., resulting from their Work or operations, leaving the job and equipment furnished in a clean, first-class condition.
8. Punch List
 - a. All items on the punch list prepared by Elevator Consultant shall be completed to the satisfaction of the Owner and Elevator Consultant. Elevator Contractor to submit to Elevator Consultant and Owner a copy of the State of Oregon Elevator Inspectors Field Report including all Punch List items. List shall be provided to Elevator Consultant and Owner the same day the State of Oregon Elevator Inspector inspects the elevator.

END OF SECTION 14 24 00

Oregon Department of Administrative Services

Executive Building Elevator Replacement

Specification Sections Applicable to Matthew J. Cash, PE Stamp & Signature

22 05 00	22 14 29	23 00 00	23 81 26	26 00 01	26 00 20
26 00 26	26 05 19	26 05 26	26 05 29	26 05 33	26 05 33.16
26 05 53	26 05 60	26 05 83	26 27 26	26 29 12	26 51 13.10
26 51 13.20	28 31 33				



EXPIRES: 12/31/2019
Signed: 10/4/2019

SECTION 22 05 00 - GENERAL PLUMBING PROVISIONS**PART 1 - GENERAL****1.1 SUMMARY**

- A. Products under this contract must meet minimum specification requirements in detail without exception unless specifically noted and approved as provided in these Specifications. Equipment submitted for review must clearly state on cover sheet any differences from specified product. Equipment substitution or submittal review does not relieve Contractor from meeting all requirements of specified item.

1.2 CONTRACT DOCUMENTS

- A. The Contract Documents are inclusive. All requirements of all Contract Documents shall be binding as if repeated herein and with this Division as required by any other Division or Contract Document. Applicable provisions of Division 1 govern work under this section. This Division does not express or imply separation of the Contract Documents and shall not be considered as separation of the Work. See Advertisement For Bids, Instructions to Bidders, Supplemental Instructions to Bidders, General Conditions, Supplemental General Conditions, Drawings and Specifications, and modifications incorporated in the documents before execution of the Agreement.
- B. Conflicts: If any conflicts exist the more stringent Contract Document is required.

1.3 DEFINITIONS

- A. Definitions herein are intended as advisory and shall not limit requirements within the Contract Documents. Where a conflict of definitions exists, the more stringent standard shall be used. Where a term is defined on a Drawing the Drawing definition shall be used for that drawing. Not all definitions are included. Trade standard terms are not defined.

1.4 SCOPE OF WORK

- A. General: Provide complete and functional plumbing systems as specified, as shown on Drawings, as required, and as intended.
- B. Omissions: Contractor shall be responsible for additional labor, or additional material necessary for the proper execution of the Work. Omissions of expressed reference to any item shall not relieve the responsibility to conform to the Contract Documents.
- C. Scope of Plumbing Work: All materials and workmanship shall be furnished for complete, tested, and operating plumbing systems as shown on the drawings and specified herein. Plumbing work is to include the water and sanitary service. Complete to the point of

connection with the serving utility(ies). Any changes of or work required by the serving utility(ies), are part of this work and shall be fully included in the bid price.

1.5 CODES

- A. Comply with the requirements of local, federal, Oregon Administrative Code, and Oregon Plumbing Specialty Code.

1.6 SUBMITTALS

- A. Reference: Division 1, General Requirements, Submittals.
- B. Shop drawings and Submittals: Bound, labeled, contain the project manual cover page and a material index list page showing item designation, manufacturer and additional items supplied with the installation. Submit for all equipment and systems as indicated in the respective specification sections, marking each submittal with that specification section number. Mark general catalog sheets and drawings to indicate specific items being submitted and proper identification of equipment by name and/or number, as indicated in the contract documents. Include wiring diagrams of electrically powered equipment.
- C. Engineer Review: Allow not less than 20 Days.
- D. Submit: Not less than Fixtures, Stops, and Piping catalog information.

1.7 CONFORMANCE WITH REQUIREMENTS

- A. General: All work shall conform to the reasonable requirements of the project within the scope of the project and authorizations. All work shall conform to the methods and requirements of Code at the location of the Work.
- B. Access and inspection: All portions of the Work shall be accessible to inspections and review at all reasonable times during construction. Contractor is responsible for providing access for review and inspection of the Work. Contractor shall secure written inspection reports prior to concealing Work. Contractor is responsible for damages to properly review the Work due to lack of at least 7 Days advance written notification to the Architect, and Engineer that Work is ready for inspection.
- C. Accounting: Provide general accounting information as to labor and equipment costs to assist in determination of modifications to the Contract. Provide accounting breakdown when required for securing Owner financing, or for analysis of equipment costs or equipment payback periods, as well as information for Owners incentives.

1.8 COORDINATION OF TRADES

- A. Check all other trade drawings to avert potential installation conflicts. Should major changes from the Drawings be required to resolve potential conflicts, notify the Architect and secure written approval and agreement on necessary adjustments prior to start of installation. Check all equipment locations and connections on the site for coordination with other Divisions

equipment and connections and structure and the like. Contractor is responsible for scheduling trades to properly execute all the Work as intended.

1.9 STANDARD OF CARE AND QUALIFICATIONS

- A. General: Contractor shall be experienced and knowledgeable to Provide Work. Owner is not responsible for improper operation, incompliance, or installation due to Contractor's lack of knowledge or experience. Upon request, and where requested herein the Contractor shall supply qualifications and experience. Drawings are presented with industry terms, statements, and trade practices and it is the responsibility of the Contractor to be familiar. Provide written notification prior to Bid to the Architect if any representation is not understood, or outside standard practice.
- B. Like Materials and Quality Control: All systems provided shall be new and of like materials provided through manufacturer. Items of the same by different manufacturers will be rejected. Equipment shall conform to all applicable Code and applicable listing criteria as of the date of the Contract Documents. Equipment determined to be manufactured under any other listing or Code prior to the date of the Contract is not acceptable, even if the equipment is new or has not been used. All equipment provided to project shall be listed by an approved listing organization.

1.10 EXAMINATION OF SITE

- A. Examine Site of Work prior to making Bid. Ascertain all related physical conditions. Verify at the Site of Work prior to Bid scale dimensions shown due to exact locations, distances, and levels will be governed by actual field conditions. Owner will not be responsible for any loss or costs that may be incurred due to a Bidder's failure to fully inform themselves prior to Bid in regard to conditions pertaining to the Work and nature of the Work.

1.11 MINOR DEVIATIONS

- A. Make minor changes in equipment locations and equipment connections as directed or required without extra cost.

1.12 RECORD DRAWINGS

- A. Maintain a marked set of prints at job site at all times. Show all changes from the original drawing set whether visible or concealed. Include all addendums, field orders, change orders, clarifications, request for information drawn responses, and deviations. Dimension accurately from building lines, floor, or curb elevations. Show exact location, elevation, and size of conduit/raceway, access panels and doors, equipment, and all other information pertinent to the Work. At project completion, submit marked set to Architect for review.

1.13 WARRANTY

- A. Warrant Work, materials, and equipment for not less than one year.

1.14 CONTINUITY OF EXISTING SERVICES

- A. Do not interrupt or change existing services without prior written approval from the Owner's Project Representative. When interruption is required, coordinate scheduling of down-time with the Owner to minimize disruption to his activities. Unless specifically stated, all work involved in interrupting or changing existing services is to be done during non-working hours.

1.15 CERTIFICATES AND INSPECTIONS

- A. Reference: Division 1, General Requirements, Permits, Regulations, Utilities and Taxes.
- B. Inspections: Obtain and pay for all required installation inspections except those provided by the Architect. Deliver the originals of inspection certificates and test records to the Owner's Project Representative. Include copies of the certificates and test records in the Operating and Maintenance Instructions.

1.16 PROTECTION OF FINISHED SURFACES

- A. Refer to Division 1, General Requirements, Protection of Finished Surfaces.

1.17 SLEEVES AND OPENINGS

- A. Refer to Division 1, General Requirements, Sleeves and Openings.

1.18 SEALING AND FIRESTOPPING

- A. Sealing and firestopping of sleeves/openings between piping, etc. and the sleeve or structural opening shall be the responsibility of the contractor whose work penetrates the opening. The contractor responsible shall hire individuals skilled in such work to do the sealing and fireproofing. Provide all fire stopping of fire rated penetrations and sealing of smoke rated penetrations in compliance with Specifications Fire Stopping.

1.19 OPERATION AND MAINTENANCE DATA

- A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.
- B. In addition to the general content specified under GENERAL REQUIREMENTS supply the following additional documentation:
 - 1. Records of tests performed to certify compliance with system requirements
 - 2. Manufacturer's wiring diagrams for electrically powered equipment
 - 3. Certificates of inspection by regulatory agencies
 - 4. Valve schedules
 - 5. Lubrication instructions, including list/ frequency of lubrication
 - 6. Parts lists for fixtures, equipment, valves and specialties

7. Manufacturers installation, operation and maintenance recommendations for fixtures, equipment, valves and specialties
8. Additional information as indicated in the technical specification sections.

PART 2 PRODUCTS

2.1 IDENTIFICATION

- A. Pressure-sensitive, adhesive backed, vinyl pipe markers with applicable labeling, ¾" min. size for lettering and surrounding tape on both ends.

PART 3 – EXECUTION

THIS PART NOT USED

END OF SECTION 22 05 00

SECTION 22 14 29 – SUMP PUMPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Submersible sump pumps.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Wiring Diagrams: For power, signal, and control wiring.
- C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. UL Compliance: Comply with UL 778 for motor-operated water pumps.

1.4 WARRANTY

- A. One (1) year manufacturer's warranty from the universal warranty start date defined in front end documents.

PART 2 - PRODUCTS

2.1 ELEVATOR SUMP PUMP (FOR ELEVATOR HOISTWAY)

- A. Submersible, Fixed-Position, Single-Seal Sump Pump:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following, or approved:
 - a. Zoeller Company.
 - b. Stancor, Inc.
 - c. Weil Pump Co.
 - d. Liberty Pumps
 - e. Bell & Gossett
 - 2. Provide pump and control systems capable of containing oil and only pumping water. The system shall function automatically and shall provide for an alarm and separate LED lights in the event of (a) the presence of oil in the sump, (b) high liquid in the sump, or

(c) high amps or a locked rotor condition. In addition, LED lights shall be provided for (1) power and (2) pump run function. An alarm that sounds only in the event of a high liquid condition or does not separately identify the above functions shall not be acceptable.

3. The pump shall be a submersible type and shall be approved to UL 778 standards and shall include thermal and overload protection. The motor housing shall be constructed of #304 stainless steel and mechanical seals shall be housed in a separate oil-filled compartment.
4. The main control shall be approved to UL 508 standards and housed in a gasketed NEMA 4X enclosure with a see-through window for observation of operating functions. The control shall be equipped with an 8-pin twist lock receptacle, dual solid state OilMinder or approved relays with variable sensitivity settings, an over current relay, self-cleaning stainless steel sensor probe, high decibel warning horn with alarm silencing switch, dual floats, clearly marked terminal board and remote monitoring contact. A NEMA 4X junction box with 8-pin twist-lock electrical receptacle and 25' (additional lengths if required shall be provided) of mating 8 conductor cable shall be provided. All cables between the pump and junction box shall be 16' long and the cable and plug from the control unit shall be 8' long. The control unit, junction box, pump, floats and sensor shall be factory assembled as a complete, ready-to-use system and shall be tested and approved as a complete system by a nationally recognized testing laboratory such as ENTELA. The system shall allow for the main control to be located outside of the elevator hoistway to be monitored for all functions without having to enter the elevator shaft.

2.2 SUMP PUMP CAPACITIES AND CHARACTERISTICS

- A. For capacities and electrical characteristics see schedule on drawings.
- B. Number of Pumps: See schedule on drawings.

2.3 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for each motor.
 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. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Division 26 Sections.
- B. Motors for submersible pumps shall be hermetically sealed.

2.4 SUMP-PUMP BASINS AND BASIN COVERS

- A. Basins: Factory-fabricated, watertight, cylindrical, basin sump with top flange and sidewall openings for pipe connections.

1. Material: Cast iron, fiberglass, or HDPE.
 2. Reinforcement: Mounting plates for pumps, fittings, and accessories.
 3. Anchor Flange: Same material as or compatible with basin sump, cast in or attached to sump, in location and of size required to anchor basin in concrete slab.
 4. Size: Minimum 18" diameter x 30" deep, but as required for project conditions and inverts.
- B. Basin Covers: Fabricate metal cover with openings having gaskets, seals, and bushings; for access to pumps, pump shafts, control rods, discharge piping, vent connections, and power cables.
1. Reinforcement: Steel or cast iron, capable of supporting foot traffic for basins installed in foot-traffic areas.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Pump Installation Standard: Comply with ANSI/HI 1.4 for installation of sump pumps.
- B. Install with check valves.
- C. Connect Oil Minder or approved, and/or high level alarm to supervised fire alarm input if required by Owner, or AHJ. Include supervised Fire Alarm Relay.

END OF SECTION 22 14 29

SECTION 23 00 00 - GENERAL MECHANICAL PROVISIONS

PART 1 - GENERAL

1.1 CONTRACT DOCUMENTS

- A. The Contract Documents are inclusive. All requirements of all Contract Documents shall be binding as if repeated herein and within this Division as required by any other Division or Contract Document. Applicable provisions of Division 1 govern work under this section. This Division does not express or imply separation of the Contract Documents and shall not be considered as separation of the Work. See Advertisement For Bids, Instructions to Bidders, Supplemental Instructions to Bidders, General Requirements, Supplemental General Requirements, Drawings and Specifications, and modifications incorporated in the documents before execution of the Agreement.
- B. Conflicts: If any conflicts exist, the more stringent Contract Document is required.

1.2 SUMMARY

- A. Products under this contract must meet minimum specifications requirements in detail without exception unless specifically noted and approved as provided in these Specifications. Equipment submitted for review must clearly state on cover sheet any differences from specified product. Equipment substitution or submittal review does not relieve Contractor from meeting all requirements of specified item.

1.3 DEFINITIONS

- A. Definitions herein are intended as advisory and shall not limit requirements within the Contract Documents. Where a conflict of definitions exists, the more stringent standard shall be used.
- B. Where a term is defined on a Drawing the Drawing definition shall be used for that drawing. Not all definitions are included. Trade standard terms are not defined.

1.4 SCOPE OF WORK

- A. General: Provide complete and functional mechanical systems as specified, as shown on Drawings, as required, and as intended.
- B. Omissions: Contractor shall be responsible for additional labor, or additional material necessary for the proper execution of the Work. Omissions of expressed reference to any item shall not relieve the responsibility to conform to the Contract Documents.

- C. Scope of Mechanical Work: All materials and workmanship shall be furnished for complete, tested, and operating mechanical systems as shown on the drawings and specified herein.
- D. Mechanical work is to include the fuel utility service. Complete to the point of connection with the serving utility(ies). Any changes of or work required by the serving utility(ies), are part of this work and shall be fully included in the bid price.

1.5 CONFORMANCE WITH REQUIREMENTS

- A. General: All Work shall conform to the reasonable requirements of the project within the scope of the project and authorizations. All work shall conform to the methods and requirements of Code at the location of the Work.
- B. Access and inspection: All portions of the Work shall be accessible to inspections and review at all reasonable times during construction. Contractor is responsible for providing access for review and inspection of the Work. Contractor shall secure written inspection reports prior to concealing Work. Contractor is responsible for damages to properly review the Work due to lack of at least 7 Days advance written notification to the Architect, and Engineer that Work is ready for inspection.
- C. Accounting: Provide general accounting information as to labor and equipment costs to assist in determination of modifications to the Contract. Provide accounting breakdown when required for securing Owner financing, or for analysis of equipment costs or equipment payback periods, as well as information for Owner incentives.

1.6 COORDINATION OF TRADES

- A. Check all other trade drawings to avert potential installation conflicts. Should major changes from the Drawings be required to resolve potential conflicts, notify the Architect and secure written approval and agreement on necessary adjustments prior to start of installation. Check all equipment locations and connections on the site for coordination with other Divisions equipment and connections and structure and the like. Contractor is responsible for scheduling trades to properly execute all the Work as intended.

1.7 STANDARD OF CARE AND QUALIFICATIONS

- A. General: Contractor shall be experienced and knowledgeable to Provide Work. Owner is not responsible for improper operation, incompliance, or installation due to Contractor's lack of knowledge or experience. Upon request, and where requested herein the Contractor shall supply qualifications and experience. Drawings are presented with industry terms, statements, and trade practices and it is the responsibility of the Contractor to be familiar. Provide written notification prior to Bid to the Architect if any representation is not understood, or outside standard practice.
- B. Like Materials and Quality Control: All systems provided shall be new and of like materials provided through manufacturer authorized distributors. Provide equipment of same system and type by same manufacturer. Items of the same by different manufacturers will be rejected. Equipment shall conform to all applicable Code and applicable listing criteria as of

the date of the Contract Documents. Equipment determined to be manufactured under any other listing or Code prior to the date of the Contract is not acceptable, even if the equipment is new or has not been used. All equipment provided to project shall be listed by an approved listing organization.

1.8 EXAMINATION OF SITE

- A. Examine Site of Work prior to making Bid. Ascertain all related physical conditions. Verify at the Site of Work prior to Bid scale dimensions shown due to exact locations, distances, and levels will be governed by actual field conditions. Owner will not be responsible for any loss or costs that may be incurred due to a Bidder's failure to fully inform themselves prior to Bid in regard to conditions pertaining to the Work and nature of the Work.

1.9 MINOR DEVIATIONS

- A. Make minor changes in equipment locations and equipment connections as directed or required without extra cost.

1.10 RECORD DRAWINGS

- A. Maintain a marked set of prints at job site at all times. Show all changes from the original drawing set whether visible or concealed. Include all addendums, field orders, change orders, clarifications, request for information drawn responses, and deviations. Dimension accurately from building lines, floor, or curb elevations. Show exact location, elevation, and size of conduit/raceway, access panels and doors, equipment, and all other information pertinent to the Work. At project completion, submit marked set to Architect for review.

1.11 WARRANTY

- A. Warrant Work, materials, and equipment for not less than one year.

1.12 CONTINUITY OF EXISTING SERVICES

- A. Do not interrupt or change existing services without prior written approval from the Owner's Project Representative. When interruption is required, coordinate scheduling of down-time with the Owner to minimize disruption to his activities. Unless specifically stated, all work involved in interrupting or changing existing services is to be done during none working hours.

1.13 CODES

- A. Comply with requirements of local, federal, Oregon Administrative Code, Oregon Energy Code, Elevator Code, and Oregon Mechanical Specialty Code.

1.14 CERTIFICATES AND INSPECTIONS

- A. Refer also to Division 1, General Requirements, Permits, Regulations, Utilities and Taxes.

- B. Obtain and pay for all required installation inspections except those provided by the Architect. Deliver the originals of inspection certificates and test records to the Owner's Project Representative. Include copies of the certificates and test records in the Operating and Maintenance Instructions.

1.15 SEISMIC DESIGN CRITERIA

- A. Seismic restraints and bracing: Sized to accommodate dynamic loads as specified in the Oregon Structural Specialty Code based on the seismic criteria identified in the project general structural notes. Rigidity of bracing and/or the attachment shall be considered in determining the dynamic loads.
- B. Vibration Isolation: Mechanical equipment shall be isolated from the building structure. Refer to individual equipment specifications for isolators, unless specifically specified herein.
- C. Equipment Seismic Restraint: Provide seismic restraint bracing for mechanical equipment which has vibration isolators. Mechanical equipment, with or without vibration isolators, shall be anchored to the supporting floor, platform, or roof structure. Anchoring devices or equipment shall comply with the Seismic Criteria listed above.

1.16 SUBMITTALS

- A. Refer to Division 1, General Requirements, Submittals.
- B. Shop drawings and Submittals: Bound, labeled, contain the project manual cover page and a material index list page showing item designation, manufacturer and additional items supplied with the installation. Submit for all equipment and systems as indicated in the respective specification sections, marking each submittal with that specification section number. Mark general catalog sheets and drawings to indicate specific items being submitted and proper identification of equipment by name and/or number, as indicated in the contract documents. Include wiring diagrams, and mechanical nameplate, and electrical nameplate ratings of electrically powered equipment.
- C. Engineer's Review: Allow not less than 20 Days review.
- D. Submit: Not less than Air Distribution, Controls, Split System catalog information.

1.17 OPERATION AND MAINTENANCE DATA

- A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.
- B. In addition to the general content specified under GENERAL REQUIREMENTS supply the following additional documentation:
 - 1. Records of tests performed a to certify compliance with system requirements
 - 2. Manufacturer's wiring diagrams for electrically powered equipment
 - 3. Certificates of inspection by regulatory agencies
 - 4. Mechanical schedules

- C. Parts lists for fixtures, equipment, valves and specialties.
- D. Manufacturers installation, operation and maintenance recommendations for, equipment, thermostat, and control systems.
- E. Additional information as indicated in the technical specification sections.

PART 2 – PRODUCTS

2.1 IDENTIFICATION

- A. Adhesive Labels: Pressure-sensitive, adhesive backed, vinyl markers with applicable labeling, $\frac{3}{4}$ " min. size for lettering and surrounding tape on both ends. With flow arrows on piping. Conforming to ANSI, ANSI and NFPA standards. Seton Opti-Code, MSI, Brady or approved equal.

2.2 NON-RATED PENETRATIONS

- A. At pipe penetrations of non-rated interior partitions, floors and exterior walls, use urethane caulk in annular space around penetration. For non-rated drywall, plaster or wood partitions where sleeve is not required use urethane caulk in annular space between pipe insulation and wall material

2.3 SEISMIC RESTRAINTS AND SUPPORTS

- A. Seismic Cable Restraint: Slack cables rigidly attached to suspended equipment. Attachment to structure shall include an interlocking steel element with a minimum $\frac{1}{4}$ " thick neoprene pad between the interlocking steel members. Cables shall be slack during normal operation of equipment and shall not compromise the efficiency of the vibration isolation hangers.
- B. Manufacturers: Mason cable assemblies Type SCB, or approved.
- C. Channel Support Systems: Galvanized steel. Size as indicated on drawing details or required, 12 gauge minimum. Provide complete with necessary appurtenances; including, but not limited to, threaded rod supports, closure strips, hanger supports, joiners, swivel covers, etc.
- D. Manufacturers: Super Strut, Unistrut, or approved. Similar to Unistrut P1000.
- E. Vibration Isolator Pad (Neoprene waffle pad): One or two layers equal to $\frac{3}{4}$ " minimum thick neoprene ribbed or waffled pad. Bonded to galvanized steel load distribution plate.
- F. Manufacturer: Mason type Super W, Kinetics, Amber Booth, or approved.

PART 3 – EXECUTION

3.1 IDENTIFICATION

- A. Identify equipment in mechanical equipment rooms by stenciling equipment number and service with one coat of black enamel against a light background or white enamel against a dark background. Use a primer where necessary for proper paint adhesion.
- B. Identify interior piping not less than once every 30 feet, not less than once in each room, adjacent to each access door or panel, and on both side of the partition where accessible piping passes through walls or floors. Place flow directional arrows at each pipe identification location. Use one coat of black enamel against a light background or white enamel against a dark background.

3.2 PROTECTION OF FINISHED SURFACES

- A. Refer to Division 1, General Requirements, Protection of Finished Surfaces.

3.3 BUILDING ACCESS

- A. Arrange for the necessary openings in the building to allow for admittance or removal of all apparatus. When the building access was not previously arranged and must be provided by this contractor, restore any opening to its original condition after the apparatus has been brought into the building.

3.4 EQUIPMENT ACCESS

- A. Install all piping, conduit and accessories to permit access to equipment for maintenance and service. Coordinate the exact location of wall and ceiling access panels and doors with the General Prime Contractor, making sure that access is available for all equipment and specialties. Access doors in general construction are to be furnished by the Mechanical Contractor and installed by the General Prime Contractor.

3.5 DEMOLITION

- A. Perform all demolition as indicated on the drawings and required to accomplish new Work. Where demolition work is to be performed adjacent to existing work that remains in an occupied area, construct temporary dust partition to minimize the amount of contamination of the occupied space. Where pipe is removed and not reconnected with new work, cap ends of existing services as if they were new work. Coordinate work with the Owner to minimize disruption to the existing building occupants.
- B. All ducts, fixtures, equipment, wiring and associated conduit, insulation and similar items demolished, abandoned, or deactivated are to be removed from the site by the Contractor except as specifically noted otherwise. All designated equipment is to be turned over to the user agency for their use at a place and time so designated. Maintain the condition of material and/or equipment that is indicated to be reused equal to that existing before work began.

3.6 SLEEVES AND OPENINGS

- A. Refer to Division 1, General Requirements, Sleeves and Openings. Pipe penetrations in new poured concrete horizontal construction requiring F and T rating: Form opening using hole form or core drill opening. Alternatively provide cast in place fire stopping devices/sleeves.
- B. Pipe penetrations in new poured concrete horizontal construction requiring F rating but no T rating: Same as pipe penetrations in new poured concrete construction requiring F and T ratings except that schedule 40 steel sleeves may also be used.
- C. Pipe penetrations in new poured concrete horizontal construction that do not require F or T ratings: Provide schedule 40 steel pipe sleeve, form opening using hole form or core drill opening.
- D. Pipe penetrations in existing concrete floors: Core drill openings.
- E. Link Seal, or approved for exterior penetrations. Seal annular apace around all other opening types.

3.7 SEALING AND FIRESTOPPING

- A. Sealing and firestopping of sleeves/openings between piping, etc. and the sleeve or structural opening shall be the responsibility of the contractor whose work penetrates the opening. The contractor responsible shall hire individuals skilled in such work to do the sealing and fireproofing. Provide all fire stopping of fire rated penetrations and sealing of smoke rated penetrations as required, and in compliance with Specifications Fire Stopping.

3.8 MECHANICAL JOINT PIPE CONNECTIONS

- A. Comply with AWWA C600/C605 installation requirements. Clean pipe end and socket. Clean and lubricate pipe end, socket and gasket with soapy water or gasket lubricant. Place gland and gasket, properly oriented, on pipe end. Insert pipe end fully into socket and press gasket evenly into recess keeping joint straight. Press gland evenly against gasket, insert bolts and hand tighten nuts. Make joint deflection prior to tightening bolts. Evenly tighten bolts in sequence to recommended torque.

3.9 SEISMIC RESTRAINTS

- A. Verify that restraints, bracing and anchors are attached to structural members capable of withstanding the required forces. Provide Oregon licensed structural PE signed and letter and/or drawing stating such when equipment is over 400lbs. Including but not limited to piping runs.

END OF SECTION 23 00 00

SECTION 23 81 26
SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. General: 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. General: Section includes split-system air conditioning units consisting of separate evaporator fan and compressor-condenser components.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.
- B. Field Quality Control Reports: Provide.
- C. Warranty.
- D. Operation and Maintenance Data: For split-system air conditioning units to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASHRAE Compliance:
 - 1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
- C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

1.5 COORDINATION

- A. Ground Mounted Equipment: Coordinate sizes and locations of equipment supports, and penetrations with actual equipment provided. Mount as shown on Drawings.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fails in materials or workmanship within specified warranty period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1. Mitsubishi, or approved.

2.2 INDOOR UNITS (5 TONS OR LESS)

- A. Wall-Mounted, Evaporator-Fan Components:

- 1. Cabinet: Manufacturer's standard cabinet with removable panels on front, and discharge drain pans with drain connection.
- 2. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal expansion valve. Comply with ARI 210/240.
- 3. Fan: Direct drive, centrifugal.
- 4. Fan Motors:
 - a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and premium efficiency requirements.
 - b. Multi-tapped, multispeed with internal thermal protection and permanent lubrication.
 - c. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
 - d. Mount unit-mounted disconnect switches on interior of unit.
- 5. Condensate Drain Pans:
 - a. Fabricated to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends), and to direct water toward drain connection.
 - b. Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on one end of pan or provide integral condensate pump with discharge to drain connection.
- 6. Air Filtration Section: Provide manufacturer's standard washable and reusable filter media.

2.3 OUTDOOR UNITS (5 TONS OR LESS)

- A. Air-Cooled, Compressor-Condenser Components:

1. Casing: Manufacturer's standard casing, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base.
2. Compressor: Hermetically sealed. Compressor motor shall have thermal- and current sensitive overload devices, start capacitor, relay, and contactor.
 - a. Compressor Type: Inverter.
 - b. Refrigerant Charge: R-410A.
 - c. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins.
3. Fan: Propeller type directly connected to motor.
4. Motor: Permanently lubricated, with integral thermal-overload protection.
5. Low Ambient Kit: Permits operation down to 45 degrees F.
6. Mounting Base: Polyethylene.

2.4 ACCESSORIES

- A. Wall-Mounted Controller-Thermostat: Low voltage wired with sub-base to control compressor and evaporator fan.
 1. Compressor time delay.
 2. 24-hour time control of system stop and start.
 3. Liquid-crystal display indicating temperature, setpoint temperature, time setting, operating mode, and fan speed.
 4. Fan-speed selection including auto setting.
 5. Wall mounted remote control is acceptable.
- B. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.
- C. Drain Hose: For condensate.
- D. Condensate lift pump and drain level sensor.

2.5 CAPACITIES AND CHARACTERISTICS

- A. Cooling Capacity:
 1. Total: See Equipment Schedule on Drawings.
- B. Indoor Unit (ACI-X): See Equipment Schedule on Drawings.
- C. Outdoor Unit (ACO-X): See Equipment Schedule on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Unit Installation: Install units level and plumb.
- B. Structural Attachments: Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- C. Ground Mounted Equipment: Install ground-mounted, compressor-condenser components on existing concrete pad. Coordinate anchor installation with concrete base.
- D. Ground Mounted Equipment Base: Install ground-mounted, compressor-condenser components on polyethylene mounting base.
- E. Seismic Restraints: Install seismic restraints as required.
- F. Refrigerant Tubing: Install and connect precharged refrigerant tubing to component's quick connect fittings. Install tubing to allow access to unit. Follow all manufacturer's requirements.

3.2 CONNECTIONS

- A. General: Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Service and Maintenance: Where piping is installed adjacent to unit, allow space for service and maintenance of unit.

3.3 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Corrections: Remove and replace malfunctioning units and retest as specified above.
- C. Test and Inspection Reports: Provide.

3.4 STARTUP SERVICE

- A. Startup Service: Perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.

3.5 DEMONSTRATION

- A. Training: Train Owner's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION 23 81 26

SECTION 26 00 01 -GENERAL ELECTRICAL PROVISIONS

THIS STAMP, ON THIS PROJECT APPLIES ONLY TO SECTIONS AUTHORED BY:

MATTHEW J. CASH, PE
FLUENT ENGINEERING, INC.
2110 STATE STREET
SALEM, OR 97301
503-447-5030

PART 1 -GENERAL

Products under this contract must meet minimum specifications requirements in detail without exception unless specifically noted and approved as provided in these Specifications. Equipment submitted for review must clearly state on cover sheet any differences from specified product. Equipment substitution or submittal review does not relieve Contractor from meeting all requirements of specified item.

1.1 DEFINITIONS

- A. Definitions herein are intended as advisory and shall not limit requirements within the Contract Documents. Where a conflict of definitions exists, the more stringent standard shall be used. Where a term is defined on a Drawing the Drawing definition shall be used for that drawing. Not all definitions are included. Trade standard terms are not defined.

1.2 CONTRACT DOCUMENTS

- A. The Contract Documents are inclusive. All requirements of all Contract Documents shall be binding as if repeated herein and within this Division as required by any other Division or Contract Document.
- B. This Division does not express or imply separation of the Contract Documents and shall not be considered as separation of the Work.
- C. See Advertisement For Bids, Instructions to Bidders, Supplemental Instructions to Bidders, General Conditions, Supplemental General Conditions, Drawings and Specifications, and modifications incorporated in the documents before execution of the Agreement.
- D. Conflicts: If any conflicts exist the more stringent is required.

1.3 SCOPE OF WORK

- A. General: Provide complete and functional electrical systems as specified, as shown on Drawings, as required, and as intended. Work generally includes, inspections, electrical distribution, lighting, devices, wiring systems, Voice/Data cabling, raceways, and control systems.
- B. Omissions: Contractor shall be responsible for additional labor, or additional material necessary for the proper execution of the Work. Omissions of expressed reference to any item shall not relieve the responsibility to conform to the Contract Documents
- C. Scope of Electrical Work
 - 1. All materials and workmanship shall be furnished for complete, tested, and operating electrical systems as shown on the drawings and specified herein.
 - 2. Electrical work is to include the electrical service. Complete to the point of connection with the serving utility. Any changes of or work required by the serving utility, are part of this work and shall be fully included in the bid price.
 - 3. Work is also to include main distribution panel, feeder system and branch circuit panels. Complete branch circuit wiring. Light fixtures, wall switches, receptacles and similar items, wiring, and connection to all mechanical equipment, connection to elevators, fire alarm, phone system, and equipment as required.

1.4 CONFORMANCE WITH REQUIREMENTS

- A. General: All Work shall conform to the reasonable requirements of the project within the scope of the project and authorizations. All work shall conform to the methods and requirements of Code at the location of the Work.
 - 1. Access and inspection: All portions of the Work shall be accessible to inspections and review at all reasonable times during construction. Contractor is responsible for providing access for review and inspection of the Work. Contractor shall secure written inspection reports prior to concealing Work. Contractor is responsible for damages to properly review the Work due to lack of at least 7 Days advance written notification to the Architect, and Engineer that Work is ready for inspection.
- B. Accounting: Provide general accounting information as to labor and equipment costs to assist in determination of modifications to the Contract. Provide accounting breakdown when required for securing Owner financing, or for analysis of equipment costs or equipment payback periods, as well as information for Owner incentives.

1.5 COORDINATION OF TRADES

- A. Check all other trade drawings to avert potential installation conflicts. Should major changes from the Drawings be required to resolve potential conflicts, notify the Architect and secure written approval and agreement on necessary adjustments prior to start of installation.
- B. Check all equipment locations and connections on the site for coordination with other Divisions equipment and connections and structure and the like.

- C. Contractor is responsible for scheduling trades to properly execute all the Work as intended.

1.6 STANDARD OF CARE AND QUALIFICATIONS

- A. General: Contractor shall be experienced and knowledgeable to Provide Work. Owner is not responsible for improper operation, noncompliance, or installation due to Contractor's lack of knowledge or experience. Upon request, and where requested herein the Contractor shall supply qualifications and experience. Drawings are presented with industry terms, statements, and trade practices and it is the responsibility of the Contractor to be familiar. Provide written notification prior to Bid to the Architect if any representation is not understood, or outside standard practice.
- B. Like Materials and Quality Control: All systems provided shall be new and of like materials provided through manufacturer authorized distributors. Provide equipment of same system and type by same manufacturer. Items of the same by different manufacturers will be rejected. Equipment shall conform to all applicable Code and applicable listing criteria as of the date of the Contract Documents. Equipment determined to be manufactured under any other listing or Code prior to the date of the Contract is not acceptable, even if the equipment is new or has not been used. All equipment provided to project shall be listed by an approved listing organization.

1.7 EXAMINATION OF SITE

- A. Examine Site of Work prior to making Bid. Ascertain all related physical conditions.
- B. Verify at the Site of Work prior to Bid scale dimensions shown due to exact locations, distances, and levels will be governed by actual field conditions.
- C. Owner will not be responsible for any loss or costs that may be incurred due to a Bidder's failure to fully inform themselves prior to Bid in regard to conditions pertaining to the Work and nature of the Work.

1.8 MINOR DEVIATIONS

- A. Make minor changes in equipment locations and equipment connections as directed or required without extra cost.

1.9 RECORD DRAWINGS

- A. Maintain a marked set of prints at job site at all times. Show all changes from the original drawing set whether visible or concealed. Include all addendums, field orders, change orders, clarifications, request for information drawn responses, and deviations. Dimension accurately from building lines, floor, or curb elevations. Show exact location, elevation, and size of conduit/raceway, access panels and doors, equipment, and all other information pertinent to the Work.
- B. At project completion, submit marked set to Architect for review.

1.10 TRAINING

- A. Provide training of Owner's selected staff for all electrical systems specified herein.
- B. Training of all systems shall be videotaped, and two copies shall be distributed to Owner.
- C. Notify and Coordinate with Owner for training and attendance not later than 15 Days prior to training.
- D. Provide 2.5 hours of general system training.
- E. Training shall be conducted by qualified individuals familiar with the Work, and with the equipment.
- F. Instructor shall be familiar with programming and operation of equipment and shall provide instruction to do such.
- G. Provide contact information to Owner for an additional 1 hours support for all electrical systems.
- H. Training shall not occur prior to systems being fully inspected, operational, and complete.
- I. Utilize necessary training materials, conduct training at project location including walk-through of equipment on-site.
- J. Provide Owner with all required Operation, Maintenance, and Programming manuals provided by equipment manufacturer.
- K. Owner shall determine attendee's at training, not the contractor. Contractor shall re-train if attendee's were not selected by the owner

1.11 WARRANTY

- A. Warrant Work, materials, and equipment for not less than one year.
- B. Provide additional warranty as required herein.

PART 2 -PRODUCTS

THIS PART NOT USED

PART 3 -EXECUTION

THIS PART NOT USED

END OF SECTION 26 00 01

SECTION 26 00 20- ELECTRICAL DEMOLITION

PART 1 -GENERAL

1.1 INTENT

- A. The electrical system shall be adjusted to accommodate installation of the new work and is required to meet Code. Necessary adjustments are shown on Drawings and indicated herein.

1.2 EXISTING CONDITIONS

- A. The locations of existing utilities and equipment are shown in an approximate way only and have not been independently verified by the Owner or Owner's Representative. Contractor shall determine the exact location of every existing utility before commencing work, and agrees to be fully responsible for any and all damages which might be occasioned by the Contractor's failure to exactly locate and preserve utilities and equipment. Replace damaged items with new material to match existing. Promptly notify Owner if utilities are found which are not shown.
- B. Existing equipment to be removed is assumed to contain PCB's, Mercury, and other hazardous materials.

PART 2 -PRODUCTS

THIS PART NOT USED

PART 3 -EXECUTIONS

3.1 DEMOLITION

- A. Existing electrical light fixtures are denoted on demolition plans. Verify exact location of existing light fixtures in the field. Only partial existing electrical shown. Locations of items shown on the Drawings as existing are partially based on field inspection of unconcealed equipment and record drawings that may contain errors. The contractor shall verify the accuracy of the information shown prior to bidding and provide such labor and material as is necessary to accomplish the intent of the Contract Documents.
- B. Remove all existing fixtures, and associated electrical equipment from areas scheduled for remodeling, relocation, or demolition unless specifically shown as retained or relocated on the Drawings.

- C. Maintain continuity of existing systems that remain. Remove or relocate electrical boxes, conduit, wiring, equipment, fixtures, etc. as may be encountered in removed or remodeled areas in the existing affected by this work. Wiring which serves usable existing equipment shall be removed and restored clear of the construction or demolition. If existing junction boxes will be made inaccessible, or if abandoned outlets serve as feed through boxes for other existing electrical equipment which is being retained, new conduit and wire shall be provided to bypass the abandoned equipment. If existing conduits pass through areas being removed or remodeled, new conduit and wire shall be provided to reroute clear of the construction or demolition and maintain service to the existing load.
- D. Remove all abandoned wiring, and leave site clean.
- E. Do not disconnect service without approval from the Owner and Utility. Coordinate demolition work with the utility.
- F. Verify with the General Contractor a location for storage of materials, supplies, tools, rubbish, etc. prior to start of Work.
- G. Include disposal costs in bid unless item is specifically noted as salvage to Owner. Include removal and salvage to Owner costs in bid; including relocating equipment to another location on the Owner's site. Owner has first right of refusal for any other equipment scheduled for demolition not already noted as salvaged to Owner. Owner may elect to salvage any equipment scheduled for disposal. Protect equipment salvaged to Owner. For equipment with disposal/recycle/salvage value, such proceeds shall be passed to Owner through inclusion in total bid.
- H. (E) Ballasts with PCB's and (E) Lamps: Contractor shall properly handle, prepare for disposal (such as box, barrel, etc.), and dispose of equipment as required. Recycling is to be used to the extent feasible where costs to recycle properly do not exceed cost to dispose of properly. All (E) ballasts contain PCB's unless marked by the manufacturer on the ballast "No PCB's"
 - 1. Barrel all leaking PCB ballasts per disposal requirements in approved barrels, not exceeding barreling volume/quantity allowances. Dispose of PCB's ballasts in a facility regulated under the Federal Toxic Substances Control Act.
 - 2. Non-leaking PCB ballasts not recycled shall be disposed at a PCB disposal facility in approved leak-proof containers.
 - 3. See DEQ Fact Sheets attached herein. Follow regulatory requirements for proper disposal of removed equipment. Submit certificate of disposal.

END OF SECTION 26 00 20

Managing Waste Lamps

Background

This fact sheet provides tips for persons who create or manage wastes from lamps containing hazardous materials. Detailed regulations for managing these wastes are in the federal Code of Federal Regulations (Title 40, Parts 260 and 273) and in Oregon Administrative Rule Chapter 340, Divisions 101 and 113.

Environmental concerns

Fluorescent lamps as well as high-intensity discharge lamps – including mercury vapor, high-pressure sodium and metal halide lamps from businesses – can contain levels of mercury and lead that make them hazardous waste when disposed. Businesses and governments in Oregon discard several million lamps each year, making these lamps the state's largest source of mercury in the solid waste stream.

Mercury and lead are toxic metals that can accumulate in living tissue and cause adverse health effects. When a lamp breaks – either intentionally, during compaction or transport or while sent for incineration – metal vapors and lead- and mercury-contaminated dust enter the environment. This contaminates the air, surface water, groundwater and surface soil.

Mercury lamps

There are five basic approaches in dealing with using lamps containing mercury:

- Purchase lamps that contain amounts of mercury below hazardous waste levels; recycle glass, metal and low-level mercury
- Recycle waste lamps and reclaim the mercury
- Dispose of mercury-containing lamps as hazardous waste
- Dispose of lamps as solid waste in a landfill, if qualified (see below)
- Crush lamps and dispose of them as hazardous waste (see health warning on next page).

Lamp management disposal options

Most businesses have three legal options for disposing of waste lamps: universal waste, hazardous waste and special provisions for conditionally exempt generators.

Universal waste

(CFR Title 40, Part 273; OAR Chapter 340, Division 113). Universal wastes are a class of generated wastes which the U.S.

Environmental Protection Agency allows to be managed by alternative standard or “universal waste rule.” Advantages of managing waste lamps under this rule are:

- Universal wastes are not counted toward hazardous waste generator status
- Manifests are not required unless the waste lamps are transported through states or treated or disposed of in states that do not recognize mercury-containing lamps as a universal waste
- Waste lamps may be stored for up to a year, provided the facility tracks them by the date they became a waste
- Reduced recordkeeping, training and emergency preparedness compared with requirements for small- and large-quantity generators

Handlers of waste lamps managed under the universal waste rule must:

- Manage lamps in a way that prevents releases of the waste to the environment
- Place lamps in containers such as cardboard boxes or fiber drums, which are adequate to prevent breakage
- Keep containers closed
- Label each container with the words “Universal Waste – Lamps,” “Waste Lamps” or “Used Lamps”
- Immediately clean up broken or damaged lamps
- Store broken lamps in a closed, structurally sound container

Universal waste handlers are prohibited from crushing lamps or diluting them with other wastes. They must send waste lamps to a universal waste destination facility for recycling or disposal.

Hazardous waste (CFR 40, Parts 260-66, 268); OAR 340, Divisions 100-106, 108)

Hazardous waste management requirements include:

- Storing waste lamps in a proper container (to protect lamps from breakage)
- Manifesting and contracting with a registered hauler
- Paying necessary fees
- Completing additional training and emergency planning
- Managing waste to a permitted hazardous waste landfill or recycling facility



State of Oregon
Department of
Environmental
Quality

Hazardous Waste Program

811 SW 6th Avenue
Portland, OR 97204
Phone: (503) 229-6742
(800) 452-4011
Fax: (503) 229-6977
Contact: Dave LeBrun
www.oregon.gov/DEQ

- Filing an annual report quantifying the amount of hazardous waste generated
- Meeting other requirements based on facility status

Conditionally exempt generator status (CFR 40, Part 261.5)

Before a waste generator qualifies as conditionally exempt, it must:

- Generate less than 220 pounds of hazardous waste each month
- Store less than 2,200 pounds of hazardous waste at any one time

Some municipal landfills don't allow disposal of hazardous waste from conditionally exempt generators. Check with your hauler and with DEQ's hazardous waste technical assistance program (contacts below). In this case, conditionally exempt generators should manage this material as a hazardous waste – via recycling or disposal.

Solid waste considerations

(OAR 340-102-0011)

To manage waste lamp tubes as a solid waste, the waste cannot exhibit toxic characteristics for mercury or lead. The complete waste characterization must be based on laboratory analysis of lamps of the brand and model being disposed of. Waste lamps that don't exhibit hazardous waste characteristics may be disposed of in the municipal solid waste stream. Recycling is the preferred option.

For more on this, refer to DEQ's Hazardous Waste Determination fact sheet.

Crushing lamps

Universal waste regulations prohibit the crushing of universal waste lamps. Crushing is considered hazardous waste treatment. Applicable hazardous waste management and standards pertain to these generated wastes.

Crushing lamps poses human and environmental risks due to mercury vapor release. Crushing lamps in a drum top crushing unit reduces the waste volume. DEQ does not consider on-site lamp crushing a recycling process, even if the crushed glass is later sent to a recycling facility. This is because recycling involves reclaiming or recovering something of value from a waste. A drum top unit reduces waste volume but does not separate and reclaim the waste as recycling facilities do.

Crushing lamps is allowed if the lamps are managed under hazardous waste regulations or if the waste lamps are determined to be a solid

waste before crushing. If solid waste bulbs are crushed with hazardous waste bulbs, the mixture must be managed as hazardous waste. Lamps must be crushed in commercially available crushing units designed to control mercury emissions.

Lamp collection services

The following is a partial list of firms that offer waste lamp services. DEQ does not endorse specific recyclers or disposal firms.

By providing this list, DEQ doesn't imply that the companies comply with applicable laws. DEQ cautions waste generators to personally evaluate the services and environmental compliance status of any company they use to manage their waste.

Waste Management

Portland, OR
1-800-833-3505

Northwest Hazmat, Inc.

Springfield, OR
1-541-988-9823
Spill response services

Lighting Resources Inc.

Ontario, CA
1- 888-923-7252

Waste-Pro

La Grande, OR
541-963-5459

Total Reclaim

Portland, OR
503-281-1899

AERC Recycling Solutions

30677 Huntwood Ave.
Hayward, CA 94544
Phone: 510-429-1129
Fax: 510-429-1498

Philip Services Corporation

20245 77th Ave
South Kent, WA 98032
1-800-548-8797

Veolia Environmental Services

Vancouver, WA
1-360-260-0882

Where to find more information

DEQ has other fact sheets about handling mercury-containing materials. Go to DEQ's factsheet web page at:

<http://www.deq.state.or.us/pubs/factsheets.htm>

Scroll down to "Land Quality," "Hazardous Waste."

DEQ's universal waste regulations are in [Oregon Administrative Rules Chapter 340, Division 113](#)

DEQ's hazardous waste regulations are in [Oregon Administrative Rules Chapter 340, Division 102](#)

Other related federal requirements of interest are on the [federal website for Title 40](#), "Protection of the Environment."

- Part 261 (hazardous waste identification)
- Part 262 (hazardous waste generators)
- Part 273 (universal waste)

DEQ regional offices and assistance

For more assistance, see the DEQ hazardous waste program specialist in your area.

Northwest Region Office: 2020 SW Fourth Ave., Suite 400, Portland, OR 97201, 503-229-5263

Bend office: 475 NE Bellevue, Suite 110, Bend, OR 97701, 541-388-6146

Pendleton office: 800 SE Emigrant, Suite 330, Pendleton, OR 97801, 541-276-4063

Salem office: 750 Front St. NE, Suite 120, Salem, OR 97310, 503-378-8240, ext. 253

Eugene office: 165 E. 7th Ave., Suite 100, Eugene OR 97401, 541-686-7838

Alternative formats

Alternative formats of this document can be made available. For more information, call 503-229-5696, Portland, or phone toll-free in Oregon at 1-800-452-4011, ext. 5696. Hearing-impaired persons may call 711.

Waste Lamps & Ballasts

This fact sheet provides guidance to individuals that create and manage waste lamps and ballasts. Complete management regulations can be found in the Code of Federal Regulations (CFR), Title 40, Part 273 and 261 and the Oregon Administrative Rule (OAR) Chapter 340, Division 113.

Environmental concerns

Fluorescent lamps and High Intensity Discharge (HID) lamps, including mercury vapor, high-pressure sodium, and metal halide lamps from businesses, can contain levels of mercury and lead that make them hazardous waste when disposed. Mercury and lead are toxic metals that can accumulate in living tissue and cause adverse health effects. Businesses and governments in Oregon discard several million lamps each year, making these lamps the largest source of mercury in our solid waste-stream. When a lamp is broken, or placed in a landfill or incinerator, metals are released into the environment that may contaminate the air, surface or groundwater.

Lamp ballasts manufactured prior to 1978 likely contain polychlorinated biphenyls (PCBs). When released into the environment, PCBs persist for many years and bioaccumulate in organisms. Studies have shown that PCBs cause cancer in animals, and repeated exposure to PCBs has shown adverse reproductive and developmental effects in animals. Exposure to PCBs can cause liver damage, nausea, dizziness, eye irritation and bronchitis in humans.

Management of lamps as universal waste

The universal waste rule was designed to encourage the collection of certain hazardous wastes that are generated by a wide variety of businesses and institutions. Depending on your individual situation, other options may be preferred to managing your waste lamps as universal waste. A summary of lamp management options is presented in a table on page 2. For specific requirements, refer to the rules listed in the table.

Advantages of managing waste lamps under the universal waste rule are:

- Universal wastes are not counted towards hazardous waste generator status;
- No manifesting required unless the waste lamps are transported through states or treated or disposed in states that do not recognize mercury-containing lamps as a universal waste;
- Increased storage time available; and
- Reduced administrative requirements for record-keeping, training, and emergency preparedness.

Universal waste management requirements

Handlers of waste lamps managed under the universal waste rule must:

- Manage lamps in a way that prevents releases of the waste to the environment;
- Contain lamps in containers such as cardboard boxes or fiber drums, which are adequate to prevent breakage;
- Keep containers closed;
- Minimize lamp breakage and immediately clean up any broken or damaged lamps; and,
- Store broken lamps in a closed, structurally sound container.

Universal waste handlers are prohibited from crushing lamps, or diluting lamps with other wastes. Waste lamps must be sent to a universal waste destination facility for recycling or disposal.

Labeling and marking

Each container of waste lamps must be labeled or marked clearly with one of the following phrases: "Universal Waste—Lamps", "Waste Lamps," or "Used Lamps."

Accumulation time

Waste lamps may be accumulated for up to 1 year. Accumulation of universal waste lamps longer than 1 year is permitted if the handler can demonstrate, if inspected by the Department, that more time is needed to accumulate the quantities necessary to facilitate proper recovery, treatment or disposal.



State of Oregon
Department of
Environmental
Quality

Land Quality Division Hazardous Waste Program

811 SW 6th Avenue
Portland, OR 97204
Phone: (503) 229-5913
(800) 452-4011
Fax: (503) 229-6977
www.oregon.gov/DEQ/

Mercury Containing Lamp Management Options

Management As:	Conditions Which Must Be Met	Applicable Rules	Comments
Universal Waste	Management of waste subject to applicable universal waste management standards.	See 40 CFR Part 273* and OAR 340 Division 113**	Universal waste rule is designed to encourage collection of waste. Waste lamps are ultimately subject to hazardous waste management requirements when treated or disposed.
Conditionally Exempt Hazardous Waste	Generator of waste lamps must be a conditionally exempt generator (<220 lbs. hazardous waste generated per month and <2,200 lbs. hazardous waste stored at any one time).	See 40 CFR 261.5	Waste lamps may be disposed of in solid waste landfill, if allowed by the operator.
Solid Waste	Waste lamps <u>must not</u> exhibit hazardous waste characteristics.	See OAR 340-102-0011 for hazardous waste determination requirements	Some fluorescent lamps do not exhibit hazardous waste characteristics.
Hazardous Waste	Generator must follow applicable hazardous waste regulations.	See 40 CFR 260-266, 268, OAR 340 Divisions 100 to 106, and 108	Most restrictive management requirements. Waste must be sent directly to permitted hazardous waste facility.

* 40 CFR is Title 40 of the Code of Federal Regulations and contains the Federal environmental regulations.

** OAR 340 is Chapter 340 of the Oregon Administrative Rules and contains the State environmental regulations.

Lamp crushing

Crushing of universal waste lamps is prohibited under the universal waste regulations. However, crushing is allowed if the waste will be managed as hazardous waste. (See discussion below under "Management of Waste Lamps as Hazardous Waste".)

- Limit the time waste can be accumulated;
- Be subject to hazardous waste generation fees;
- Require additional training, emergency preparedness and contingency plans to be developed; and
- Require annual reporting of waste generated.

Management of waste lamps as hazardous waste

Generators of waste lamps may decide, in lieu of the management as universal waste, to manage their waste lamps as hazardous waste.

Management of lamps as hazardous waste is more restrictive than under the universal waste rule and, depending on the amount of hazardous waste generated, may:

Conditionally exempt hazardous waste

Waste lamps may be managed as conditionally-exempt generator waste if the generator of the waste is a conditionally-exempt hazardous waste generator. A conditionally-exempt hazardous waste generator is a generator that produces less than 220 pounds of hazardous waste per month. When determining if they are conditionally-exempt, hazardous waste generators must count all their hazardous waste (lamps and other hazardous waste) generated during the calendar month.

To remain "conditionally-exempt" from the more stringent hazardous waste management requirements, generators who produce less than 220 pounds of hazardous waste must:

- Ensure delivery of their waste to a hazardous waste disposal or recycling facility, or a solid waste disposal facility, and
- Accumulate no more than 2,200 pounds of hazardous waste at any one time.

Crushing lamps

Crushing lamps is permitted if the waste lamps are managed under the hazardous waste regulations or if the waste lamps are determined to be a solid waste. Lamps must be crushed in commercially available crushing units that are designed to control mercury emissions.

Crushing is allowed provided that the generator of the lamps:

- Crushes lamps in a well-ventilated and monitored area to ensure compliance with applicable OSHA exposure limits for mercury;
- Ensures that employees crushing lamps are thoroughly familiar with proper waste mercury handling and emergency procedures; and
- Stores crushed tubes in closed, non-leaking containers.

When making a decision to crush lamps, be aware that the crushing may add additional costs to prepare lamps for disposal or recycling. In addition, lamp recyclers may prefer whole lamps to crushed ones. Crushing units also can pose health and environmental risks because of the release of mercury vapors.

Management of waste lamps as solid waste

Waste lamps may be managed as solid waste if they do not exhibit a hazardous waste characteristic. In many cases, any such characteristic exhibited will be for mercury. Waste lamps used in special situations, such as photo processing, or larger HID lamps, can also exhibit hazardous waste characteristics for cadmium or lead.

To manage waste lamps as solid waste, a generator must first determine that their lamps do not exhibit a hazardous waste characteristic.

- Testing a representative sample of the waste, using the Toxicity Characteristic Leaching Procedure (TCLP); or,
- Using process knowledge of the waste. In this case, knowledge of the waste could be obtained from the manufacturer. Lamp manufacturers now offer low mercury lamps that do not exhibit hazardous waste characteristics. Be sure to have documentation from the manufacturer that the lamps you are using have been tested and are not hazardous waste. You must be able to demonstrate that the data used in your waste determination is for the type of lamps (i.e., the brand and model) you are disposing.

For more information regarding how to perform a hazardous waste determination, refer to the Department's Hazardous Waste Determination Fact Sheet.

Lamp collection services

The following is a partial list of firms that offer waste lamp services. DEQ does not endorse specific recyclers or disposal firms.

DEQ, by providing the list, does not imply that the companies are in compliance with applicable laws. DEQ cautions generators to personally evaluate the services and compliance status of any company they use to manage their waste.

- Allied Environmental, White City, OR
541-772-1723
- Earth Protection Services, Tigard, OR
503-620-2466
- Environmental Protection Services, Brooks, OR
503-474-1586
- Northwest Hazmat, Springfield, OR
541-988-9823
- Garriss Environmental, White City, OR
541-830-1100
- Safety-Kleen, Clackamas, OR 503-655-5798
- The Retrofit Companies, Sherwood, OR
503-625-2760
- Waste-Pro, LaGrande, OR 541-963-5459
- AERC, Hayward, CA 510-429-1129
- EcoLights NW, Seattle WA 206-343-1247
- Lighting Resources, Ontario CA 800-572-9253
- Philips Services Corporation, Washougal, WA
800-547-2436
- Veolia Environmental Services, Vancouver, WA
360-260-0882

A generator may do this by:

Management of lamp ballasts

Light ballasts are the primary electrical components of fluorescent light fixtures and are generally located within the fixture under a metal cover plate. In older ballasts, a tar-like substance surrounds the components of the ballast that is designed to muffle the noise that is inherent in the operation of these ballasts.

Before the U.S. Environmental Protection Agency (EPA) banned the manufacture of PCBs in 1978, PCBs were commonly used in ballasts. All lamp ballasts manufactured since 1978 that do not contain PCBs should be marked by the manufacturer with the statement "No PCBs."

For ballasts manufactured prior to 1978, or for those that do not contain a statement regarding PCB content, you should assume that they contain PCBs.

PCB-containing ballasts contain approximately 1 to 1½ ounces of PCBs. If the ballast fails, PCBs may drip out of the fixture. If it does, measures should be taken to limit or avoid personal exposures.

Disposal of ballasts containing PCBs

The best option for non-leaking PCB ballasts is to recycle them at a facility with EPA approval for recycling PCB ballasts. Use a broker with EPA interim status as a PCB commercial storage facility to transport them to the recycling facility. Non-leaking PCB ballasts that are not recycled must be managed and disposed at a PCB disposal facility.

Leaking PCB ballasts must be managed as PCB waste and disposed in a facility regulated under the Federal Toxic Substances Control Act (TSCA).

Brokers that collect PCB ballasts:

*EcoLights Northwest, Seattle, WA
(206) 343-1247*

Facilities with EPA approval for recycling fluorescent light ballasts:

(Call company for shipping guidelines.)

- *Earth Protection Services, Inc.,
Tigard, OR (503) 620-2466*
- *Mercury Waste Solutions, MN
(877) 636-6514*
- *Onyx Environmental Services, Vancouver,
WA (877) 652-6292*
- *Trans-Cycle Industries, AL
(800) 909-9997*

Additional information from DEQ

- Universal Waste Regulations
- Universal Waste Handler Fact sheet
- Hazardous Waste Determination Fact Sheet
- Oregon Hazardous Waste Regulations

For more information on Hazardous Waste Management, contact DEQ at (503) 229-5913 or visit our website.

For PCB disposal information contact EPA Region X at (503) 326-3399 or visit:

<http://yosemite.epa.gov/R10/OWCM.NSF/pcb/pcb>

Need technical assistance managing waste?

DEQ Technical assistance is available:

- Free on-site visits
- Free telephone consultations
- Hazardous waste training

DEQ Technical assistance can help you:

- Understand how hazardous waste regulations apply to your business
- Determine which wastes are hazardous
- Complete reporting forms
- Manage wastes better
- Reduce disposal costs
- Minimize the waste you produce
- Determine what areas need improvement

If you would like technical assistance or have any questions about your hazardous waste determination responsibilities, please contact the DEQ field office nearest you:

- *Bend (541) 388-6146*
- *Medford (541) 776-6010*
- *Portland (503) 229-5263*

For more information on technical assistance, please visit: www.deq.state.or.us/lq/hw/technicalassistance.htm

Alternative Formats

Alternative formats of this document can be made available. Contact the DEQ Office of Communication and Outreach for more information: (503) 229-5696.

SECTION 26 00 26 - SUBMITTALS AND SHOP DRAWINGS

PART 1 -GENERAL

1.1 REQUIREMENTS

- A. Refer to Division 1
- B. Organization
 - 1. Provide 3-ring type hard cover notebook with 3-hole punch product data sheets.
 - 2. Order submittals in logical form with tab dividers indicating specification section, and specification title
 - 3. Equipment shown on schedules shall be in logical order as the equipment appears on the schedule (i.e. light fixture type A precedes light fixture type Z).
 - 4. Submit 5 copies for review. Not all copies will be returned to Contractor.
 - 5. Clearly readable electronic submittals are permitted provided they are printed by the Contractor with the O&M Manuals for Owner's hard-copy.
 - a. Contractor is responsible to verify receipt of electronic submittals by Engineer.
 - b. Electronic Submittals shall include the project title in the subject line with unique submittal number, and description of submittal.
 - c. Submit Submittals per Division 1 Requirements
- C. Allow no less than 20 Days for review by Engineer.
- D. Contractor is responsible to submit and verify receipt of comments for all submittals.
- E. Resubmittals shall contain all items included in previous submittals with changes clearly identified with a cover letter listing the changed items. Only revised items will be reviewed.
- F. No item requiring review shall be delivered to the site or otherwise provided to the Project until submittals have been reviewed by the Engineer.

1.2 DEFINITIONS

- A. Manufacturing Data: Information regarding the product(s) and equipment issued by the manufacturer as described below.
- B. Manufacturer's Label: Manufacturer's label shall include a typewritten list of manufacturer's name, sizes and model or catalog numbers.
- C. Manufacturer's Catalog Data: Manufacturer's catalog data shall include standard catalog information (Cut Sheets) marked to indicate specific equipment and options for complete and functional system. All components of the system shall be included. Include listing information. Include installation instructions.

- D. **Manufacturer's Technical and Engineering Data:** Manufacturer's technical and engineering data shall include materials, dimensions, details, installation instructions, weights, capacities, illustrations, wiring diagrams, control diagrams, control schematics, piping diagrams, connection diagrams, performance data, trip curves, listings, mix design, test results, and any other information required for a complete evaluation of the equipment specified, and to verify compliance with the Contract Documents. All available details shall be included with any modifications to the equipment indicated. All manufacturers and associated model numbers used for complete system shall be indicated.
- E. **Shop Drawings:** Shop drawings are Construction drawings of items manufactured specifically for this project. Shop drawings shall include dimensions, construction details, weights, and additional information to identify the physical features of the system or piece of equipment. Drawings shall be adequately sized and scaled for a complete review.
- F. **Samples:** Samples include actual example of the equipment to be installed. Include actual color, finish, and functioning replica of equipment to be installed. Samples will be returned to the Contractor when submitted with pre-paid postage.
- G. **Certifications and Qualifications:** Submit list of past projects with same systems. Submit information listing references, copies of certificates issued by manufacturer, school, and standards organizations. Submit information mandated in specific specification section.

1.3 SUBMITTALS REQUIRED

- A. **Product Evaluation Data.** 5 copies of product literature. The submittal schedule for product evaluation data is as indicated below. Each item requiring a submittal is given the following code:

L	Manufacturer's Label
C	Manufacturer's catalog data (Cuts)
E	Manufacturer's technical and engineering data
S	Shop drawings
SA	Samples
CR	Certifications
Q	Qualifications

1.4 SUBMITTAL SCHEDULE

Division 26 - Electrical

Section 26 05 19- BUILDING WIRE AND CABLES	C
Section 26 05 26- GROUNDING.....	C
Section 26 05 29- SUPPORTING DEVICES.....	L
Section 26 05 33- RACEWAYS & FITTINGS	L
Section 26 05 33.16- OUTLET, JUNCTION, AND PULL BOXES.....	C
Section 26 05 53- ELECTRICAL IDENTIFICATION.....	L
Section 26 05 60- OVERCURRENT PROTECTION DEVICES.....	C,E
Section 26 05 83- WIRE CONNECTIONS.....	L

Section 26 27 26- WIRING DEVICES.....	C
Section 26 29 12- DISCONNECTS & MANUAL MOTOR STARTER ...	C,S
Section 26 51 13- LIGHTING FIXTURES.....	C
Section 28 31 33- FIRE ALARM SYSTEM.....	C

PART 2 -PRODUCTS

THIS PART NOT USED

PART 3 -EXECUTION

THIS PART NOT USED

END OF SECTION 26 00 26

SECTION 26 05 19 - BUILDING WIRE & CABLES

PART 1 -GENERAL

1.1 WORK INCLUDED

- A. Wires and Cables

1.2 REFERENCE STANDARDS

- A. National Fire Protection Association (NFPA).
 - 1. NFPA 70 National Electrical Code.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Deliver new wire and new cable to site in new packaging with standard cable coils/reels. Packaging shall clearly show length, wire size, wire/cable type, and manufacturer.
- B. Protect products from weather, moisture, and damage.

PART 2 -PRODUCTS

2.1 MATERIALS

- A. Building Wiring & Insulation: Copper, 98 percent conductivity, stranded. Solid may be used at contractor's option for wire smaller than #8 AWG. 600 volt insulation, Type THHN for dry interior and damp interior locations. Type THW, THWN or XHHW for wet locations, and exterior locations.
- B. Conductor cable with conductors smaller than #12 AWG for branch circuits not permitted.
- C. Exterior cables exposed to sunlight shall be listed "sunlight resistant."
- D. Control panel wiring no smaller than #14 AWG stranded switchboard Type MTW unless otherwise specified on the Drawings or required by system manufacturer.
- E. Motor control wires shall be no smaller than #14 AWG.
- F. Wire for other areas as shown on the Drawings.

PART 3 -EXECUTION

3.1 INSTALLATION

- A. Parallel feeders shall have identical conductor length.
- B. Use UL listed pulling lubricant for greater than equivalent #4 AWG wire diameter.
- C. Use UL listed pulling lubricant for pulls greater than 75 feet.
- D. Remove moisture from raceway prior to wire pull.
- E. Provide copper grounding conductors. Provide a ground wire through conduits. Utilize the ground wire as the equipment grounding conductor no smaller than #12 AWG otherwise sized as shown and per NEC.
- F. Do not splice feeders, or services. Splices only permitted in accessible junction or outlet boxes where circuit routes deviate. Do not splice or tap branch circuits terminating in a single outlet.
- G. Color code conductors per NEC to designate neutral, phase, and ground as follows:

CONDUCTOR	120/208
Phase A	Black, or per (E) facility standard
Phase B	Red
Phase C	Blue, or per (E) facility standard
Neutral	White, or per (E) facility standard
Ground	Green
Travelers	Purple, or per (E) facility standard

- H. Wires shall be factory color coded. Coloring shall be integral to the insulation. Plastic tape permitted on #6 AWG and larger where insulation coloring is not available or practical. Apply tape in spiral half-lap over exposed portions of cable at all locations that cable is accessible.
- I. All conductors shall be identified with circuit number where conductors are accessible such as at terminals, outlets, switches, circuit breakers, motor control centers, etc. Identify the ends of a given conductor circuit the same.
- J. Do not install wires of different voltage systems in same raceway, box, or other enclosure. Control voltage is permitted in same enclosure only where specific equipment is listed for multiple voltage use, and a listed voltage barrier is provided.
- K. Radius of cable bends shall not be less than 10 times the outer diameter of the cable.
- L. Do not install cable within conduit per NEC.
- M. Follow standards of practice for storage, handling, and termination of aluminum conductors. Provide anti-oxidation gel, and remove any oxidation by approved means when terminating conductors.

END OF SECTION 26 05 19

SECTION 26 05 26 - GROUNDING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Electrical systems grounding.
- B. Signal systems grounding.

1.2 APPLICABLE STANDARDS

- A. Underwriters Laboratories (UL)
 - 1. UL 467 Standard for Grounding and Bonding Equipment
- B. Institute of Electrical and Electronic Engineers (IEEE)
 - 1. IEEE 81 Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System Part 1: Normal Measurements
 - 2. IEEE 142 Recommended Practice for Grounding of Industrial and Commercial Power Systems

1.3 APPLICABLE REGULATIONS

- A. National Fire Protection Association (NFPA)
 - 1. NFPA 70 National Electrical Code (NEC)
- B. NEC references below are based on the 2005 edition. Contractor shall meet current NEC requirements.

PART 2 PRODUCTS

2.1 GROUNDING CONDUCTORS, AND JUMPERS

- A. Size: Per NEC 250.
- B. Material: Copper.
- C. Protection: Conductors not in raceway or concealed shall be insulated. Provide raceway where shown or required for physical protection.

PART 3 EXECUTION

3.1 POWER AND SIGNAL SYSTEM GROUNDING

- A. All equipment grounding conductors shall be routed through same equipment conductor raceway from beginning to end (distribution source to load).
- B. Metallic raceways are not approved as equipment grounds.
- C. Circuit Grounding: Install grounding bushings, studs, and jumpers at distribution centers, pullboxes, motor control centers, panelboards, and junction boxes.
- D. Ground Connections: Clean surfaces thoroughly before applying ground lugs or clamps. If surface is coated, the coating must be removed down to the conductive material. After the coating has been removed, apply a listed and approved noncorrosive compound to cleaned surface and connections. Where galvanizing is removed from metal, it shall be re-applied or painted.
- E. Bonding Jumpers: Provide with green insulation and size not smaller than per NEC and larger where shown. Connection to neutral only at service neutral bar. Bonding jumpers shall be contiguous without break, joint, or splice.
- F. Feeders and Branch Circuits: Install green grounding conductors with feeders and branch circuits. Additional locations and systems as shown.
- G. Raceway Systems:
 - 1. Ground all metallic enclosed raceway systems.
 - 2. All enclosed raceway connecting to equipment shall contain a grounding conductor.
 - 3. Conduit systems shall contain a grounding conductor.
 - 4. Bond grounding conductor at beginning and end of raceway provided for mechanical protection containing only a grounding conductor.
- H. Boxes, Cabinets, Enclosures, and Panelboards:
 - 1. Bond the grounding wires to each pullbox, junction box, outlet box, cabinets, and other enclosures through which the ground conductors pass.
 - 2. Provide lugs in each box and enclosure for ground wire termination.
 - 3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs for terminating the ground wires.
- I. Receptacles - Refer to Section 26 27 26.
- J. Ground lighting fixtures to the equipment grounding conductor of the wiring system.
- K. Fixed electrical equipment shall have a ground lug installed for termination of the equipment ground conductor.

- L. Motors: Install a separate insulated equipment grounding conductor from the equipment ground connection in the motor controller through the raceway and flexible conduit to the ground terminal on the motor housing. Ground motor controller through feeder raceway. No reductions.
- M. Variable Frequency (Speed) Drives (VFD/VSD): Additional grounding requirements as shown on Drawings.
- N. Control and Signaling Equipment: Ground metallic enclosures and raceways, terminate shields and drain wires to building ground system. Provide additional grounding as required by equipment manufacturer.

END OF SECTION 26 05 26

SECTION 26 05 29 - SUPPORTING DEVICES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Raceway Supports.
- B. Cable supports.
- C. Provide all hardware and materials to support, as required, a complete and congruent raceway system.

1.2 APPLICABLE STANDARDS

- A. National Fire Protection Association (NFPA)
 - 1. NFPA 70 National Electrical Code
- B. Underwrites Laboratories (UL)
 - 1. UL 2239 Hardware for the Support of Conduit, Tubing, and Cable
- C. National Electrical Contractors Association (NECA)
 - 1. ECA 101 Standard for Installing Steel Conduit

PART 2 PRODUCTS

2.1 RACEWAY SUPPORTS

- A. Single Runs: Steel rod hangers, galvanized single hole conduit straps, or ring bolt type hangers with spring clips. Adhesives, tape, staples, or "J-nails" not acceptable.
- B. Multiple Runs: Rack with 25 percent spare capacity. Maximum width per manufacturer's recommendations.
- C. Vertical Runs: U-channel support with conduit fittings.
- D. All hardware such as inserts, straps, bolts, nuts, screws and washers shall be galvanized or plated steel.
- E. PVC coated galvanized steel in exterior and wet locations.
- F. Channel manufacturers: Kindorf, Unistrut, or approved.

2.2 CABLE SUPPORTS

- A. Approved plastic coated wire-ties.
- B. Approved PVC coated hangers.
- C. Building studs as permitted by Code and specifications.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Supporting devices shall be listed for the location installed. Supports shall be of like material of raceway and be rated for location installed.
- B. Layout to maintain headroom, neat mechanical appearance, and to support equipment loads required.
- C. Exact location and spacing between supports per manufacturer's recommendations and NEC requirements.
- D. Provide adequate spacing to prevent moisture build-up. All runs of conduit shall be arranged so as to be devoid of traps wherever possible.
- E. Cable "Sag" greater than 3-Inches from valley to peak of run, not acceptable

END OF SECTION – 26 05 29

SECTION 26 05 33
RACEWAY & FITTINGS

PART 1 -GENERAL

1.1 WORK INCLUDED

- A. Conduit, Fittings, and Tubing.
- B. Flexible Conduit.

1.2 REFERENCE STANDARDS

- A. National Fire Protection Association (NFPA).
 - 1. NFPA 70 National Electrical Code--Chapter 3.
 - 2. Underwriters Laboratories (UL) 6,
 - 3. UL797
 - 4. UL1990

PART 2 -PRODUCTS

2.1 MATERIALS AND COMPONENTS

- A. General: No smaller than ¾-inch unless otherwise shown or indicated herein.
- B. Conduit and Tubing: Electrical metallic tubing, galvanized rigid steel threaded conduit, Schedule 40 PVC.
- C. Flexible Conduit: Flexible plastic jacketed type with liquidtight connectors and steel wrap armor (liquidtight flexible metallic conduit).
- D. Fittings:
 - 1. General: Listed and approved for purpose. Water, gas, concrete tight where required.
 - 2. Electrical Metallic Tubing (EMT): Connectors to be steel. All connectors shall have factory insulated throats. Couplers and connectors shall be compression, setscrew type.
 - 3. Galvanized Rigid Steel Conduit (GRC): Threaded. Do not use pressure type. Provide factory insulated throats on bushings.
 - 4. Liquidtight Flexible Metallic Conduit: Continuous copper ground in core; approved watertight.
- E. Expansion Joints: Offset or sliding type with bending straps and clamps. Listed for purpose.

- F. Entrance Seal: Shall be modular, mechanical type, consisting of inter-locking synthetic rubber links shaped to continuously fill the annular space between the pipe and the wall opening. The elastomeric element shall be sized and selected per manufacturer's recommendations. Link-Seal or approved.
- G. Underground Marking Tape: 6-inches wide, yellow, low density polyethylene 4 mil thickness. Imprinted: "CAUTION: STOP DIGGING - BURIED ELECTRIC LINE BELOW" and current date. Tape for telephone line similar, except green.

2.2 TYPE

- A. Utilize GRC in concrete with concrete-tight connectors.
- B. Utilize GRC for exterior with watertight connectors.
- C. Utilize electrical metallic tubing concealed in finished interior spaces.
- D. Utilize electrical metallic tubing exposed in unfinished spaces, where not subject to physical damage.
- E. For underground conduit, utilize Schedule 40 PVC or GRC. Provide GRC elbows and GRC risers through penetrations where PVC is used.
- F. Utilize surface metal raceways for exposed runs in finished areas. Paint to match wall finish. Use only where shown on Drawings or where approved.
- G. Connections to motors, vibrating equipment, and movable equipment shall be with flexible metallic conduit or liquidtight flexible metallic conduit. Use liquidtight type in damp locations. No smaller than 1/2-inch for motor connections. Use 3/8-inch only for light fixture wiring where provided by light fixture manufacturer. Provide sufficient length of flexible conduit to stop vibration into connecting support. Sizes not noted on the Drawings shall be as required by the NEC and no smaller than upstream connection conduit size.

PART 3 -EXECUTION

3.1 INSTALLATION

- A. Install raceway concealed in all areas where required concealment not required in mechanical and electrical rooms, connections to motors, above suspended ceilings, and underfloor spaces.
- B. Coordinate installation of conduit in masonry, cabinetry, and building slab work.
- C. Underground Raceways: Watertight, including fittings, slope 3 inches per 100 feet downward from building. Install underground marking tape. Bury 6 inches to 8 inches below grade directly above raceway. Seal exterior junction boxes or provide with drainage.
- D. Galvanized rigid steel conduit installed in contact with earth shall be wrapped with 2-half laps of 10 mil, all weather, corrosion protection tape.

- E. Route all conduits parallel or perpendicular to building lines.
- F. Vertical Runs: Straight and plumb.
- G. Raceways Running in Groups: Run at same elevation, properly spaced and supported.
- H. Install conduit in concrete slab with minimum 2-inch cover. Do not install conduit larger than one inch maximum in concrete slabs unless approved.
- I. Do not interfere with placement of concrete re-bar. Place raceway between re-bar layers. Space at least 8-inches on center. Space as far as possible where terminating at same area. Secure raceway, boxes, inserts, etc. by mechanical means prior to pour.
- J. Install conduit free with no dents or bruises. Cap ends to prevent entry of foreign materials and moisture.
- K. Clean raceway before installation of conductor.
- L. Alter conduit routing to avoid obstructions, minimizing crossovers. Avoid use of bends and offsets where possible. Only bend raceway with an approved conduit bending machine or approved hand (hickey) bender.
- M. Provide listed expansion complete fittings with grounding jumpers where conduits intersect building expansion joints and for longer runs where conduit expansion may be excessive.
- N. Allow minimum of 6 inches clearance at flues, steam pipes, and heat sources.
- O. Dissimilar Metals: Avoid contact with pipe or duct runs of other systems.
- P. Lengths and Bends: Maximum number of bends in any run shall be the equivalent of four quarter bends (360 degrees total). Maximum length of any run shall be 300 feet, less 50 feet for each equivalent quarter bend. Provide Junction and pull boxes to meet these limits.
- Q. Provide entrance seal for all exterior wall, underground, and exterior slab raceway penetrations.
- R. All empty raceways shall be provided with pull string or #12 conductor. Provide #12 conductor for exterior empty PVC raceways.

END OF SECTION – 26 05 33

SECTION 26 05 33.16 -OUTLET, JUNCTION, AND PULLBOXES

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. Provide electrical boxes and fittings as required for a complete, protected, and operable system.
- B. Comply with local Codes and NEC as required for Providing electrical boxes and fittings.

1.2 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI).
 - 1. C73 Series Dimensions of Attachment Plugs and Receptacles
- B. National Electrical Manufacturers Association (NEMA)
 - 1. OS 1 Sheet-Steel Outlets Boxes, Device Boxes, Covers, and Box Supports
 - 2. FB 1 Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable

1.3 APPLICABLE REGULATIONS

- A. American National Standards Institute (ANSI).
 - 1. C2 National Electrical Safety Code (ANSI/IEEE C2)
- B. National Fire Protection Association (NFPA).
 - 1. NFPA 70 National Electrical Code.
- C. Underwriters' Laboratories (UL).
 - 1. UL50 Cabinets and Boxes (ANSI/UL50).
 - 2. UL514 Outlet Boxes and Fittings (ANSI/UL514).

PART 2 PRODUCTS

2.1 OUTLET BOXES:

- A. No smaller than 4-inch, 1-1/2-inches deep box. Provide raised covers where required for surface mounted outlets, plaster rings on flush outlets. Provide tile rings where flush outlets installed in tile. Concrete type where installed in concrete.

- B. Receptacle Outlets and Flush Switch: 4-inch square box, 1-1/2-inches deep, with single or two-gang plaster ring.
- C. Match one piece gang boxes to number of devices, install one device per gang. Devices requiring more than one-gang shall be installed in individual boxes matched to device size. Do not exceed 5-gang configuration per row of devices at same location.
- D. Provide galvanized steel interior dry location outlet wiring boxes for emt raceway shaped and sized, to conform to each individual location and installation. Provide with factory knockouts in back and sides, and with threaded holes with screws for securing box covers or devices.
- E. Provide outlet box accessories as required. Accessories include mounting brackets, wallboard hangers, extension rings, fixture studs, cable clamps and metal straps for supporting outlet boxes. Choice of accessories is Contractor's option.
- F. Outlet Box Covers:
 - 1. Flush Mounting: Bevelled, white nylon plastic, match device installed or full cover where no device installed.
 - 2. Surface Mounting: Bevelled, steel, pressure formed, match device installed or full cover where no device installed.

2.2 WEATHERPROOF / WET LOCATION OUTLET BOXES:

- A. Provide corrosion-resistant cast metal weatherproof outlet wiring boxes, shaped and sized, to conform to each individual location and installation. Provide with threaded conduit ends, suitably configured for each application, including face plate gasket and corrosion proof fasteners.
- B. Weatherproof boxes shall have smooth sides, gray finish.
- C. Boxes used in contact with earth shall be cast iron alloy with gasketed screw cover and water-tight hubs.
- D. Weatherproof Plates: Cast metal, gasketed for switches provide spring loaded sealed door(s).
- E. Weatherproof Receptacle Outlet Cover: Cast metal, NEMA 3R, In-Use type, with locking tab. Match device configuration. 3 ¼ -inches internal depth. T&B CK series, or approved

2.3 WEATHERPROOF JUNCTION AND PULL BOXES:

- A. Provide galvanized sheet steel junction and pull boxes, with screw-on covers; of the type, shape and size, to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.

2.4 KNOCKOUT CLOSURES:

- A. Provide punched-steel knockout closures for steel boxes.

2.5 PULLBOXES

- A. Provide sheet metal in interior dry locations for EMT raceway. Provide cast metal in exterior, or damp locations. Type and material shall conform to National Electrical Code, with screw-on cover.
- B. Flush Mounted Pullboxes: Provide overlapping covers with flush head screws, finished in light gray enamel.
- C. Box volumes shall meet NEC for size and number of entering conduits and cables.

2.6 UNDERGROUND PULLBOXES

- A. Underground Pull Boxes: Cast concrete with suitable concrete cover to withhold loads in location installed. Provide heavy-duty traffic cover where installed with vehicle traffic. Cover and box shall not deform and be rated for location installed. Provide drainage and no less than 4 feet compacted gravel below installation. Size, and configuration to match installation. Provide where required, and shown on Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Match one piece gang boxes to number of devices, install one device per gang. Do not exceed 4-gang configurations per row of devices at same location.
- B. Locate outlet boxes flush other than in mechanical rooms, electrical rooms, and above suspended ceilings. Provide insulation behind box to prevent condensation for boxes mounted in exterior walls.
- C. Provide insulation behind box for walls with insulation for sound reduction.
- D. Coordinate location and mounting heights with built-in units and cabinetry. Outlet mounting height shall be at same level required for equipment served.
- E. When mounting receptacle, or voice/voice outlet boxes above bench or counter, mount box to the side (horizontally) for finished receptacle grounding pole at left.
- F. Locate pullboxes and junction boxes concealed above suspended ceilings or in electrical rooms, mechanical rooms, or unfinished areas.
- G. Support: Provide adequate support of all outlet boxes. Secure boxes independent raceway, by attaching directly to building structure by approved means.
- H. Identify each junction and pullbox with system description including branch circuit numbers of enclosed circuits, and voltage.

- I. Secure all raceway to entering boxes with approved bushings, and locknuts.
- J. Do not mount boxes back-to-back. Boxes on opposite sides of wall shall be separated by at least 3 inches.
- K. Maintain sound transmission and fire properties of surface installed. Provide appropriate fire stop and sound stop materials as required to maintain these properties.
- L. Provide separate boxes where two voltage systems have equipment at same location. Provide separate boxes for equipment on emergency power system.

END OF SECTION- 26 05 33.16

SECTION 26 05 53 - ELECTRICAL IDENTIFICATION

PART 1 -GENERAL

1.1 WORK INCLUDED

- A. Permanent Identification of system components.

1.2 APPLICABLE REGULATIONS

- A. National Fire Protection Association (NFPA)
 - 1. NFPA 70: National Electrical Code.

PART 2 -PRODUCTS

2.1 MATERIALS

- A. Phenolic Nameplate:
 - 1. Three layer, white front and back with black core.
 - 2. Neatly engraved through outer layer to show white characters on black background.
 - 3. Beveled edges, print lettering.
 - 4. Other colors as specified or shown. Use red for fire alarm, or fire sprinkler only.
- B. Stenciling and Silk Screening: Printed lettering with enamel or lacquer paints. Legends contrasting with the background on which applied
- C. Panelboard Directory Card: Fiberboard typed. Laminate or place in protective cover.
- D. Concealed Box Labels: Permanent black ink such as "Sharpie" pen with neat and legible writing. Red permanent ink for fire alarm.
- E. Concealed Conductor Labels: Listed white tape wrapped around individual conductor or cable, with permanent black ink with printed lettering.

PART 3 -EXECUTION

3.1 EQUIPMENT TO BE IDENTIFIED

- A. Motor starters, panels, lighting panels and the disconnecting devices contained therein.
- B. Egress/Emergency Lighting
- C. Remote Emergency Inverters

- D. Disconnects.
- E. Control panels, starters, pushbutton stations, pilot lights and other control devices.
- F. Transformers.
- G. Remote control devices.
- H. Conductors at both device and terminal strip terminations for control and instrumentation cables and conductors.
- I. Other items as specified, required by NEC, or noted on Drawings
- J. Devices in lighting panels and power panels shall be identified on the panelboard directory card.
- K. Receptacles, and light switches each, with panel name and circuit labeled on cover/wall plate.

3.2 PHENOLIC NAMEPLATES

- A. Power panels shall be labeled on the door of the interior with a nameplate. Letters for panels shall be printed and no less than 1/2 inch high.
- B. Provide nameplate on switchboard
- C. Provide nameplates where specified and as shown.

3.3 APPLYING IDENTIFICATION

- A. Stenciled letters shall be applied by brush or by spraying.
- B. Nameplates shall be attached with either adhesive or screws. If adhesive is used, it shall adequately adhere to the surface installed.

3.4 IDENTIFICATION REQUIREMENTS

- A. Indicate Voltage for all concealed labels, and for Disconnects, panelboard and switchboard identification.
- B. Identification for disconnecting devices contained in panels and motor control centers shall show the equipment name and location by floor, area, and direction to adequately indicate location of load. Do not include Voltage when the Voltage is the same as for the panel or motor control center.
- C. Nameplates on disconnect devices located in the area but not part of a panel or motor control center shall have the equipment name, power source identification, and voltage designation. Nameplates for disconnect devices located remotely from the equipment shall also show the equipment location by floor, area, and direction to adequately indicate location of load.

- D. All indicators and controls for control panels, starters, and the like shall be labeled, such as (Start, Stop, On, Off, Reset, Fault, etc.).
- E. Panelboard directory cards shall list the circuit numbers and show the equipment name and location supplied by the circuits. Equipment locations shall be shown by floor, area and direction, or by room numbers.

END OF SECTION – 26 05 53

SECTION 26 05 60
OVERCURRENT PROTECTIVE DEVICES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Circuit Breakers.
- B. Fuses.

1.2 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI).
 - 1. C37.16 Preferred Ratings, Related Requirements, and Application Recommendations for Low Voltage Power Circuit Breakers and AC Power Circuit Protectors.
 - 2. C37.17 Trip Devices for AC and General-Purpose DC Low-Voltage Power Circuit Breakers.
 - 3. C37.50 Test Procedure for Low-Voltage AC Power Circuit Breakers Used in Enclosures - Test Procedures.
 - 4. C97.1 Low Voltage Cartridge Fuses 600 Volts or Less.
- B. Institute of Electrical and Electronic Engineers, Inc. (IEEE).
 - 1. 20-73 Low Voltage AC Power Circuit Breakers Used in Enclosures: ANSI C37.13.
- C. National Electrical Manufacturer's Association (NEMA).
 - 1. FU-1 Low Voltage Cartridge Fuses.

1.3 APPLICABLE REGULATIONS

- A. Underwriters' Laboratories (UL).
 - 1. UL 489-72 Molded Case Circuit Breakers and Circuit Breaker Enclosures.
 - 2. UL 198 E Class R Fuses.
 - 3. UL 869 Service Disconnects
 - 4. UL 1066 Standard for Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures
- B. National Fire Protection Association (NFPA).
 - 1. NFPA 70 National Electrical Code.

1.4 QUALITY CONTROL

- A. Breakers shall be selectively coordinated with feeder breakers.
- B. Breakers shall be of the same manufacturer as the switchboard and the panelboards.

PART 2 PRODUCTS

2.1 CIRCUIT BREAKERS

- A. Construction
 - 1. Bolt-on connection to bus.
 - 2. Thermal-magnetic, molded case, with inverse time current overload and instantaneous magnetic tripping.
 - 3. Quick-make, quick-break, with tripped indication clearly shown by breaker handle taking a position between ON and OFF.
 - 4. Multiple phase breakers shall have a common internal trip. Do not use handle ties between single pole breakers.
 - 5. Breaker shall be switch (T) rated.
 - 6. Where used as service disconnects, breakers shall be listed for use as service entrance equipment and include locking handle.
 - 7. Fully rated at fault current of panel or switchboard.
 - 8. Selectively coordinated by manufacturer with upstream protection device.

2.2 GFI BRANCH CIRCUIT BREAKERS

- A. Meet construction requirements herein.
- B. Ground fault protection with integral push-to-test button.
- C. Class 1.
- D. Adjustable setting pickup from 0.03 to 30 Amps.
- E. Adjustable time delay from instantaneous to 2.0 seconds.

2.3 TESTING

- A. By Manufacturer at factory. Timed thermal trip test and timed magnetic trip test.
- B. As required by local authority.
- C. Submit test results to Engineer upon request.

2.4 FUSES

- A. Feeder, Branch Circuit and Service Entrance Fuses: 600 amperes and below, UL Class J or RK1 current limiting type, 600 volt 200,000 ampere interrupting capacity.

- B. Motor and Inductive Circuit Fuses: UL class RK5 time delay current limiting type, 600 volt, 200,000 ampere interrupting capacity.
- C. Control Circuit Fuses: UL Class J or R current, limiting type, 600V.
- D. Manufacturer: Bussmann, or approved

PART 3 EXECUTION

3.1 CIRCUIT BREAKER INSTALLATION

- A. Label each breaker located in switchboard or separate enclosure to indicate load served.
- B. Adjust settings on breakers to operate properly under actual field conditions and to provide selective system coordination.
- C. Torque breakers to bus per manufacturer's requirements and installation procedures.

3.2 FUSE INSTALLATION

- A. Label each switch to indicate type and rating of fuse installed.
- B. All fuses shall be selected to provide selective system coordination.
- C. Provide the greater of 10%, or not less than 3 spare fuses of each size, and rating used.

END OF SECTION – 26 05 60

SECTION 26 05 83 - WIRE CONNECTIONS

PART 1 -GENERAL

1.1 WORK INCLUDED

- A. Wires Connectors

1.2 REFERENCE STANDARDS

- A. National Fire Protection Association (NFPA).
 - 1. NFPA 70 National Electrical Code.
- B. Underwriters' Laboratories, Inc (UL)
 - 1. UL 486A through UL 486E
- C. American National Standards Institute (ANSI)
 - 1. ANSI/UL 467

PART 2 -PRODUCTS

2.1 TWIST-ON CONNECTOR

- A. Pressure-type wound spring twist on connector.
- B. Solderless pressure connectors.
- C. Shell rating of 105 degrees C.
- D. "Push-On" or "punch" type connectors not permitted.

2.2 COMPRESSION ADAPTER

- A. Dual rated for use with both aluminum and copper cable conductors.
- B. Diameter and ampacity as current carrying equivalent copper wire.
- C. Pre-filled with approved joint compound
- D. Connectors shall be clearly marked with Catalog Number, wire size and color-coded die index number.
- E. Burndy "Hyplug" type AYP or equal by T&B, or approved.

2.3 TERMINAL, CRIMP TYPE

- A. Flat; fork tongue, or flat circular matched to terminal size.
- B. Color coded to wire size.
- C. T&B "Sta-Kon", or approved.

2.4 WP COATING

- A. Liquid
- B. For use as an outer seal on vinyl tape splice, fast- drying, suitable for use for direct burial and moisture protection.
- C. 3M Scotchkote Electrical Coating FD, or approved

PART 3 -EXECUTION

3.1 INSTALLATION

- A. Provide Twist-On Connectors at taps and splices for conductors no larger than #10 AWG. Provide only in approved junction and outlet boxes.
- B. Provide Compression Adapters for terminating a single conductor into mechanical connectors such as a circuit breaker or set screw lugs. Provide only where required for AL/CU transitions or where lugs require adapters.
- C. Provide Crimp terminal at all Control voltage terminal blocks, unless otherwise recommended by manufacturer.
- D. Do not nick conductor when stripping insulation. No "ringing"
- E. Conductor and cable shall not be reduced at the terminal for connections.
- F. Connectors shall be approved and listed for the purpose used.
- G. Wrap all twist-on connectors with listed tape to maintain equivalent insulation of wire.
 - 1. Exterior, Underground, and WP connections shall include 2-coats of WP Coating.
- H. Remove any obstructions on connection to maintain continuity prior to installation of connectors, such as paint, dirt, and construction materials.
- I. Copper conductors can be terminated in approved compression or mechanical connector, including set screws.

- J. Provide slack at equipment to allow for a neat termination, access to conductors, and ability to repair or replace equipment.

END OF SECTION – 26 05 83

SECTION 26 27 26 - WIRING DEVICES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Wall Switches.
- B. Receptacles.
- C. Ground Fault Receptacles.

1.2 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI).
 - 1. C73 Series Dimensions of Attachment Plugs and Receptacles.
- B. National Electrical Manufacturer's Association (NEMA).
 - 1. WD 6 Wiring Devices- Dimensional Requirements
 - 2. WD 1 General Color Requirements for Wiring Devices.
- C. National Fire Protection Association (NFPA).
 - 1. NFPA 70 National Electrical Code.
- D. Underwriters' Laboratory (UL).
 - 1. UL-20 Standard for Snap Switches.
 - 2. UL 498 Attachment Plugs and Receptacles
 - 3. UL 467 Grounding and Bonding Equipment
 - 4. UL 514D Cover Plates for Flush-Mounted Wiring Devices
 - 5. 2006 UL 943 Safety for Ground-Fault Circuit-Interruption

1.3 QUALITY ASSURANCE

- A. Provide type 5362 receptacles in common.
- B. Acceptable Manufacturers: Hubbell, Pass and Seymour, Arrow-Hart, Leviton, or approved

PART 2 PRODUCTS

2.1 MATERIALS

- A. Switches: 120/277 Volt. AC Quiet, slow make, slow break design, toggle style handle, with totally enclosed case, 20 Ampere, specification grade. Provide matching two-pole, three-way and four-way switches.
- B. Receptacles: 20 Ampere (unless otherwise indicated), 125 Volts (unless otherwise shown), duplex, polarized, full gang size, specification grade, separate ground terminal, 20 Amp. break-off tab for split circuit wiring.
- C. Ground Fault (GFI) Receptacles: 20 Ampere, specification grade duplex receptacle with integral ground fault circuit interrupter. LED operation indicator. Test and reset buttons. End of life protection- GFI component failure results in no power delivered to equipment (2006 UL 943).
- D. Wall Plates: 302 Stainless Steel, Match device configuration.
- E. Colors:
 - 1. Gray Receptacles, Gray Switches: In all finished areas that are not dark brown in color.
 - 2. Brown Receptacles, Brown Switches & Brown Nylon Wall Plate: In all finished areas with dark brown or dark wood finish.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Do not use back wiring wells, terminate conductors on mechanical screw terminals.
- B. Provide wiring devices as shown.
- C. Install devices plumb and consistent with building lines. Wall Plates shall make contact on four corners and shall fit flush with device.
- D. Devices to include same configuration outlet box, cover, wall plate and other necessary installation materials for a complete operating circuit.
- E. Mount switches 42 inches (to center line of faceplate) above floor except as otherwise noted on the Drawings.
- F. Coordinate mounting locations with architectural details.
- G. Mount receptacles vertically at 15 inches (to bottom of faceplate) above finished floor, with grounding pole at bottom.
- H. Coordinate receptacle height with benches and counters

- I. When mounting receptacle above bench or counter, mount receptacle to the side with grounding pole at left.
- J. Grounding: Install a separate bare conductor between the receptacle strap grounding (green) screw and a screw into the outlet box. Self-grounding strap not approved as grounding means.

END OF SECTION - 26 27 26

SECTION 26 29 12 - DISCONNECTS & MANUAL STARTERS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide motor disconnects as shown, and as required by Codes.
- B. Provide circuit disconnects as shown, and as required by Codes.
- C. Provide manual motor starters for single phase motors below one horsepower where disconnect is shown as required by Codes.
- D. Disconnects to include adequate support, required hardware, and accessories for complete functional installation.

1.2 APPLICABLE REGULATION

- A. Conform to National Electrical Code and inspection authority.
- B. Provide disconnects rated for the location installed, as required by National Electrical Code, as shown, and as indicated herein.

1.3 REFERENCE STANDARDS

- A. Underwriters' Laboratory (UL).
 - 1. UL-98 Enclosed Switches.
- B. National Electrical Manufacturer's Association (NEMA).
 - 1. NEMA KS-1 Enclosed Switches.

PART 2 - PRODUCTS

2.1 MANUAL MOTOR STARTER

- A. Toggle horsepower rated, switch with thermal overload and pilot light.
- B. Switch tab for locking switch in "OFF" Position.

2.2 DISCONNECT

- A. Motor and circuit disconnects shall have a UL label.

- B. Construction: Dry, Indoor Locations shall be not less than NEMA 1. Enclosures for outdoor, or wet locations shall be not less than NEMA 3R. Rated at 600 Volt. Heavy duty, quick make, quick break. Number of poles and ampacity as noted or required by Code. Fusible with dual element fuses where shown. Short circuit rating sufficient to withstand the available fault current. Solid ground, solid neutral.
- C. Compression lugs or set-screw lugs approved for use with copper wire.
- D. ON/OFF Positions clearly marked.
- E. Lockable in "OFF" position.
- F. Interlock:
 - 1. Prevents switch from being opened when "ON."
 - 2. Prevents closing switch when cover is open.
 - 3. Provide defeater to permit authorized personnel to open door and inspect switch when "ON," or operate with cover open.

PART 3 -EXECUTION

3.1 INSTALLATION

- A. Install motor and circuit disconnects as recommended by manufacturer, required by Code, required by UL, and where shown.
- B. Maintain Code clearances and access.
- C. Provide Manual Motor Starter where shown for single phase motors rated less than one horsepower. Manual Motor Starter is not required for motors with integral thermal overload protection. Provide Switch with locking tab for motors with integral thermal overload protection. Provide Manual Motor Starters as required for single phase motors without integral or other protection, otherwise provide Disconnect.
- D. Provide a phenolic nameplate on each disconnect identifying the equipment item served.
- E. Independently support disconnects. Do not mount disconnects on vibrating, HVAC, or Plumbing equipment.
- F. Install heaters correlated with full load current of motors provided.
- G. Set overload devices according to measured current of motors provided.

END OF SECTION - SECTION 26 29 12

SECTION 26 51 13.10 - LAMPS – LED MODULES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Provide and install lamps in all light fixtures as required in this Division and shown.

PART 2 PRODUCTS

2.1 GENERAL

- A. Lamps shall be certified, and approved per CEE- Consortium for Energy Efficiency.

2.2 TYPE AND COLOR

- A. Refer to Lighting Fixture Schedule.
- B. All lamps of each type and color shall be by the same manufacturer.

2.3 INCANDESCENT LAMPS

- A. Incandescent Lamps: 130 volt, extended service type.

2.4 LED MODULES

- A. 80 to 90+ CRI, 4000K color temperature unless otherwise indicated on lighting schedule.
- B. Full compatibility with provided driver. Driver to be dimmable where specified and compatible with specified emergency power solution.
- C. LED drivers to be fully protected, last not less than 7 years, and include integral surge protection.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install lamps in accordance with manufacturer's instructions.

3.2 SPARE STOCK

- A. Provide 1 spare of each type

3.3 BURNOUT REPLACEMENT

- A. Make replacements from extra stock as required until 60 days after Substantial Completion date. Deliver remaining lamps to Owner.

3.4 WARRANTY

- A. Provide not less than 5 year warranty for LEDs. Provide greater as included by manufacturer.

END OF SECTION 26 51 13.10

SECTION 26 51 13.20 - LIGHTING FIXTURES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Provide complete, supported, trimmed and finished lighting system operational for the use intended.

1.2 REFERENCE STANDARDS

- A. National Electrical Manufacturer's Association (NEMA).
 - 1. NEMA LE1: Fluorescent Luminaires.
- B. American National Standards Association (ANSI)
 - 1. ANSI C62.41 IEEE Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits
- C. Underwriters Laboratories (UL)
 - 1. UL 1598 Luminaires
 - 2. UL 1029 Standard for High-Intensity-Discharge Lamp Ballasts
 - 3. UL 935 Standard for Fluorescent-Lamp Ballasts'
- D. National Fire Protection Association (NFPA)
 - 1. NFPA 70 National Electrical Code
- E. Oregon Energy Code

1.3 COORDINATION

- A. Verify compatibility and coordination of other materials with luminaire and ceiling system, and mounting system. Inform discrepancies to the Architect, and do not order until clarified.
- B. Coordinate with Division 23 to avoid conflicts with mechanical equipment.

1.4 QUALITY CONTROL

- A. Acceptable Manufacturers- Refer to Fixture Schedule.

PART 2 PRODUCTS

2.1 GENERAL

- A. Provide support and trim hardware required for adequate support and approved appearance of mounted equipment.
- B. Factory balanced. Provide concealed weighted material to offset ballast and other component weight. Fixtures that do not hang or mount level are not acceptable.
- C. Provide A12 lens, semi-diffuse, not less than 0.125 thick acrylic or per lighting fixture schedule.
- D. Fixtures installed in insulated cavities shall be IC rated.
- E. Provide fire rated enclosures for all fixtures installed in fire rated structures and fire rated ceilings. Enclosure shall be of the same rating as to not compromise the full rating of the structure where installed. Fixtures used in fire rated enclosures shall be UL listed for such installation and shall have 3-inches clear from enclosure on all sides.
- F. Equipment shall be certified, and approved per Oregon Energy Code.

2.2 LED LUMINAIRES

- A. Painted finish, no exposed materials with potential to oxidize. Additional or other requirements per Lighting Fixture Schedule.
- B. Not less than 20-gauge steel housing and reflectors unless otherwise indicated and per light fixture schedule.
- C. Provide Hinged Frames with Catches; removable for cleaning without tools. Support lay-in lenses on four sides with flip ends on short dimension. Include captive removable and reusable hardware to secure lens to frame.
- D. Design Luminaire to adequately dissipate heat from LEDs/lamp, driver/ballast, and battery pack.
- E. Provide formed endplates and trim.
- F. Suitable for mounting where shown.

2.3 RECESSED LUMINAIRES

- A. Incandescent type shall be prewired with J-box integral to fixtures. Conductors rated for area and for conductor connections.
- B. Flush and plumb with exposed surface, no gaps, include required trim rings and materials of adequate type for flush appearance.

2.4 PENDANTS/CABLE HANGERS

- A. Pendant: Shall be contiguous, and color matched to fixture. Pendant type shall include swivel sockets permitting normal fixture motion and self-adjustment. Include color matched canopy

at structural attachment. Provide safety cables secured to structure, wrapped around or through pendant where recommended by fixture manufacturer to independently support fixture. Route conductors through pendant as per manufacturer requirements.

- B. Visible Cable: Field adjustable length, with extra coiled and concealed. Equal lengths, with 18-inches. Additional cable and for future adjustments. Locking ring to adequately hold fixture at desired mounting height. Cable stop to prevent fixture from sliding off end of cable.

2.5 CABLE HUNG FIXTURE CORDS

- A. Visible Cords: Straight (not pigtail type) along length of cable, black, by fixture manufacturer. Shall not provide supporting function.
 - 1.

PART 3 EXECUTION

3.1 GENERAL

- A. Replace any damage to fixture, lamps, lens, or other lighting components with new fixture. Damage includes paint spray, and other construction materials adhering to fixtures. Damage or altering fixture as a result of mounting or placing fixture into applicable space is not acceptable.
- B. Install per requirements of Oregon Energy Code.

3.2 COORDINATION

- A. See Reflected Ceiling plan for exact location of equipment and ceiling construction.
- B. See Finish Schedule for additional finish requirements.
- C. Coordinate fixture mounting system prior to ordering fixtures.
- D. Provide price breakdown accounting as required and requested by Oregon Energy Trust, or Engineer.

3.3 ACCESS

- A. All fixtures shall have Code accessible supplies. Use reach-through type where recessed in non-accessible spaces.

3.4 SUPPORT

- A. Suspended ceiling:
 - 1. Attach light fixtures to the suspended ceiling system where installed. Attachment shall have capacity of 5 times fixture weight in all directions.

2. Support fixtures with not smaller than number 12 AWG hangers attached to the grid members within 3 inches of the corner of each fixture, attached to building structure.
 3. Attach two not smaller than number 12 AWG hangers from the fixture housing to the building structure.
 4. Support pendent-hung lighting fixtures directly from the structure above with not smaller than number 9 AWG wire or approved alternate support.
- B. Support all fixtures from structure rated at least five times support weight.

3.5 SURFACE MOUNTING

- A. Attach with mechanical means to secure fixture flush with structure. Attach at each corner of fixture not less than four places to building structure. Round fixtures shall be attached by forming a tripod configuration. Single center connection is not acceptable.
- B. Seal around fixture so no light trespass can be observed.

3.6 ACCEPTANCE

- A. Remove all debris, bugs, and other foreign materials from lamps and fixture housings. Clean all lamps, shades, reflectors, and lens removing all temporary labels, debris, dirt, and dust per manufacturer guidelines.

END OF SECTION -SECTION 26 51 13.20

SECTION 28 31 33 - FIRE ALARM SYSTEM

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Provide a complete and satisfactory operating automatic, class B, addressable fire alarm and detection system. Updated as shown on drawings for elevator upgrades.
- B. Provide all components, equipment, materials, and connections for complete system. Update to existing
- C. Provide all required construction documents as required by Authority Having Jurisdiction for permit review.

1.2 REGULATORY REQUIREMENTS

- A. National Fire Protection Associations (NFPA)
 - 1. NFPA 70 National Electrical Code
 - 2. NFPA 72 National Fire Alarm Code
 - 3. NFPA 101 Life Safety Code
- B. Underwriters Laboratories (UL)
 - 1. UL 38 Standard for Manual Signaling Boxes for Fire Alarm Systems
 - 2. UL 268 Standard for Smoke Detectors for Fire Alarm Signaling Systems
 - 3. UL 346 Waterflow Indicators for Fire Protective Signaling Systems
 - 4. UL 464 Audible Signaling Appliances
 - 5. UL 521 Heat Detectors for Fire Protective Signaling Systems
 - 6. UL 864 Standard for Control Units and Accessories for Fire Alarm Systems
 - 7. UL 1481 Power Supplies for Fire Protective Signaling Systems
 - 8. UL 1971 Signaling Devices for the Hearing-Impaired
- C. Building Code
- D. Fire Code

1.3 SUBMITTAL AND INSPECTION REQUIREMENTS

- A. Provide no less than three complete sets of construction documents as required by Authority Having Jurisdiction for permit review.

- B. Pay all plan review fees prior to picking up the approved set of documents. Provide Owner and Architect with a copy of the approved plans.
- C. Provide fire alarm operational matrix showing system programming. Indicate all unique initiating device types on individual rows. Show all output and notification actions along the columns and indicate with an "X" what output and notification action will be programmed with associated initiating device activation. Refer to 2002 NFPA 72 Handbook Figure A10.6.2.3(9) as an example.
- D. Provide all construction documents requested by Authority Having Jurisdiction and outlined:
 - 1. Floor plans with room type and numbers
 - 2. Mounting heights of all components
 - 3. Locations of all initiating and notification equipment
 - 4. Control and trouble signaling equipment
 - 5. Annunciation
 - 6. Power Connections
 - 7. Battery Calculations
 - 8. Conductor type and size
 - 9. Voltage drop calculations
 - 10. Schematics and termination to source wiring diagram
 - 11. Equipment List and Manufacturer
 - 12. Details of ceiling height and construction material
 - 13. Interfaces and inter-tied equipment
 - 14. Listing information
 - 15. CFSM Listing information
- E. Submit all testing data to Authority Having Jurisdiction, Owner, and as requested by Architect.
- F. Additional requirements as specified and shown on drawings.

1.4 SYSTEM DESCRIPTION

A. EQUIPMENT

- 1. Provide a complete, supervised, new fire alarm system consisting of all required equipment, equipment shown on Drawings, and equipment as listed:
 - a. All required conductors, cables, connectors, and protection of such.
 - b. Control panels
 - c. Power supplies and uninterruptible power supplies
 - d. Notification Appliance Circuit (NAC) supplies
 - e. Area Smoke detectors
 - f. Area Heat detectors

- g. Interface equipment (i.e. Elevator, ect.)
- h. Synchronization Equipment
- i. Visual, and Audible Notification Appliances
- j. Elevator Recall and Shunt Trip modules

B. SEQUENCE OF OPERATIONS

- 1. General operation and general building alarm
 - a. Upon activation of initiating device: All horns shall sound, Strobes flash in synchronization, HVAC equipment shall shutdown, held doors shall close, fire/smoke dampers shall close. Location of initiating device annunciated at Master panel, location of initiating device annunciated at remote annunciators, central monitoring company contacted, additional programmed outputs activate (i.e. connections to HVAC controls, lighting controls, elevators, water flow sprinkler bell, etc), system logs and time stamps events, and printer shall print events.

C. Supervisory Operation

- 1. Activation caused by:
 - a. Elevator fault
- 2. The following functions shall automatically occur:
 - a. Location and time of activation, activation type, and visual and audible indication shall be annunciated at all annunciator locations and printed if existing.
 - b. Transmit an alarm signal to the central station.

D. Trouble Operation

- 1. Activation caused by:
 - a. System fault
 - b. Open, short or ground-fault in initiating or notification wiring
 - c. Removal of any initiating or notification appliance from the system
 - d. Normal power failure
 - e. System component fault
 - f. Dirty detector
 - g. Otherwise noted, required, or indicated herein
- 2. The following functions shall automatically occur:
 - a. Location and time of activation, activation type, and visual and audible indication shall be annunciated at all annunciator locations and printed.
 - b. Transmit an alarm signal to the central station.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURES

- A. Match existing Siemens System.

2.2 POWER SUPPLY

A. Operation:

1. Transfer to battery power without loss of signal upon loss of normal power, or drop in normal voltage.
2. Audible and visual indicators shall show loss of normal power

B. Battery

1. Provide 24 hours operation and then operated full alarm condition for at least 5 minutes per NFPA 72.
2. 24 Volts DC
3. Include charger, protection, expiration, and over/under charge indication

2.3 HEAT DETECTOR

- A. Analog/addressable combination fixed temperature / rate-of-rise detector.
- B. Fixed temperature alarm point rating of 135°F (57°C) and a rate of rise alarm point of 15°F(9°C) per minute unless otherwise noted.
- C. Plug-in Base
- D. Rated for ceiling installation and wall mount installation.

2.4 SMOKE DETECTOR

A. Features:

1. Optical sensing, photoelectric analog/addressable with remotely programmable sensitivity settings.
2. Maintenance/clean alert.
3. No moving components
4. Local alarm LED indicator to show trouble and alarm signals
5. Hardware to prevent tampering
6. Remote alarm indicator connection
7. 24V DC 2-wire operation
8. Separate individual identification of each detector.
9. Voltage/circuit monitoring, indicate trouble to fire alarm control panel.

2.5 RELAY BASE SMOKE DETECTOR

- A. Same as Smoke Detector and include Relay Base.

- B. Relay Base to include the following features:
 - 1. 1-gang or round ceiling box mounting
 - 2. Selectable normally open or normally closed relay contacts
 - 3. Supervised contact position
 - 4. Local detector operation
 - 5. 1Amp 30V DC rated for pilot duty

2.6 WIRING

- A. UL Listed limited power cable for fire system signaling
- B. Size not less than 18 AWG, solid, color-coded Red PVC jacket , shielded where required by manufacturer.
- C. Notification appliances cable shall be sized not less than 14 AWG.
- D. Provide quantity and type as required by the manufacturer.
- E. Provide plenum rated cables where routed through air plenums.
- F. Belden as approved by manufacturer, or approved.

PART 3 EXECUTION

3.1 WIRING

- A. Provide in Raceway throughout.
- B. Do not support by staples or other mechanical means where support can pinch or damage cables.
- C. Route concealed in all finished areas.
- D. Label conductors at all junction points, include circuit and device number and function. Label all junction boxes as "FIRE ALARM"
- E. Provide not less than two telephone lines in protective raceway to FACP/DACT Location.
- F. Ground all shielded cables and ground conductors per manufacturer requirements. Test, record, and provide ground resistance.

3.2 INSTALLATION

- A. Properly support and secure all fire alarm equipment to building materials suitable to support equipment.

- B. Include smoke detection over each fire alarm system panel (NAC, FACP, Expander, Battery, etc) throughout facility.
- C. Provide manufacturer supervision of installation and final connections shall be by manufacturer.
- D. Label all fire alarm equipment with "NOT IN SERVICE UNTIL ACCEPTED" remove labels after acceptance.
- E. Pre-test all system components.
 - 1. Properly identify equipment and location through system programming.
 - 2. Provide all forms required by Authority Having Jurisdiction for acceptance testing.
- F. Test system prior to Authority Having Jurisdiction acceptance. Coordinate with Authority Having Jurisdiction for test day requirements, such as disconnecting system from normal power prior to Authority Having Jurisdiction arrival for testing. Provide written notice to Owner, Authority Having Jurisdiction, and Architect system is ready for acceptance not less than 14 days or more as required by Authority Having Jurisdiction.
- G. Test system according to NFPA 72. Provide NFPA 72 test report to Authority Having Jurisdiction, and as requested by Owner, and Architect.
- H. Correct deficiencies indicated by testing. Retest all system components that were replaced or altered as a result of testing. Verify operation of system affected by corrected deficiencies.
- I. Provide complete system programming.
- J. Verify system is operation and ready for acceptance prior to Authority Having Jurisdiction's arrival.
- K. Trouble signals shall be indicated regardless of status of FACP or device. Signals that appear only upon alarm condition or when the device is activated are not acceptable. Program system automatic cycled testing as required by NFPA and recommended by manufacturer.

3.3 DETAILED OPERATION

- A. General
 - 1. Install and program system for proper operation per NFPA 72. System operation to include alarms, diagnostics, supervision, activation, and automation as required by Code including local requirements.
 - 2. As intended, shown on drawings, and indicated herein.

3.4 CLEANING

- A. Remove all foreign construction materials, dirt, and debris for all system equipment. Replace damaged equipment. Clean components using materials and methods as recommended by manufacturer.

3.5 TRAINING

- A. Provide factory-authorized service representative to train and demonstrate elevator recall operation.

3.6 CERTIFICATION

- A. The installer shall provide written certification to the Owner and Authority Having Jurisdiction that the system has been installed in accordance with the approved plans and specifications.
- B. Provide contact information of installer.
- C. Provide written list of all component part numbers, device addresses, and panel annunciation verbiage associated with respective device for Owner.
- D. Change panel annunciation verbiage as required by Authority Having Jurisdiction.

END OF SECTION 28 31 33