PROJECT MANUAL

FOR

Rock Creek Elementary School
Freezer Replacement

Beaverton School District
16550 SW Merlo Road
Beaverton, Oregon 97003

Bid Documents
November 20, 2020

IBI GROUP

SET NO._____

PROJECT MANUAL
FOR:

Rock Creek Elementary School
Freezer Replacement

for

Beaverton School District
16550 SW Merlo Road
Beaverton, Oregon 97003

(ARCHITECT)
IBI Group Architects (USA), Inc.
907 SW Harvey Milk Street
Portland, OR 97205
PH: 503 226-6950 / FAX: 503 273-9192

November 20, 2020

END OF TABLE OF CONTENTS

SECTION 01 10 00
SUMMARY

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. General Requirements.

B. Work Covered by Contract Documents.

C. Delegated Design Requirements.

D. Contractor Use of Premises.

1.02 GENERAL REQUIREMENTS

A. TIME OF COMPLETION
   1. The work of this Contract shall be commenced on the date of written notice to proceed and shall be completed by the dates established in the Owner/Contractor Agreement, and as stipulated in the General Conditions of the Contract for Construction.

B. LIQUIDATED DAMAGES
   1. The Contractor acknowledges and agrees to abide by all provisions of the General Conditions of the Contract regarding Liquidated Damages as it pertains to all work under this Contract.

C. ASBESTOS FREE CERTIFICATION
   1. Absolutely no materials containing asbestos are to be furnished or installed as part of this Project. Ensure that no subcontractor or any of the Contractor's own forces installs any materials containing asbestos. At final closeout of the Project, provide to the Owner certification that no materials containing asbestos have been installed in the Project, and that the Project is asbestos-free as required by the State in which the Project is located.

D. COORDINATION
   1. The Contractor is responsible for overall coordination of the Project.
   2. The Drawings and Specifications are arranged for convenience only and do not necessarily determine which trades perform the various portions of the Work.
   3. Coordinate sequence of work to accommodate agreed-upon Owner occupancy.
   4. Perform all necessary work to receive and/or join the work of all trades.
   5. Verify location of existing utilities and protect from damage.

E. PERMITS AND FEES
   1. The Owner will be responsible for filing and paying for building permits and all fees associated with the building permit, system development charges, impact fees, etc. The Contractor will be responsible for picking up all Project permits and will have full responsibility for requirements of and payments for all trade permits (i.e. electrical, plumbing, mechanical) as a direct expense.

F. REQUIREMENTS FOR CONTRACTOR, SUBCONTRACTORS, AND MATERIAL SUPPLIERS
   1. Ensure that all persons performing the Work comply with Owner's tobacco policy. Copies made available upon request.
   2. Contractor and Subcontractors shall refrain from contact with staff and students at all times.
   3. Neither the Contractor nor any of its Subcontractors of any tier shall utilize any employee at the site who has pled guilty to or been convicted of any felony crime involving the physical neglect of a child, physical injury to or death of a child, sexual offenses against or sexual exploitation of a child, child prostitution, or other similar offenses as defined by the most current State Statutes, or similar laws of another jurisdiction. Remove from the work and work site any employee who has engaged in such actions, or who the Owner reasonable considers objectionable.
      a. All personnel under the employment of the Contractor and its Subcontractors that travel to, or spend time at, the project site are to wear photo ID badges while on the

work site. Individuals not wearing badges will be removed from the project work site. ID badges are to contain:
1) Individual's full name (no nicknames).
2) Individual's company affiliation.
3) Recent photograph of the individual; taken within the last 4 years.

b. All personnel under the employment of the Contractor and its Subcontractors that spend time at the project site, must be run through formal background screening by the Contractor and pass that screening review, before being allowed on the work site. Background screening is to be done by a professional screening firm meeting the following qualifications:
1) Must have a minimum of five years of screening experience specifically for construction industry clients.
2) Must have a minimum of fifteen employees.
3) Must be able to provide access to an internet-based screening management software system which has a feature to allow access by the District to view the pass-no pass result for each screened Contractor/Subcontractor employee working on a District project.
4) Must be accredited by the National Association of Professional Background Screeners (NAPBS).

c. Each individual will be screened for having committed any crime as listed in ORS 342.142, most recent edition.

4. Without limiting the generality of the foregoing, ensure by appropriate provision in each subcontract agreement that the Contractor may remove from the work and work site any Subcontractor or Subcontractor's employee who has engaged in such action. At no change to the Contract Sum or Contract Time, remove from the work and work site any employee or other person pursuant to this Section. Failure to comply with these requirements is grounds for immediate termination of the Agreement for cause.

1.03 WORK COVERED BY CONTRACT DOCUMENTS

A. Work of this Contract comprises all required demolition and general renovation construction for the Rock Creek ES Freezer Replacement Project located at 4125 NW 185th Avenue, Portland, OR 97229.

1.04 DELEGATED DESIGN REQUIREMENTS

A. Certain components of the Work under this project are Delegated Design. It is the Contractor's responsibility to coordinate and assume or assign to subcontractors the complete responsibilities for the design, calculation, submittals, fabrication, transportation and installation of the Delegated Design portions or components as required. Delegated Design components of the Work are defined as complete operational systems, provided for their intended use.

B. Owner shall not be responsible to pay for any delays, additional products, additional hours of work or overtime, restocking or rework required due to failure by the Contractor or the subcontractor to coordinate their work with the work of the other trades on the project or to provide the Delegated Design portion or component in a timely manner to meet the schedule of the project.

1.05 CONTRACTOR USE OF PREMISES

A. Work Sequence:
1. Perform Work in a manner required to accommodate School District use of premises during the Contract Period. Coordinate Work schedules and operations with Owner's use requirements.
2. Provide access to and from site as required by law and by Owner:
a. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
3. Do not obstruct roadways, sidewalks, or other public ways without permit.

B. Limitations on Use:
   1. Owner intends to occupy and conduct school in the existing building during portions of the construction period. The existing building during times of Owner occupancy is a limited Contractor access area. Coordinate access to the existing building.
   2. Complete and exclusive use of the construction area except as outlined above will be permitted from Notice to Proceed until Substantial Completion of the Project. Coordinate areas available for early occupancy (if any) with Owner.
   3. During times of Owner's occupancy there may be down days during the Contract Period when occupied areas will be closed. Request from the District a list of down days that may occur during the Contract Period. Notify the District at least 48 hours in advance of down days during which time the Contractor intends to work. The District will pay for employee time during such down days when the building is required to be open for Contractor use.
   4. Smoking or open fires will not be permitted within the building enclosure or on the premises.
   5. Do not encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated or coordinated with Owner.
   6. Move any stored products under Contractor's control which interfere with operations of Owner or separate contractors.

C. Contractor's Site Conduct:
   1. Identifying name tags will be worn at all times.
   2. No loitering in the school buildings or unsupervised/unauthorized entry.
   3. Site is tobacco-free. This means no smoking or chewing on any school property.
   4. Beyond courtesy, there should be no interaction between staff and faculty.
   5. Keep project free of pop cans, lunch wrappers and similar debris.
   6. Review with the Owner the scheduling of any work that is excessively noisy or has the potential to disrupt activities of Owner or neighbors.
   7. Be considerate of the client, the students and faculty.
   8. Always consider, prior to an act, the safety of students, faculty and other co-workers.
   9. Profanity is not acceptable.
   10. The wearing of clothing with logos displaying alcohol, tobacco, illegal substances or suggestive themes is not acceptable attire.

D. Non-Interference with School:
   1. Perform work operations upon areas adjacent to existing Owner-occupied areas and/or structures in such manner as to not interfere with continued free and comfortable use of such areas.
   2. During normal school hours, keep building exits safe, protected, and restricted from remainder of construction site and clear of obstructions at all times. If closure of an exit is required by the Work, notify the school Principal and allow ample time for an alternate exit plan to be executed.
   3. Work shall not be performed in Owner-occupied areas or rooms during normal school hours when such spaces are required for school use. Such Work shall be performed after normal school hours up to 10:00 PM or as agreed upon with Owner, and if no nighttime school activities are planned. Work may be performed during weekends and vacation periods when school is normally closed if coordinated in advance with school administration. All Work required in rooms or spaces being utilized for school purposes must be closely scheduled with the District such that rooms or spaces may be safely used for school purposes when classes resume.

E. Non-Interference with Serving Utilities:
   1. Do not interrupt electric, gas, water, or other services to existing Owner-occupied structures without prior notice to the District and then only at a definite time and for a definite duration approved by Owner.

a. Disruption of utilities must be approved by the Owner. Requests must be made 72 hours prior to disruption and a plan detailing a definite start time and duration provided.

2. Schedule demolition, remodel, and new construction to accommodate Owner's continued use of existing and/or new mechanical, electrical, and plumbing services as required for Owner's continued occupancy and beneficial use of designated areas.
3. Consult with public and private utility companies for location and extent of all utilities before commencing work.
4. Provide services of a utilities locator to investigate and mark underground utilities in the vicinity of exterior work; and for interior below-slab utilities in areas which will be partially demolished prior to commencing work. Ensure that utilities are identified prior to saw cutting interior floor slabs.
5. Provide all services required. Protect and maintain existing utilities, active electrical conductors, sewers, pipes, and other active lines either on project site or in offsite street excavations.
6. Arrange for and pay cost of disconnecting, removing, relocating, capping, replacing, or abandoning of public and private utilities in the way of construction operations in accordance with serving utilities policies, local regulations and governing codes. Utilities, pipes, sewers, electrical conductors and the like to be abandoned shall be capped in accordance with instructions of governing authority or as directed.

F. Protections - Exterior Components:
1. Protect sidewalks, asphalt paving, concrete, plantings, and lawn areas at all times from spillage of materials used in carrying out the Work. Exercise care to preclude materials from clogging catch basins and yard drains. Leave all drainage items clean and in proper working condition.
2. Clean, repair, resurface, or restore existing surfaces to their original condition, or completely replace such surfaces to match existing where damaged by construction operations.
3. Whenever it is necessary to cut and remove fences and/or power lines (whether on private or public property), restore such demolished work to condition at minimum equal to that which existed prior to such demolition.
4. Damage to property adjacent to Owner's property shall be restored to the satisfaction of respective property owners.

G. Protections - Interior Components:
1. Contractor is responsible for protection of completed portions of the Work. Provide protection as required such that items are not soiled or damaged during the progression of the Work. Maintain all such protections for the entire duration of the construction until acceptance by Owner.
   a. Provide a weathertight condition throughout the Work. Clean, repair, resurface or restore building and site components required to be protected to their original condition, or completely replace items to match existing undamaged portions of Work, where damaged by construction operations.
2. Whenever it is required and/or necessary to demolish portions of work, take all precautions to protect adjacent portions of the work which remain from damage.
3. Keep public areas such as hallways, stairs, elevator lobbies and toilet rooms free from accumulation of waste material, rubbish or construction debris.
4. Gather and shroud all existing furnishings to the extent needed to provide protection from construction dust.
5. Clean, repair, resurface, or restore such items above required to be protected to their original condition, or completely replace items to match existing undamaged portions of work, where damaged by construction operations.

H. Protections: Vegetation and Plantings:
1. Protect all existing trees to remain on-site from foliage, trunk, branch, and root damage.

2. Provide barricades and maintain same around all trees, plantings, and other landscaped areas adjacent to work of this Contract to protect such areas from damage of any nature caused by construction operations.
3. Replace any plantings damaged or destroyed with plants of equivalent type, size, quantity, and nature as approved by Architect.

I. Security:
1. Provide security and facilities to protect the Work and Owner's operations from unauthorized entry, vandalism, and theft.
2. Provide temporary barriers, doors, and locks at all openings after building is enclosed.
3. Lock automotive vehicles and other mechanized or motorized construction equipment when parked and unattended. Do not leave vehicles or equipment unattended with the motor running or ignition key in place.
4. Coordinate with Owner's building security provider and program.

J. Removal of Equipment and Materials:
1. Clear site and surrounding street areas of all equipment, apparatus, appliances, tools, unused materials, and similar items immediately as they cease to be necessary to carry out the Work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 13 31

CERTIFICATE OF COMPLIANCE

No final payment shall be made until the Contractor provides to the Owner, prior to acceptance of the work, a notarized certification of compliance in following form:

The Contractor does hereby certify that all work has been performed and materials supplied in accordance with the drawings, specifications and Contract Documents for the above Work, and that:

No less than the prevailing rates of wages as ascertained by the governing body of the Contracting agency has been paid to laborers, workmen and mechanics employed on this Work;

There have been no unauthorized substitutes of Subcontractors; nor have any subcontracts been entered into without the names of the Subcontractors having been submitted to the Owner prior to the start of such subcontracted work;

No subcontract was assigned or transferred or performed by any Subcontractor other than the original Subcontractor, without prior notice having been submitted to the Owner together with the names of all Subcontractors;

All claims for material and labor and other service performed in connection with these specifications have been paid;

In WITNESS WHEREOF, the undersigned has signed and sealed this instrument this

_____ day of_____, _____

Firm Name: _____

Signature: _____

Title: _____

Attest _____
(Seal if Bidder is a Corporation)

As determined necessary, evidence of compliance may be required to be submitted with and made a part of this Certificate of Compliance.

END OF SECTION

SECTION 01 13 32

CERTIFICATE OF NO HAZARDOUS MATERIALS

No final payment shall be made until the Contractor shall file with the Owner, prior to acceptance of the work, a notarized certificate of no hazardous materials in the following form:

"To the best of my knowledge no hazardous material, including, but not limited to: asbestos, polychlorinated biphenyls (pcb's) and lead based products, is used in the construction of this project. Material safety data sheets will be provided as requested by the Owner for all materials which may be questioned in the future."

In WITNESS WHEREOF, the undersigned has signed and sealed this instrument this

_____day of_____, _____

Firm name: _____

Signature: _____

Title: _____

Attest: _____

(Seal if Bidder is a Corporation)

As determined necessary, evidence of compliance may be required to be submitted with and made a part of this certificate.

END OF SECTION

SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Procedures for preparation and submittal of application for final payment.

1.02 RELATED REQUIREMENTS

A. Section 01 77 00 - Closeout Procedures: Substantial Completion and Final Payment.

1.03 SCHEDULE OF VALUES

A. Form to be used: AIA G703 Continuation Sheets.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.

C. Forms filled out by hand will not be accepted.

D. Submit Schedule of Values at times indicated in Section 01 30 00 - Administrative Requirements.

E. 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 and bonds and insurance. Provide closeout and punchlist line items.

F. For items on which progress payments will be requested for stored materials, break down the cost into:
   1. The cost of materials (only), delivered and unloaded, with taxes and the like, paid.
   2. Remainder of installed value (labor, temporary facilities/equipment needed, etc.).
   3. Failure to provide this breakdown prior to materials being delivered voids Contractors right to be paid for affected materials until they are installed.

G. For each line item of installed value exceeding $20,000, show breakdown by major products or operations under each item.

H. Round-off figures to nearest dollar amount for the original breakdown only.

I. Make sum of total scheduled costs equal to Contract Sum.

J. Revise schedule to list approved Change Orders, with each Application For Payment.

1.04 SUBCONTRACTOR AND SUPPLIER LISTING

A. Subcontractor and Supplier Listing: Follow Project Manual Table of Contents as a format for listing name of Subcontractors, including lower-tier Subcontractors and suppliers.
   1. Identify by section number and title the company, address, telephone number and contact person.
   2. Adjacent to Subcontractor list its lower-tier Subcontractor(s) and/or supplier(s).

1.05 APPLICATIONS FOR PROGRESS PAYMENTS

A. Submit a preliminary copy of the Payment Application to Architect for comment prior to formal submittal.

B. Payment Period: Submit at intervals stipulated in the Agreement.
   1. Contractor is encouraged to review the payment application draft during the progress meeting that occurs during the last week of the month.

C. Form to be used: AIA G702 and G703.

D. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

E. Forms filled out by hand will not be accepted.

F. Execute certification by signature of authorized officer.

1. Notarized Affidavit: After the first request for payment, each subsequent request shall be accompanied by notarized affidavit stating that all subcontractors have been paid less earned retainage as their interests appeared in the last payment received. No application for payment by the Contractor shall be processed unless accompanied by such Contractor's affidavit.
2. In addition, the Owner may require that any requests for payment shall also be accompanied by a receipt with original signature from the Principal Subcontractors, and others as required by the Owner, of the dollar amount they received for the previous month's work (less earned retention), and an affidavit by such Subcontractors stating that all sub-subcontractors, suppliers, wages, fringes, and taxes arising out of such subcontract have been paid in full as their interest appeared in the last payment received.

G. 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.
   1. For applications for stored materials include:
      a. Project.
      b. Application number and date.
         1) Item number and identification as shown on application and description of specific material or product.
         2) Material stored off-site: Record of quantities and bonding/insurance of storage facility.
         3) Must be within 75 driving miles of the site and open to Architect's and Owner's inspections and inventory during regular business hours.
      c. Verification of stored materials and partial payment for such materials do not constitute acceptance on the part of the District. In the event that materials stored are found to be unsuitable for installation or incorporation into the Work for any reason, Contractor shall bear full responsibility for any and all corrections needed.
      d. District shall not be responsible for any additional costs incurred for storage of materials unless such storage is the result of and a part of an approved Change Order where the District is found to be responsible for such costs.

H. List each authorized Change Order as a separate line item, listing Change Order number, description and dollar amount as for an original item of Work. Provide a breakdown by major products or operation for amounts in excess of $20,000.

I. Submit one electronic copy of each Application for Payment through e-Builder.

J. Include the following with the application:
   1. Construction progress schedule, revised and current as specified in Section 01 32 00 - Construction Progress Documentation.
   2. Partial release of liens from major Subcontractors and vendors.
   3. Affidavits attesting to off-site stored products.

K. Current Record Documents: Prior to acting on processing each monthly request for payment, Contractor is required to present for review to Architect and consultants, a current set of record documents indicating any revisions.

L. Certified Statements of Intent to Pay Prevailing Wage for each trade shall be on file with the Architect and Owner prior to applying for payment of work of that trade. Where such Certified Statements are not provided, that category of work will not be paid until appropriate documentation is filed.

M. 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.

1.06 SPECIAL CONDITIONS OF INITIAL PAYMENT

A. Prior to initial payment, the Contractor must have delivered all required insurance, bonds and contracts; acceptable Schedule of Values, Sub-Contractors/Suppliers List, Contractor Construction Schedule.

1.07 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
   1. Submit Application for Final Payment at time indicated in Section 01 30 00 - Administrative Requirements.

B. All Project Closeout activities must be complete; all liens and claims settled; all project record documents transmitted in final approved form; removal of temporary services, facilities and all debris/materials/ equipment. All permit drawings, sign-off sheets and Certificates of Occupancy transmitted.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 23 00
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of Alternates.

B. Procedures for pricing Alternates.

C. Documentation of changes to Contract Price and Contract Time.

1.02 RELATED REQUIREMENTS

A. Section 09 51 00 - Acoustical Ceilings.

1.03 DEFINITIONS

A. Base Bid: Includes all work shown on Drawings and as specified, with the exception of the Work specifically included in Additive or Deductive Alternates listed herein.

B. Alternate Bid: Amount proposed by bidders and stated on the Bid Form that will be either Added To or Deducted From the Base Bid amount if the Owner decides to accept a change in either scope of work or in products, materials, equipment, systems, or other installation methods as described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate the alternate into the Work. No other adjustments are made to the Contract Sum.

1.04 ACCEPTANCE OF ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.

1. Evaluation of Alternate: Bid evaluation will be based on lowest total of base bid modified by Owner accepted alternates.

B. Owner reserves the right to select any or all of the Alternates up to 90 days after award of Contract. If Owner so selects, the time for Substantial Completion will be correspondingly adjusted for those selected items only. Immediately following Award of Contract the Contractor shall prepare and distribute to each party involved notification of the status of each Alternate.

C. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

D. Notification: Immediately following award of Contract, prepare and distribute to each party involved notification of the status of each alternate. Indicate whether alternates have been accepted, rejected or deferred for consideration at a later date.

1.05 PROCEDURES

A. Alternates shall conform to the requirements of each Section of the Specifications which pertain to the scope of work contained within the Alternate.

B. Refer to Drawings for details and other information related to the construction of Alternates where such construction is required by scope.

C. Include as part of each Alternate miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation, whether or not specifically mentioned as part of the Alternate.

1.06 SCHEDULE OF ALTERNATES

A. Alternate No. 1 - Remove and replace existing ceiling grid and tile in Kitchen with new as indicated on the drawings.

1. Base Bid: Ceiling work in Kitchen limited to protecting existing ceiling related to remaining scope of work. Existing suspended ceiling system to remain existing.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 25 00
SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedural requirements for proposed substitutions.

1.02 RELATED REQUIREMENTS

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

B. Section 01 23 00 - Alternates, for product alternatives affecting this section.

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

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

1.03 DEFINITIONS

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

B. Substitutions: See General Conditions for definition.

1.04 SUBMITTALS

A. Substitution Requests: Electronically submit each request for consideration as a PDF. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Name of PDF shall reflect the specification Section number and the proposed product manufacturer or product name.
   2. Limit each request to one proposed substitution.
   3. Submit a separate form for each item upon which approval is requested, with the exception of groups of items (e.g., electrical fixtures, plumbing fixtures, etc.) for which an itemized listing may be attached.
   4. Acceptance of the particular product or method on a previous project does not confer or imply acceptance for this project.
   5. Submit samples to Architect upon request.
   6. It is the responsibility of the substitution applicant to notify the Architect whether there are additional primer requirements with the proposed product. At least the same level of laboratory testing and/or industry certification must be achieved with the proposed product.
   7. Organic-based urethane sealants are not a substitute for silicone technology.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
   2. Agrees to provide the same warranty for the substitution as for the specified product.

3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
5. Waives claims for additional costs or time extension that may subsequently become apparent.
6. Agrees to reimburse Owner and Architect for review or redesign services, detailing, construction costs, or re-approval by authorities caused by the requested substitution.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
1. Note explicitly any non-compliant characteristics.

C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
1. Substitution Request Form:
   a. Use Substitution Request Form following Document 00 21 13 - Instructions to Bidders for substitution requests during the bid phase.
   b. Use "Substitution Request (After the Bidding Phase)" form bound at the end of this Section for substitution requests after the Award of Contract.

D. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
1. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
2. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
3. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
4. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
5. Samples, where applicable or requested.
6. Certificates and qualification data, where applicable or requested.
7. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
8. List of availability of maintenance services and replacement materials.
9. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
10. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
11. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
12. Cost information, including a proposal of change, if any, in the Contract Sum.
13. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
14. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
15. No specific form is required. Contractor's Substitution Request documentation must include the following:

a. Project Information:
   1) Official project name and number, and any additional required identifiers established in Contract Documents.
   2) Owner's, Architect's, and Contractor's names.
b. Substitution Request Information:
   1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
   2) Indication of whether the substitution is for cause or convenience.
   3) Issue date.
   4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
   5) Description of Substitution.
   6) Reason why the specified item cannot be provided.
   7) Differences between proposed substitution and specified item.
   8) Description of how proposed substitution affects other parts of work.
c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
d. Impact of Substitution:
   1) Savings to Owner for accepting substitution.
   2) Change to Contract Time due to accepting substitution.

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

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

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

B. Document 00 21 13 - Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period, and the documents required.
   1. Submit all requests for substitutions electronically as PDFs.
   2. Submit Substitution Request Form via email to the individual indicated in Document 00 21 13 - Instructions to Bidders.

C. Accepted Substitutions prior to Bid Date will be listed in Addenda published in accordance with Advertisement for Bids and the Instructions to Bidders. Bidders will not rely upon approvals made in any other manner.

3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

A. Submit all requests for substitution electronically as PDFs.
   1. Submit all requests for substitutions after the Bid Phase in accordance with requirements for electronic submittals in Section 01 30 00 - Administrative Requirements.
   2. Submit all requests for substitutions after the Bid Phase through the Contractor. Substitution requests received directly from Subcontractors or Suppliers will be returned through the Contractor without review.

B. Substitutions will normally not be considered after date listed in Document 00 21 13 - Instructions to Bidders, except when required due to unforeseen circumstances. Within a period of 30 days after date of Contract, the Owner may, at its option, consider formal written requests for substitution of products in place of those specified when submitted in accord with the requirements stipulated herein. To receive consideration, one or more of the following conditions must be documented in any such request:
   1. The substitution is required for compliance with final interpretation of Code requirements or insurance regulations.
   2. The substitution is required due to unavailability of a specified product, through no fault of the Contractor.

3. The substitution is required because subsequent information disclosed the inability of the specified product to perform properly or to fit in the designated space.
4. Manufacturer's or fabricator's refusal to certify or warrant performance of specified product as required.
5. Subsequent information that a long delivery date will not be compatible with the Contract construction period.
6. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

C. Owner reserves the right to reject any and all substitution requests for any reason, without obligation or liability

D. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
3. Bear the costs engendered by proposed substitution of:
    a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.

E. Substitutions will not be considered under one or more of the following circumstances:
1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
2. Submittal for substitution request has not been reviewed and recommended by Contractor. Substitution requests received directly from Subcontractors or Suppliers will be returned through the Contractor without review.
3. Without a separate written request.
4. When acceptance will require revisions to Contract Documents.
5. Submittal for substitution request does not include point-by-point comparison of proposed substitution with specified product.

3.04 RESOLUTION

A. Architect's Action for Substitutions After Award of Contract: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
1. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
2. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

3.05 ACCEPTANCE

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

3.06 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

END OF SECTION

SUBSTITUTION REQUEST FORM

TO: IBI Group Architects (USA) Inc.
907 SW Harvey Milk Street
Portland, OR 97205
Attn: jim.fitzpatrick@ibigroup.com

PROJECT: Rock Creek ES Freezer Replacement

We hereby submit for your consideration the Product described below as a substitute for the specified product indicated:

1. Specified Product:

   Name: _____

   Section:_____ Paragraph: _____

2. Proposed Substitution:

   a. Brand Name:_____

   b. Model/Catalog No.: _____

   c. Manufacturer: _____
   (Name)

   _____
   (Address) (Zip) (Telephone)

   d. Nearest Distributor:_____
   (Name)

   _____
   (Address) (Zip) (Telephone)

   e. Substitute product effects adjacent Work in the following way:

   _____
   _____

3. Supporting Data:

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

   b. Attached data also includes description of changes to Contract Documents which proposed substitution will require for its proper installation.

4. Certification:

   The undersigned certifies that the following paragraphs, unless modified on attachments, are correct:

a. The proposed substitution does not affect dimensions shown on Drawings.

b. The undersigned will pay for changes to the building design, including engineering design, detailing and construction costs caused by the requested substitution.

c. The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.

d. Maintenance and service parts will be locally available for the proposed substitution.

e. The function, appearance and quality of the proposed substitution are equal or superior in all respects to the product specified.

5. Submitted By:

Firm:_____
(Name)

_____
(Address) (Zip) (Telephone)

By:_____ Title: _____
(Please type or print)

Signature:_____

6. Acceptance/Rejection:

Acceptable substitution items will be covered by an Addendum issued to all Bidders.

7. Architects Action:
The following is for use by the Architect:

___ Accepted ___ Accepted with exceptions as noted
___ Not Accepted ___ Received after deadline

Remarks: _____
_____
_____
_____

By:_____ Date: _____

For: IBI Group Architects (USA) Inc.

END OF FORM

SUBSTITUTION REQUEST
(After the Bidding Phase)

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ Architect Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No: _____

Installer: _____ Address: _____ Phone: _____

History: ☐ New Product ☐ 2-5 years old ☐ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

_____

_____

Point by Point comparative data attached - REQUIRED

Reason for not providing specified item: _____

_____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes, explain _____

_____

Savings to Owner for accepting substitution: _____ ($_____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days

Supporting Data Attached:

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

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

Attachments: _____

_____

_____

REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01 30 00.

☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 30 00.

☐ Substitution rejected - Use specified materials.

☐ Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____

_____

_____

_____

_____

_____

_____

_____

SECTION 01 26 00
CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for processing contract modifications and Change Orders.

1.02 RELATED REQUIREMENTS

A. Section 01 20 00 - Price and Payment Procedures: Applications for payment and Schedule of Values.

B. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance (O&M) data, warranties and bonds.

1.03 SUBMITTALS

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

B. Submit name of individual authorized to accept changes, and to be responsible for informing others in Contractor's employ of changes in the Work.

1.04 GENERAL REQUIREMENTS

A. No additional work shall be undertaken without Owner's and Architect's written approval.

B. Written approval authorizing Contractor to undertake additional Work does not authorize automatic extension of Contract Completion time.

1.05 DEFINITIONS

A. Change Order (CO): This document signed by Owner, Contractor and Architect formally changes the Contract Sum or Contract Time and may incorporate Proposal Requests and/or Construction Change Directives.

B. Proposal Request (PR): This document initiated by the Architect is to be priced by the Contractor. Upon authorization by the Owner it becomes a directive to the Contractor to modify the scope of the Contract for inclusion in a future Change Order.

C. Architect's Supplemental Instructions (ASI): This form is a written order comprising instructions or interpretations, signed by Architect making minor changes in the Work not involving a change in Contract Sum or Contract Time. If the Contractor considers that the ASI constitutes a Change in the Work, it must notify the Owner in accordance with the Contract Documents.

D. Construction Change Directive (CCD): A written order to the Contractor, signed by the Owner and Architect, amending Contract Documents as described. This order directs Contractor to proceed with Work that may alter Contract Sum and/or Contract Time, and is intended to be included in a subsequent Change Order pending agreement on changes in the Contract Sum and/or Contract Time.

1.06 SIGNATURES

A. All signatures on Change Orders and Construction Change Directives shall be original; no photocopies, unless electronic signatures are acceptable to all parties. Facsimile signatures shall be followed immediately by mail and/or delivery of originals.

1.07 MODIFICATION PROCEDURES

A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
   1. Form for Minor Changes in the Work: Architect's "Architect's Supplemental Instructions" form.
   2. If Contractor determines that an Architect's Supplemental Instruction involves adjustments to the Contract Sum or Contract Time, Contractor shall prepare and issue a Proposal Request to the Architect for approval prior to proceeding with the Architect's Supplemental Instruction.

1.08 DOCUMENTATION OF CHANGE IN CONTRACT SUM AND CONTRACT TIME

A. Maintain detailed records of work performed on a time and materials basis. Provide complete information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

B. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.

C. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.

D. On request, provide additional data to support computations including:
   1. Quantities of products, labor, and equipment.
   2. Taxes, insurance, and bonds.
   3. Overhead and profit.
   4. Justification for any change in Contract Time.
   5. Credit for deletions from Contract, similarly documented.

E. Support each claim for additional costs, and for work performed on a time and materials basis with the following information:
   1. Origin and date of claim.
   2. Dates and times work was performed, and by whom.
   3. Time records and wage rates paid.
   4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

1.09 PROPOSED CHANGE PROCEDURES

A. 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. Contractor shall prepare and submit a fixed price quotation within 14 days.
   1. Form for Proposal Requests: Architect's "Proposal Request" form.
   2. Form for Fixed Price Quotation: Electronically submitted PDF.

B. If latent or unforeseen condition require modifications to the Contract, or if an RFI response or an Architect's Supplemental Instruction is determined to have cost or schedule impacts, 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 substitutions in accordance with Section 01 60 00.
   1. Form for Proposal Requests: Architect's "Proposal Request" form.
   2. Form for Fixed Price Quotation: Electronically submitted PDF.

C. Proposal Request Log: Maintain a current log of all Proposal Requests and submit same at each project meeting and with each Application for Payment. Each Proposal Request shall have a unique number for tracking purposes.
   1. The log shall, at a minimum, show the Proposal Request number, date initiated, brief description, reference (e.g., RFI or supplemental instruction) estimated cost, estimated time, status and reason for the Proposal Request.

1.10 APPROVAL OR REJECTION OF PROPOSAL

A. When a proposed change is initiated through a Proposal Request:
   1. Submit the following in writing within seven (7) days of date on Proposal Request:
      a. All direct and indirect costs.
      b. Schedule of Values and Unit Prices including basis for costs.
      c. Impact on other Work not described. Describe and include all direct and indirect costs of changes to other Work not specified in the PR.

d. Quotation will be guaranteed for period specified in the PR beginning from signing of proposal, but, as a minimum, 30 days. If no period is specified, quotation shall be guaranteed for sixty (60) days from signing.
e. Proposal shall be signed by authorized person.
f. Failure of the Contractor to respond with pricing in a timely manner shall not be justification for claims by the Contractor of delay of the project associated with the Change.

2. Architect and Owner will review proposal and respond in writing by one of the following:
   a. Authorizing.
   b. Requesting additional information.
   c. Rejecting.
3. Authorization to proceed with Change through a recommendation by the Architect to the Owner and written authorization by the Owner directs Contractor to undertake Work.

B. When Change is initiated by Contractor:
1. Architect and Owner review and respond in writing by one of the following:
   a. Processing a Change Order or Proposal.
   b. Requesting additional information.
   c. Rejecting.
2. If Owner responds by processing a Proposal Request, follow procedure outlined above.
3. If additional information is requested by Owner, respond in writing within seven days of Owner's request.

1.11 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Support each lump sum proposal quotation and each unit price (not previously established) with detailed substantiating data. Clearly cross reference tracking numbers of CCDs, RFIs, PRs, etc. to allow easy identification of costs origins
1. Include as separate line items any changes related to credits to Contract Sum or Contract Time associated with not performing the originally specified Work.

B. On request, provide additional data to support time and cost computations:
1. Labor hours, number of workers, time cards and hourly rate cost justification
2. Equipment hours, make and model, number of pieces required, rental agreements and hourly rate justification.
3. Products required.
   a. Recommended source of purchase and unit cost.
   b. Quantities required.
4. Documented credit for Work deleted from Contract.
5. Justification citing specifics of critical path impacts per current CPM for any change in Contract Time.

C. Support each claim for additional costs, and time-and-material/force account work with documentation, as required for lump-sum proposal. Include additional information:
1. Name of Owner's authorized agent who ordered work, and date of order.
2. Dates and times work was performed and by whom.
3. Time record, summary of hours worked and wage rates paid.
4. Receipts and invoices for:
   a. Equipment used, listing dates and times of use.
   b. Products used, listing of quantities.
   c. Subcontracts.

1.12 CONSTRUCTION CHANGE DIRECTIVES

A. For changes that involve an adjustment to the Contract Sum or Contract Time, 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.
3. Form for Construction Change Directives: Architect's "Construction Change Directive" form.

1.13 FIXED PRICE CHANGE ORDER

A. Base upon Architect's Proposal Request and Contractor's fixed price quotation; or Contractor's request for Change Order as approved by Architect and Owner.

B. Change Order describes Work changes, additions and deletions, with attachments of authorized Proposal Requests, agreed Construction Change Directives and/or previously agreed upon change pricing or Contract Time modifications.

C. Change Order provides accounting of any Contract Sum and Contract Time adjustment.

1.14 UNIT PRICE CHANGE ORDER

A. For pre-determined unit prices and quantities, Change Order will be executed on a fixed price basis.

B. For unit costs or quantities of units of work which are not predetermined, execute Work under a Construction Change Directive. Changes in Contract Sum or Contract Time will be computed as specified for a time and material Change Order.

1.15 TIME AND MATERIAL CHANGE ORDER

A. Submit itemized account and supporting data after completion of change, within time limits specified in General Conditions of the Contract.

B. Architect will determine the change allowable in Contract Sum and Contract Time as provided in the General Conditions of the Contract.

C. Maintain and provide detailed records of work done on a time and materials basis.

1.16 EXECUTION OF CHANGE ORDERS

A. Architect will issue Change Orders for signatures of parties as provided in General Conditions of the Contract.
   1. Form for Change Orders: Architect's "Change Order" form.

B. Proper signatures (original and dated) on CCD or Change Order authorize Contractor to proceed with Change.

C. Promptly sign and date Change Order or provide detailed written and signed statement detailing reasons if refusing to sign. If the Contractor does not sign and return the Change Order, all aspects will be considered disputed, and Contractor shall not be paid on any Work on it.

1.17 DISTRIBUTION

A. Architect will distribute one electronic copy to Owner and Contractor for review.

B. Change Orders: Upon authorization, all parties will sign originals with original signatures, unless electronic signatures are acceptable to all parties.
   1. Project procedures for distribution will be discussed and agreed upon at the preconstruction meeting.
   2. All parties will receive signed copies of the Change Order for record.

C. Construction Change Directives: Upon authorization, Architect will issue one electronic copy to Owner and Contractor.
   1. Directive describes Work Change additions or deletions, with attachments of revised Contract Documents.
   2. Owner will sign and date as directive to proceed with Change.
   3. Promptly sign, date and return to the Architect. If Contractor does not agree with terms, it will proceed with changed Work and follow procedures noted in the General Conditions while still returning one copy to the Architect.

1.18 CREDIT AMOUNT TO CONTRACT SUM - INSURANCE

A. If a Change Order or Construction Change Directive results in a reduction of the Contract Sum, the Owner shall be entitled to a credit that includes the amount of the value of bond premium, amounts charged for additives for insurance premium.

1.19 CORRELATION OF CONTRACTOR SUBMITTALS

A. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item. Adjust Contract Sum as shown on Change Order.

B. Promptly revise Progress Schedule to reflect any changes in Contract Time, revise subschedules to adjust times for other items of work affected by the change, and resubmit.

C. Promptly enter changes in Project Record Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General administrative requirements.

B. Project coordination.

C. Electronic document submittal service.

D. Electronic document submittals.

E. Preconstruction meeting.

F. Progress meetings.

G. Preinstallation conferences.

H. Project closeout conference.

I. Contractor's daily reports.

J. Requests for information (RFI).

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

L. Number of copies of submittals.

M. Requests for Interpretation (RFI) procedures.

N. Deferred submittals.

O. Submittal procedures.

P. Product submittals - detailed requirements.

Q. Timing of submittals.

R. Construction progress schedule.

S. Schedule of values.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Delegated design requirements.

B. Section 01 31 23 - Project Management Database (PMD).

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

D. Section 01 32 00 - Construction Progress Documentation: Form, content and administration of schedules.

E. Section 01 40 00 - Quality Requirements: Testing Laboratory Reports and Manufacturer's Field Services.

F. Section 01 60 00 - Product Requirements: Contractor's list of Products.

G. Section 01 78 00 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 GENERAL ADMINISTRATIVE REQUIREMENTS

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

1.04 PROJECT COORDINATION

A. Coordinate Work of all personnel, requirements and Work specified throughout the Contract Documents, including Work performed by subcontractors and suppliers.

B. Coordinate scheduling, submittals, and the work of the various Sections of the Specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

C. Contractor's work and responsibilities include, but are not limited to, the following:
   1. Provide all labor, materials, equipment, delivery, tools, machines, facilities, and services necessary for the proper execution of the Work.
   2. Coordinate scheduling, submittals and Work of the various Sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
   3. Ensure that notification to and inspections by permitting agencies are completed in a timely fashion.
   4. Coordinate utility outages with a minimum of 48 hours advance notice to Owner.
   5. Store, protect, and secure materials, on and off site.
   6. Supervise and coordinate after hours work.

D. The separation of portions of the Work into particular divisions of the specifications or sections of the drawings may not in every case conform to the categories of work typically subcontracted to particular crafts or trades. Inform bidders, subcontractors, crafts and trades that work assigned to them may be contained in sections other than customary. In every case, provide and coordinate at no additional cost to Owner all work required in the Contract Documents.

E. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, all such equipment.

F. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for piping, ductwork, 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 construction and components.

H. Coordinate completion and cleanup of Work of separate Sections in preparation for Substantial Completion and for portions of Work designated for Owner occupancy.

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 activities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
   1. Besides submittals for review, information, and closeout, this procedure applies to submittal schedule, requests for information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, proposal requests, change orders, construction change directives), applications for payment, field reports and meeting minutes, substitution requests and any other document any participant wishes to make part of the project record.
   2. Contractor and Architect are required to use this service.
   3. It is Contractor's responsibility to submit documents in allowable format.
      a. Limit PDF size to 10MB, unless otherwise authorized by Architect.
      b. Name PDF's for product submittals as indicated under "Product Submittals - Detailed Requirements" Article.
   4. Subcontractors, suppliers, Architect, and Architect's consultants are to be permitted to use the service at no extra charge.

5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
7. 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 service is to be paid by Contractor; include the cost of the service in the Contract Sum.

C. Submittal Service: The selected service is:
1. e-Builder.
   a. Refer to Section 01 31 23 - Project Management Database (PMD) for additional information.

D. Training: One, one-hour training session will be arranged for all participants, with representatives of Architect, Architect's Consultants and Contractor participating; further training is the responsibility of the user of the service.

E. Project Closeout: Coordinate with Architect and Owner to verify that archive documents have been saved and remain accessible to Architect and Owner prior to terminating the service for the project.

3.02 ELECTRONIC DOCUMENT SUBMITTALS

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via email directed to the personnel identified at the Preconstruction Meeting.
1. Besides submittals for review, information, and closeout, this procedure applies to submittal schedule, requests for information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, proposal requests, change orders, construction change directives), applications for payment, field reports and meeting minutes, substitution requests and any other document any participant wishes to make part of the project record.
2. It is Contractor's responsibility to submit documents in PDF format.
   a. Limit PDF size to 10MB, unless otherwise authorized by Architect.
   b. Name PDF's for product submittals as indicated under "Product Submittals - Detailed Requirements" Article.
3. Paper document transmittals will not be reviewed, unless otherwise authorized by Architect.
4. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

3.03 PRECONSTRUCTION MEETING

A. The Owner will schedule a preconstruction conference before the start of construction, at a time convenient to the Owner, Contractor and the Architect, but no later than 10 days after execution of the Agreement. The conference will be held at the Project Site or another convenient location. The meeting shall be conducted to review general issues of responsibilities, communications, and contract administration procedures.

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

C. Attendance Required:
1. Owner.
2. Architect.
3. Contractor.
4. Contractor's Superintendent.
5. Major Subcontractors.

6. Major Suppliers when requested; others as appropriate.

D. Agenda:
1. Status of the Contract, bonds, insurance or other contract requirements.
2. Status/timing of Notice to Proceed.
3. Submission of executed bonds and insurance certificates.
4. Distribution of Contract Documents.
5. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
6. Submission of initial Submittal schedule.
7. Designation of personnel representing the parties to Contract and Architect.
8. Contract administration responsibilities, communications and procedures.
9. Project management communications and electronic submittal service requirements.
10. Tentative Contractor's construction schedule.
11. Procedures and processing of field decisions, submittals, substitutions, applications for payments, BOLI requirements, proposal request, Change Orders, and Contract closeout procedures.
12. Scheduling.
13. Related work by Owner and coordination with Contractor.
14. Use of premises and ongoing facility operations.
15. Review of existing conditions.
16. Hazardous materials.
17. Owner's requirements.
18. Working hours, site access and parking.
19. Contractor's site mobilization and storage areas.
20. Material and equipment deliveries.
21. Maintaining good neighborhood relations and limiting noise, store water, erosion and dust control.
22. Construction facilities and controls.
23. Temporary storage.
24. Security and housekeeping procedures.
25. Special inspection, testing and quality control, including procedures for testing.
26. Procedures for maintaining record documents.
27. Requirements for start-up of equipment and Commissioning.
28. Inspection and acceptance of equipment put into service during the construction period.
29. Status of permits.
30. Progress meeting schedule date and time.
31. Review of Contract Documents and outstanding questions related thereto.

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

3.04 PROGRESS MEETINGS

A. Progress meetings will be conducted at the Project Site on a weekly basis, or at intervals otherwise agreed to. The schedule of the meetings shall be established by mutual consent of the Owner, Architect and Contractor. No changes to said schedule shall be made without mutual consent of the same parties. Coordinate preparation of the payment request with dates of meetings.
1. Notify subcontractors and other representatives of scheduled meetings where their attendance is requested.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendees: In addition to representatives of the Contractor, Owner and the Architect, other individuals concerned with current progress or coordination may be represented at these meetings. Participation by Subcontractors shall be limited to attendance only when required

by the Architect or when a prearranged topic relating to the specific trade or supplier requires their attendance at the meeting.

1. Persons designated by the Contractor to attend and participate shall have all required authority to commit the Contractor to solutions as agreed upon in the meeting.

D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems that impede, or will impede, planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Status of RFIs, ASIs, Proposal Requests, CCDs and Change Orders.
   7. Review of off-site fabrication and delivery schedules.
   8. Site access, utilization and parking.
   9. Problems from or affecting occupants or neighbors.
   10. Permitting and agency issues.
   11. Quality/inspection issues.
   12. Maintenance of progress schedule.
      a. Review progress since the last meeting;
      b. Distribute Contractor's two-week look ahead schedule.
      c. Evaluate current activity is in relation to the Contractor's Schedule.
      d. Identify in advance potential delays involving: submittals, material / equipment procurement; approvals; Owner-furnished materials; or separate contracts, if any.
      e. Determine how construction behind schedule will be expedited; securing commitments from parties involved to do so.
      f. Determine whether a recovery schedule is required for the Contractor's Construction Schedule to insure completion within the contract time.
   13. Coordination of projected progress.
   14. Maintenance of quality and work standards.
   15. Effect of proposed changes on progress schedule and coordination.
   16. Pay Application review at monthly interval.
   17. Review of Project Record Documents.
   18. Other business relating to work.

E. Architect will record minutes and distribute copies within two days after meeting to participants, with one copy to Architect, Owner, participants, and those affected by decisions made.
   1. Minutes shall number topics in a manner that reflects when each topic was first raised.
   2. Each topic shall reflect who is responsible for acting on the topic and date by which resolution is required.
   3. No topic shall be dropped from the minutes until the method of resolution is recorded.

3.05 PREINSTALLATION CONFERENCES

A. When required in individual Specification Sections, convene a preinstallation conference at work site prior to commencing work of the Section.
   1. Additional conferences may be conducted as required for performance of the Work.

B. Attendees: The Installer and representatives of manufacturers and fabricators, sub-contractors, Contractor, Owner's representative and Owner's special inspector involved in or affected by the installation, and its coordination or integration with other materials and installations, shall attend the meeting. Advise the Architect of scheduled meeting dates.

C. Notify Architect and Owner minimum four days in advance of meeting date.

D. Agenda: Review the progress of related construction activities, including drawing and specification requirements for the following:
   1. Shop Drawings, Product Data, and quality-control samples and other required submittals.
   2. Time schedules,
   3. Weather limitations.

4. Manufacturer's recommendations.
5. Warranty requirements.
6. Acceptability of substrates.
7. Quality, inspection, and testing requirements.

E. Review conditions of installation, preparation and installation procedures, and coordination with related work.

F. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

G. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.

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

3.06 PROJECT CLOSEOUT CONFERENCE

A. Request a meeting to discuss the requirements for project closeout.

B. Attendees: In addition to representatives of the Contractor, Owner and the Architect, other individuals concerned with project closeout may be represented at these meetings.

C. Agenda:
1. Preparation of record documents.
2. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
3. Submittal of written warranties.
4. Requirements for preparing operations and maintenance data.
5. Requirements for demonstration and training.
6. Preparation of Contractor's punch list.
7. Completion time for correcting deficiencies.
8. Inspections by authorities having jurisdiction.
9. Certificate of occupancy and transfer of insurance responsibilities.
10. Partial release of retainage.
11. Preparation for final field observation.
12. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
13. Submittal procedures.
    a. Project Record Documents.
    b. Operating and maintenance documents.
    c. Final commissioning documentation.
    d. Warranties and bonds.
    e. Affidavits.
    f. Turnover of extra materials and spare parts.
14. Owner's partial occupancy requirements.
15. Installation of Owner's furniture, fixtures, and equipment.
16. Responsibility for removing temporary facilities and controls.
17. Final cleaning.
18. Contractor's demobilization of site.
19. Maintenance.

D. Architect will record meeting minutes.

3.07 REQUESTS FOR INFORMATION (RFIS)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, prepare and submit an RFI in the form specified.
1. RFIs shall originate with Contractor. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.

2. Limit topics on each RFI to a single topic to expedite response.
3. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
4. If Contractor disagrees with Architect's response to Contractor's RFI, Contractor shall notify Architect within seven days of receipt of response. Lack of such notification shall be understood to mean that Contractor agrees with response.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
2. Date.
3. Name of Contractor.
4. RFI number, numbered sequentially.
5. RFI subject.
6. Specification Section number and title and related paragraphs, as appropriate.
7. Drawing number and detail references, as appropriate.
8. Field dimensions and conditions, as appropriate.
9. Contractor's suggested resolution. If proposed solution impacts the Contract Time or the Contract Sum, state impact in the RFI.
10. The following statement:
    a. "This reply is not an authorization to proceed with work involving additional cost, time or both. If any reply requires a change to the Contract Documents, a Change Order or Construction Change Directive must be executed in accordance with the Contract Documents prior to implementation of the reply. Proceeding with the Work in accordance with this RFI response indicates Contractor's acknowledgement that there will be no change in the Contract Sum or Contract Time."
11. Contractor's signature.
12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings and other information necessary to fully describe items needing interpretation.

C. RFI Forms: Contractor's software-generated form with the content specified and as acceptable to the Architect.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
    a. Requests for approval of substitutions.
    b. Requests for adjustments in the Contract Time or the Contract Sum.
    c. Requests for interpretation of Architect's actions on submittals.
    d. Incomplete RFIs or inaccurately prepared RFIs.
2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Proposal Request according to Section 01 26 00 - Contract Modification Procedures.
    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
    b. A response to an RFI is not direction or approval of a change to either Contract Time or Contract Sum.
    c. Proceeding with the Work in accordance with an RFI response, without such written notification and an approved Change Order or Construction Change Directive, indicates Contractor's acknowledgement that there is no change to the Contract Time or the Contract Sum.

E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number using electronic document submittal service. Submit log at each Progress Meeting. Include the following:
   1. Project name.
   2. RFI number including RFIs that were dropped and not submitted.
   3. RFI description.
   4. Date the RFI was submitted.
   5. Date Architect's response was received.
   6. Identification of related Minor Change in the Work, Construction Change Directive, Change Order and Proposal Request, as appropriate.

3.08 SUBMITTAL SCHEDULE

A. Submit to Architect for review a schedule for submittals in tabular format.
   1. Submit at the same time as the preliminary schedule specified in Section - 01 32 16 - Construction Progress Schedule.
   2. Coordinate with Contractor's construction schedule and schedule of values.
   3. Format schedule to allow tracking of status of submittals throughout duration of construction.
   4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
   5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
      a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.09 SUBMITTALS FOR REVIEW

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

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

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

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

3.10 DEFERRED SUBMITTALS

A. For delegated design elements defined in Section 01 10 00 - Summary, submit deferred submittals in accordance with the specified requirements and in accordance with Section 107.3.4.2 of the Oregon Structural Specialty Code.

B. Submission will include the following, as a minimum, in quantities as required by the governing agency:
   1. Drawings showing all members, sizes, fastener information, where applicable, dimensions, connections, materials used and how attached to the main structure.
   2. Calculations, including criteria, design assumptions, substantiating computations and such additional data sufficient to show compliance with Code.
   3. Product information.

4. Drawings and calculations must be stamped and signed by an Engineer registered in Oregon and must have Architect/Engineer of record's submittal review stamp.

C. Architect or Engineer, as applicable, will review delegated design submittals, and, if the submittal is acceptable and receives a "No Exceptions Taken" or "Make Corrections Noted" action, will forward to the Contractor for submission to the building official with annotation indicating that the deferred submittal documents have been reviewed and that they have been found to be in general conformance with the design of the building.

D. The Architect's and Engineer's approval is contingent upon approval of submittal by governing authorities.

E. Contractor shall be responsible for submission to the governing agency and for coordinating with the governing agency for timely review and approval of the submittals. Architect will not be responsible for delays due to failure of the Contractor to submit with adequate time allowance for agency review of the submittals.

F. The deferred submittal items shall not be installed until their design and submittal documents have been approved by the building official.

G. Contractor is responsible for obtaining written approval from governing authority for all Deferred Submittals.

H. Contractor is responsible for obtaining and costs associated with applicable permits for delegated design elements as required by governing authority.

3.11 SUBMITTALS FOR INFORMATION

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

B. Submit for Architect's knowledge as contract administrator for Owner. No action will be taken.

3.12 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 78 00 - Closeout Submittals:
1. Project record documents.
2. Operation and maintenance data.
3. Warranties.
4. Bonds.
5. Other types as indicated.

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

3.13 NUMBER OF COPIES OF SUBMITTALS

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

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
1. After review, produce duplicates.
2. Retained samples will not be returned to Contractor unless specifically so stated.

3.14 SUBMITTAL PROCEDURES

A. General Requirements:
   1. Submit submittals to Architect as indicated in Electronic Document Submittals Article above.
   2. Transmit using approved form.
      a. Use form generated by Electronic Document Submittal Service software.
   3. Submit Schedule of all shop drawings, product data, and samples as specified in each individual Section of the Project Manual. Include submittal and installation dates of each product and assembly. Coordinate with construction schedule and allow ample time, but in no case fewer than 14 days, for Architect's review. Allow time for possible disapproval, correction, and resubmittal.
   4. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
      a. Provide a separate PDF for each submittal element (Product Data, Shop Drawings, etc.) for each specification Section.
         1) Submit all elements for any Section as a single submittal at the same time.
         2) Do not combine submittals for multiple specification Sections, unless previously approved by the Architect.
      b. Number submittals as indicated in Product Submittals - Detailed Requirements Article.
      c. No secure PDFs allowed.
      d. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
   5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
   6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
      a. Architect will not accept or process submittals which do not have Contractor's signed stamp that reflects Contractor's review and approval.
      b. Submission of submittal by Contractor represents that Contractor has fully reviewed and certified acceptance.
   7. Schedule submittals to expedite the Project, and coordinate submission of related items.
      a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
      b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
   8. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
      a. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Architect's review of submittals, unless Contractor notates specific deviations and the deviations are specifically approved by the Architect.
   9. Provide space for Contractor and Architect review stamps.
   10. When revised for resubmission, identify all changes made since previous submission.
   11. Submittals not requested will be recognized, but will be returned without comment,

B. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
   2. Do not reproduce Contract Documents to create shop drawings.
   3. Use of reproductions of Contract Documents in digital data form to create shop drawings is only permitted as defined _____.

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

C. Do not fabricate products or begin work which requires submittals prior to return of submittal with Architect acceptance.

D. Contractor is responsible for timely and efficient submittals and the correctness of the documentation submitted. Costs associated with multiple reviews of submittal information beyond one re-submittal (if any) shall be the responsibility of the Contractor.

E. The Contractor is responsible for timely submittals of any required deferred submittals to the governing agencies.

3.15 SUBMITTAL REVIEW

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

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

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

D. Architect's and consultants' actions on items submitted for review:
1. Authorizing purchasing, fabrication, delivery, and installation:
   a. "Approved", or language with same legal meaning.
   b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
      1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
   c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
2. Not Authorizing fabrication, delivery, and installation:

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

3.16 PRODUCT SUBMITTALS - DETAILED REQUIREMENTS

A. Present in a clear and thorough manner. Title each drawing with Project Name.

B. Identify field-verified dimensions; show relation to adjacent or critical features of Work or products.

C. Number submittals by submittal section number, followed by a two letter designation for the type of submittal and a number which sequentially numbers submittals in order submitted to Architect. For example, the initial submittal of Joint Sealers 07 92 00 Product Data would be designated 079200-PD-1. If the submittal must be resubmitted it shall be identified as 079200-PD-1R1 and subsequent resubmittal shall be sequentially numbered in order as resubmitted.

D. Shop Drawings (SD):
1. Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproduction of the Contract Documents or standard printed data.
2. Fully illustrate requirements in the Contract Documents including, but not limited to:
   a. Identification of products.
   b. Compliance with specified standards.
   c. Notation of coordination requirements.
   d. Notation of dimensions established by field measurement.

e. Relationship and attachment to adjoining materials or assemblies, relevant field conditions and all necessary dimensions.

E. Product Data (PD):
1. Submit only pages which are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number.
2. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable.
3. Product data that has not been marked to indicate the applicable information will be returned without review.
4. Contractor shall assemble Product Data required for maintenance manuals and submit to Architect in accordance with Section 01 78 00 - Closeout Submittals.

F. Samples (SA):
1. Samples for Initial Selection: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected. Architect will retain selected sample for confirmation of subsequent submittals.
2. Submit samples to illustrate functional characteristics of products, including parts and attachments.
3. Approved samples which may be used in the Work are indicated in the individual Specification Sections.
4. Label each sample with identification required for transmittal letter.
5. Verification Samples: Submit the number of samples specified in individual Specification Sections. One of which will be retained by the Architect.
a. Submit three copies if no number is indicated.
b. Submit additional samples when copies will be required for distribution to other subcontractors or fabricators for matching or preparation of finish samples.
6. Provide field samples of finishes at project site, at location acceptable to Architect, as required by individual Specifications Section. Install each sample complete and finished. Acceptable finishes in place may be retained in completed work if approved by Architect.

G. Manufacturer's Instructions (MI):
1. Provide at Minimum: Manufacturer's instructions for storage, preparation, assembly, installation, start-up, adjusting, balancing, and finishing in accordance with Section 01 40 00 - Quality Requirements.

H. Manufacturer's Certificates (MC):
1. When specified in individual Specification Sections, submit manufacturers' certificate to Architect/Engineer for review, in quantities specified herein.
2. Indicate material or product in conformance with or exceeding specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
3. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect.

3.17 TIMING OF SUBMITTALS

A. General:
1. The listing of submittals hereinafter is set forth as a checklist for Contractor's convenience and is general in nature.
2. Architect reserves the right to add to this list in case of omission of any submittals specified in other Sections but not listed hereinafter.

B. Submittals - Required Within Seven Days Postbid:
1. Contractor's Qualification Statement.
2. Letter from Insurance Company - insurance required effective upon Contract.
3. Letter from Surety - bonds required effective upon Contract.
4. Breakdown of bid (if requested).

5. Names of proposed suppliers for each of the principal portions of the Work.
6. Contractor's Construction Management Personnel: Project Manager - minimum 3 years experience; Field Superintendent - minimum 5 years experience.
7. Responsibility of Subcontractors.
8. A designation of the Work to be performed by the Contractor by his own forces.

C. Submittals - Required Within Seven Days After Notice of Intent to Award Contract (Prior to Execution of Contract):
1. Final List of Subcontractors and major material suppliers for principal portions of the Work.
2. Evidence of bondability (Performance Bond and Payment Bond).
3. Certificates of Insurance (on AIA Document G705 or equivalent).
4. Actual costs (%) of the Contractor's liability insurance.
5. Endorsements for additional insured.
6. Statements of State Worker's Compensation coverage.
7. Copy of Builder's Risk Policy.
8. Project Organizational Chart.
9. Key Staff Resumes with telephone and contact information.
10. Summary of Warranties included in Bid, including duration and start time of each. Itemize any deviations from Bid Document requirements.
11. Other documents required by Contract Documents.

D. Submittals - Prior to Notice to Proceed:
1. Executed Agreement.
2. Certified copies of Contractor's Liability Insurance Policies (AIA Document G705).

E. Submittals - Within Seven Days Following Contract Execution and Prior to Commencing Work:
1. Deliver Bonds to Owner with copy to Architect.
2. Performance and Labor & Material Payment Bonds per Oregon Law with certified copy of Power of Attorney from Attorney-in-Fact executing bonds.
3. Certified Schedule of Prevailing Wage Rates (attach to executed contract).

F. Submittals - Within Thirty Days Following Notice to Proceed and Prior to First Payment Application:
1. Schedule of values - submit at least 14-days in advance of application.
2. Schedule of submittals.
3. Copies of acquired and unacquired building permit licenses etc. to complete the Work of the Contract. Submit copies of any remaining permits as they are acquired.
4. Construction schedule.

G. Submittals - Prior to Each Month's Progress Payment:
1. Submit 10 days in advance of date established for progress payment.
2. Application and Certificate for Payment (AIA Document G702 and G703).
3. Notarized affidavit of payments to all subcontractors and major material suppliers (see application for payment).
4. Updated Construction Schedule.
5. Public Works Contractor Wage Certification per Oregon Law.

H. Submittals - Prior to request for Substantial Completion:
1. Notification to Architect that Work of the Project is substantially complete.
2. Itemized listing of items of work to be completed or corrected.
3. Submit Certificate of Occupancy or Occupancy Permit issued by the Local Building Department for the entire Project.
4. Draft Operations and Maintenance Manuals and draft warranties.

I. Submittals - Prior to request for Final Completion:
1. Certified copy of punchlist items completed.
2. Submit final Application for Payment.
3. Summary of Commissioning indicating all required items are completed.
4. Demonstration and Training training reports.

5. Final complete and correct Operations and Maintenance Manuals.
6. Record Drawings of Contract Documents with all changes indicated.
7. Final dated and signed Warranties.

3.18 CONSTRUCTION PROGRESS SCHEDULE

A. Submit initial progress schedule as required in Section 01 32 00 - Construction Progress Documentation.

B. Revise and resubmit as required.

C. Review revised schedules with each Application for Payment, identifying changes since previous version.

D. See Section 01 32 00 for specific requirements.

3.19 SCHEDULE OF VALUES

A. Submit typed schedule on AIA Form G703. Contractor's standard form or media-driven printout will be considered on request.

B. Format: Table of Contents of this Project Manual. Identify each line item with number and title of the major Specification Sections.

C. Revise schedule to list change orders, for each application for payment.

D. Comply with requirements in Section 01 20 00 - Price and Payment Procedures.

END OF SECTION

SECTION 01 31 23
PROJECT MANAGEMENT DATABASE (PMD)

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Summary.

B. General Requirements.

C. System Requirements.

D. System Access.

E. System Use.

1.02 SUMMARY

A. Project Management Communications: The Owner, Contractor and Architect shall use the Internet web based project management communications tool, e-Builder® software, and protocols included in that software during this project. The use of project management communications as herein described does not replace or change any contractual responsibilities of the participants.

B. Purpose: The intent of using e-Builder® is to improve project work efforts by promoting timely initial communications and responses and to reduce the number of paper documents while providing improved record keeping by creation of electronic document files

1.03 GENERAL REQUIREMENTS

A. Project management communications is available through e-Builder® as provided by "e-Builder®" in the form and manner required by the Owner.

B. The project communications database is on-line and fully functional. User registration, electronic and computer equipment, and Internet connections are the responsibility of each project participant. The sharing of user accounts is prohibited.

C. Support: e-Builder® will provide on-going support through on-line help files.

D. Authorized Users: Access to the web site will be by individuals who are licensed users as required by the Owner.

E. Licenses Granted by Owner: Owner shall pay for and provide licenses for the following members of the project team:
   1. Lead member of Architect's design team responsible.
   2. Two Contractors representatives.
   3. Owner's project manager or representative.
   4. Others as deemed appropriate by Owner.

1.04 SYSTEM REQUIREMENTS

A. System configuration:
   1. PC system 500 MHz Intel Pentium III or equivalent AMD processor
   2. 128 MB Ram
   3. Display capable of SVGA (1024 x 768 pixels) 256 colors display
   4. 101 key Keyboard
   5. Mouse or other pointing device.

B. Operating system and software configuration
   1. All software shall be properly licensed with vendors or developers. Use of “e-Builder” does not convey any rights or licensure for use of any software, hardware or internet service provider.
   2. Software configuration:
      a. Most current version of Microsoft Internet Explorer (current version is a free distribution for download). This specification is not intended to restrict the host server

or client computers provided that industry standard HTTP clients may access the published content.

b. Most current version of Adobe Acrobat Reader (current version is a free distribution for download).

c. Other plug-ins specified by e-Builder® as applicable to the system (current versions are a free distribution for download from www.e-builder.net)

d. Users are recommended to have properly licensed versions of the standard Microsoft Office Suite (current version must be purchased) or the equivalent.

1.05 SYSTEM ACCESS

A. Minimum Equipment and Internet Connection: In addition to other requirements specified in this Section, the Contractor shall be responsible for providing suitable computer systems for each licensed user at the users normal work location with high-speed Internet access, i.e. DSL, local cable company's Internet connection, or T1 connection.

B. Authorized users will be contacted directly by the web site provider, e-Builder®, who will assign the temporary user password.

C. Individuals shall be responsible for the proper use of their passwords and access to data as agents of the company in which they are employed.

1.06 SYSTEM USE

A. Owner's Administrative Users: Owner administrative users have access and control of user licenses and all posted items. DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE!

B. Improper or abusive language toward any party or repeated posting of items intended to deceive or disrupt the work of the project will not be tolerated and will result in deletion of the offensive items and revocation of user license at the sole discretion of the Administrative User(s). Costs incurred or associated with such issues shall be the financial responsibility of the party responsible for the transgression.

C. Communications: Communication for this project for the items listed below shall be solely through e-Builder®:

1. Applications for Payment.
2. Meeting minutes.
3. RFI, Requests for Information.
4. Contract Modifications.
5. Architect's Supplemental Instructions.
6. Submittals.
7. Substitution requests.
8. Record document submission.
9. Test results.
10. O&M Manuals (electronic format).
11. Formal letters and notices between the District and the Contractor.
12. Calendar of Events (meetings, events, open houses, public site tours, etc.).
13. All other communication shall be conducted in an industry standard manner.

D. Document Integrity and Revisions:

1. Documents, comments, drawings and other records posted to the system shall remain for the project record. The authorship time and date shall be recorded for each document submitted to the system. Submitting a new document or record with a unique ID, authorship, and time stamp shall be the method used to make modifications or corrections.
2. The system shall identify revised or superseded documents and their predecessors.
3. Server or Client side software enhancements during the life of the project shall not alter or restrict the content of data published by the system. System upgrades shall not affect access to older documents or software.

E. Document Security:
   1. The system shall provide a method for communication of documents. Documents shall allow security group assignment to respect the contractual parties' communication except for Administrative Users.

F. Document Integration:
   1. Documents of various types shall be logically related to one another and discoverable.

G. Notifications and Distribution:
   1. Document distribution to project members shall be accomplished both within the extranet system and via email as appropriate. Project document distribution to parties outside of the project communication system shall be accomplished by secure email of outgoing documents and attachments, readable by a standard email client.

H. Ownership of Documents and Information:
   1. All documents, files or other information posted on the system shall become the property of the Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preliminary schedule.

B. Construction progress schedule, with network analysis diagrams and reports.

C. Material location reports.

D. Field condition reports.

E. Special reports.

1.02 REFERENCES

A. AGC (CPSM) - Construction Planning and Scheduling Manual.

B. M-H (CPM) - CPM in Construction Management - Project Management with CPM; O'Brien.

1.03 SUBMITTALS

A. Preliminary Schedule: Within 10 days after date of Owner's Notice of Intent to Award the Contract, submit preliminary schedule defining planned operations for the first 30 days of Work, with a general outline for remainder of Work.
   1. Submit minimum two hard copies to Architect for review.
   2. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

B. Construction Schedule: Within 14 days after date established in Notice to Proceed, submit draft of proposed complete schedule for review.
   1. Include written certification that major Subcontractors have reviewed and accepted proposed schedule.
   2. Not less than 10 percent of the initial Application for Payment may be withheld until a complete Construction Progress Schedule has been submitted in a form acceptable to Architect and Owner.
   3. Neither Owner nor Architect shall be responsible for review of the entire substance of the Progress Schedule.
   4. Within 30 days after dated established in Notice to Proceed, submit complete schedule.
   5. Submit updated schedule with each Application for Payment.
   6. At each progress meeting, submit the following:
      a. Updated schedule incorporating revisions to the construction schedule.
      b. A three-week look-ahead schedule listing current and upcoming activities by trade, including anticipated start and complete dates as applicable.

C. Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.

D. Material Location Reports: Submit at monthly intervals.

E. Field Condition Reports: Submit at time of discovery of differing conditions.

F. Special Reports: Submit at time of unusual event.

1.04 QUALITY ASSURANCE

A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one year minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

1.05 SCHEDULE FORMAT

A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

B. Diagram Sheet Size: Maximum 30 x 42 inches or width required.

C. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS

2.01 PRELIMINARY SCHEDULE

A. Prepare preliminary schedule in the form of a preliminary network diagram.

B. Content
   1. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
   2. Identify each item by specification section number.
   3. Identify work of separate stages and other logically grouped activities.
   4. Include conferences and meetings in schedule.
   5. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
   6. Show product and installation dates for major products.
   7. Provide separate schedule of submittal dates for shop drawings, product data, and samples, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
   8. Include a line item for Project Closeout.
   9. Coordinate content with schedule of values specified in Section 01 20 00 - Price and Payment Procedures.
   10. Include not more than 30 days for punch list and final completion, unless otherwise indicated.
   11. Provide legend for symbols and abbreviations used.

2.02 NETWORK ANALYSIS

A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.

B. Schedule shall include date of Notice to Proceed, date of Substantial Completion, and date of Final Completion in accordance with Contract Documents.
   1. Critical Path shall be clearly indicated on Schedule.
   2. Not more than 20 percent of the progress activities shall be on the Critical Path at any one time.
   3. Not more than 5 percent of the total individual activities may exceed $50,000 or 20 calendar days (per activity) without prior approval.

C. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.

D. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
   1. Preceding and following event numbers.
   2. Activity description.
   3. Estimated duration of activity, in maximum 20 day intervals.
   4. Earliest start date.
   5. Earliest finish date.
   6. Actual start date.
   7. Actual finish date.
   8. Latest start date.
   9. Latest finish date.
   10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
   11. Monetary value of activity, keyed to Schedule of Values.
   12. Percentage of activity completed.
   13. Responsibility.

E. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and recomputation of all dates and float.

F. Milestone completion dates shall be clearly shown on the Schedule.

G. If abbreviations are used on the Schedule, a legend shall be provided to define all abbreviations.

H. Required Reports: List activities in sorts or groups:
   1. By preceding work item or event number from lowest to highest.
   2. By amount of float, then in order of early start.

I. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.03 THREE-WEEK WORK SCHEDULE

A. Each week, prepare and present an updated schedule showing the planned activities for the next three weeks and one week prior. The schedule shall be coordinated with the master schedule and accurately portray activities completed and activities planned for the upcoming weeks. Present this schedule at the weekly progress meeting.

2.04 SCHEDULE - DRIVEN REQUIREMENTS

A. A schedule for the purchase, delivery, and receipt of critical items required for performance of the Work, showing lead times between purchase order placement and delivery dates, shall be integrated with the Construction Progress Schedule. Neither the Architect nor the Owner shall be deemed to have approved or accepted any such material, or its schedule, nor deemed to have waived this requirement if some or all of the material is not received.

B. Should the Contractor fail to meet any scheduled date as shown on the current Construction Progress Schedule, the Contractor shall, if requested, be required at its own expense to submit within ten days of the request an updated Construction Progress Schedule. If the Contractor's progress indicates to the Owner that the Work will not be Substantially Completed within the Contract Time, the Contractor shall, at its own expense, increase its work force and/or working hours to bring the actual completion dates of the activities into conformance with the Construction Progress Schedule and Substantial Completion within the Contract Time. The Contractor shall reschedule and also submit a revised Construction Progress Schedule at its own expense within ten days of notice from the Architect that the sequence of work varies significantly from that shown on the current Schedule showing work to complete on original Contract Time with approved extensions. Neither the Owner nor the Architect will, however, be obligated to review the substance or sequence of the Construction Progress Schedule or otherwise determine whether it is correct, appropriate or attainable.

C. Schedule Float Utilization:
   1. Any float time to activities not on the critical path shall belong to the Project, and may be used by the Project to optimize its construction process. Any float time between the end of the final construction activity and the final completion date shall belong to the Owner, and may be used by the Owner in determining if additional contract days are to be awarded for changes in the contract or for delays to the contract caused by the Owner. The Contractor will not be entitled to any adjustment in the Contract Time, the Construction Schedule, or the Contract Sum, or to any additional payment of any sort by reason of the Owner's use of float time between the end of the final construction activity and the final completion date or by reason of the loss or use of any float time, including time between the Contractor's anticipated completion date and end of the Contract Time, whether or not the float time is described as such on the Construction Progress Schedule.

D. Closeout: In the Contractor's Construction Schedule provide key activities required under Sections 01 77 00 - Closeout Procedures and 01 78 00 - Closeout Submittals. These activities will be cost-loaded to a cumulative total of not less than 2 percent of the contract value.

2.05 REPORTS

A. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.06 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 EXECUTION

3.01 REVIEW AND EVALUATION OF SCHEDULE

A. Participate in joint review and evaluation of schedule with Architect at each submittal.

B. Evaluate project status to determine work behind schedule and work ahead of schedule.

3.02 UPDATING SCHEDULE

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity.

C. Update diagram to graphically depict current status of Work.

D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Submit reports required to support recommended changes.

3.03 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.

B. References and standards.

C. Inspection agencies and services.

D. Control of installation.

E. Tolerances.

F. Manufacturers' field services.

G. Defect Assessment.

1.02 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal procedures.

B. Section 01 42 16 - Definitions.

C. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.03 SUBMITTALS

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

B. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
   1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
   2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

C. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

D. Manufacturer's Field Reports: Submit reports in quantities specified for Product Data.
   1. Submit report within 15 days of observation to Architect for information.
   2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

E. Permits, Licenses, and Certificates: For Owner's records, 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.

1.04 DEFINITIONS

A. Preconstruction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

B. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous 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.

1.05 CONFLICTING REQUIREMENTS

A. Metal Thickness: Where thickness of metals is designated in both gage and thickness in inches, the thickness in inches shall govern. Gages are provided for convenience only. Specified submittals for metals shall indicate thicknesses in inches.

1.06 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

1.07 INSPECTION AGENCIES AND SERVICES

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified inspection agency to perform these services.
   1. Owner will furnish Contractor with names, addresses, and telephone numbers of inspecting agencies engaged and a description of types of inspecting they are engaged to perform.
   2. Costs for 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: Inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
   1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
   2. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
   3. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
   4. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

1.08 MANUFACTURER'S FIELD SERVICES

A. Manufacturer's Field 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.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

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

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

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

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 INSPECTION

A. See individual specification sections for inspection required.

B. Inspection Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   2. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
   3. Perform additional inspections required by Architect.
   4. Submit reports of all inspections specified.
      a. One copy of all inspection reports shall be promptly sent directly to the Contractor, Architect, Owner, Structural Engineer, Building Department, unless otherwise directed.
      b. In addition to written reports, immediately notify by telephone Architect, Owner and Contractor of any portions of the work found to be in non-compliance with the Contract Documents.

C. Limits on Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:
   1. Provide access to the Work.
   2. Provide incidental labor and facilities:
      a. To provide access to Work to be inspected.
      b. To facilitate inspections.
   3. Notify Architect and inspection agency 24 hours prior to expected time for operations requiring inspection services.
      a. When inspections cannot be performed, through the fault of the Contractor, reimburse the Owner for the additional costs incurred.
      b. Schedule inspection so that the services of inspection personnel will be as continuous and brief as possible.
   4. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
      a. When tests or inspections cannot be performed, through the fault of the Contractor, reimburse the Owner for the additional costs incurred.
   5. Arrange with Owner's agency and pay for additional inspections required by Contractor beyond specified requirements.
      a. Schedule inspection so that the services of inspection personnel will be as continuous and brief as possible.

E. Contractor shall be responsible for coordinating inspecting services so as to insure that inspections are performed and reports delivered in a manner not to cause delays to the Work. Allow adequate time for inspection and any needed corrections before proceeding to the next construction stage.

F. Furnish records, drawings, certificates, and similar data as may be required by the inspecting personnel to assure compliance with the Contract Documents.

G. Re-inspection required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.

H. Re-inspection required because of non-conformance to specified requirements shall be paid for by Contractor.

3.04 INSPECTION REPORTS

A. The inspecting agency will perform and furnish the following:
   1. Field Inspection Reports: Furnish field inspection reports for each site visit documenting activities, observations, and inspections of work being inspected include:
      a. Date issued.
      b. Project title and number.
      c. Inspecting agency or engineering firm name, address, and telephone number.
      d. Name and signature of representative.
      e. Observations on weather and climatic conditions.
      f. Time and date
      g. Conditions and/or status of the work being inspected.
      h. Actions taken.
      i. Recommendations or evaluation of the work.
   2. Reports will be submitted to Owner and Architect in duplicate giving observations and results of inspections, indicating compliance or non-compliance with specified standards and with Contract Documents.

3.05 MANUFACTURERS' FIELD SERVICES

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

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

C. 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. Name, address, and telephone number of technical representative making report.
   2. Statement on condition of substrates and their acceptability for installation of product.
   3. Statement that products at Project site comply with requirements.
   4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
   5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
   6. Statement whether conditions, products, and installation will affect warranty.
   7. Other required items indicated in individual Specification Sections.

3.06 DEFECT ASSESSMENT

A. When inspections indicate non-compliance with the Contract Documents, subsequent re-inspection occasioned by such noncompliance shall be performed by the same personnel as performed the initial inspections, and the additional cost shall be paid by the contractor as stipulated under the Conditions of the Contract.

B. Contractor shall remove and replace any work found defective or not in compliance with the Contract Documents at no additional cost to Owner, and furnish notice for re-inspecting as specified herein above.

C. Replace Work or portions of the Work not conforming to specified requirements.

3.07 REPAIR AND PROTECTION

A. General: On completion of inspecting and similar services, repair damaged construction and restore substrates and finishes.

B. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 40 05
CUTTING AND PATCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements and limitations for cutting and patching of the Work.

1.02 RELATED REQUIREMENTS

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

B. Section 01 70 00 - Execution: Examination, preparation, and general installation procedures.

C. Section 02 41 19 - Selective Structure Demolition.

1.03 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

B. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

1.04 SUBMITTALS

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

B. Submit written request in advance of cutting or alteration which 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.

C. Include in request:
   1. Identification of Project.
   2. Location and description of affected work.
   3. Necessity for cutting or alteration.
   4. Description of proposed work, and products to be used.
   5. Alternatives to cutting and patching.
   6. Date and time work will be executed.

PART 2 PRODUCTS

2.01 MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00.

PART 3 EXECUTION

3.01 GENERAL

A. Execute cutting, fitting, patching and finishing including excavation and fill, to complete Work, and to:
   1. Fit the several parts together, to integrate with other work.
   2. Uncover work to install ill-timed work.
   3. Match work that has been cut to adjacent work.
   4. Repair areas adjacent to cuts to required condition.
   5. Repair new work damaged by subsequent work.
   6. Remove and replace defective and non-conforming work.
   7. Provide finished appearance of surfaces and to match adjacent surfaces (unless otherwise noted) affected by the Work.

3.02 INSPECTION

A. Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

B. After uncovering, inspect conditions affecting performance of work.

C. Beginning of cutting or patching means acceptance of existing conditions.

3.03 PREPARATION

A. Provide supports to assure structural integrity of surroundings; devices and methods to protect other portions of Project from damage.

B. Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations. Maintain excavations free of water.

C. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

3.04 PERFORMANCE

A. Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.

B. Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

C. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
   3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
   4. Roofing: At locations where existing roofing must be removed to accommodate new construction, remove roofing, including insulation as necessary. Provide a temporary cutoff in strict accordance with roofing manufacturer's recommendations, to provide a 100 percent watertight seal.
      a. If any water is allowed to enter under the existing roofing, the affected area shall be removed and replaced at Contractor's expense.

D. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
   1. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. At locations where interior finishes are damaged to accommodate modifications to or relocation of roof ladders, patch and repair gypsum board finishes and touch up paint so that no evidence of patch remains in the finished work.
      a. Coordinate with Owner to match paint materials, color and sheen.
   4. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
   5. Replacement of defective work will not create new seams or joint lines.
   6. Restore work with new products in accordance with requirements of Contract Documents.

7. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

E. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.05 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements. Materials subject to testing and inspection in the specifications shall be retested after cutting and patching operations are completed.

END OF SECTION

SECTION 01 42 16
DEFINITIONS

PART 1 GENERAL

1.01 SUMMARY

A. This section supplements the definitions contained in the General Conditions.

B. Other definitions are included in individual specification sections.

1.02 SPECIFICATION EXPLANATION

A. The specifications are divided into Divisions and Sections for the convenience of writing and using. The titles of these are not intended to imply a particular meaning nor to fully describe the work of each division or section, and are not an integral part of the text which specifies the requirements. The Architect is not bound to define the limits of any subcontract, and will not enter into disputes between the Contractor and its employees, including subcontractors.

B. These specifications are of the abbreviated, or "streamlined" type, and include incomplete sentences. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

C. Omissions of words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the drawings.

D. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

1.03 DEFINITIONS

A. The definitions in this Section are not necessarily complete or exclusive but, generally, apply to all portions of the Work. Some contractual definitions appear in the General Conditions. Definitions of words of a special nature which relate to Work covered in one or two Sections of the Specifications are included in such Sections. Terms used throughout the Contract Documents are defined in this Section.

B. Approve: Where used in conjunction with the Architect's or Engineer's response to submittals, requests, applications, inquiries, reports, and claims by the Contractor, the meaning of the term "approved" will be held to the limitations of the Architect's responsibilities and duties as specified in the General and Supplementary Conditions. In no case will "approval" by the Architect be interpreted as an assurance to the Contractor that the requirements of the Contract Documents have been fulfilled. The term “or approved” used in conjunction with specified materials means “properly submitted and approved substitution request.”

C. Coordinate: The term "coordinate" means satisfactorily combine the work of all trades for a complete and operating installation.

D. Directed, Requested, etc.: Unless otherwise explained, terms such as "directed", "requested", "authorized", "selected", "approved", "required", "accepted", and "permitted" mean "directed by the Architect", "requested by the Architect", etc. However, no such implied meaning will be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.

E. Furnish: Except as otherwise defined in greater detail, the term "furnish" is used to mean supply and deliver to the project site, ready for unloading, unpacking, assembly, installation and similar operations.

F. General Requirements: The provisions or requirements of Divisions 01 Sections apply to entire work of Contract and, where so indicated, to the other elements of work which are included in the Project.

G. Guarantee and Warranty: "Warranty" is generally used in conjunction with products manufactured or fabricated away from the project site, and "guarantee" is generally used in

conjunction with units of work which require both products and substantial amounts of labor at the project site. The resulting difference is that warranties are frequently issued by manufacturers and frequently supported (partially) by product guarantees from contractors and/or installers.

H. Indicated: A cross reference to details, notes or schedules on the Drawings, to other paragraphs or schedules in the Specifications, and to similar means of recording requirements in the Contract Documents. Where terms such as “shown”, “noted”, “scheduled”, and “specified” are used in lieu of “indicated”, it is for purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.

I. Install: Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

J. Installer: The person or entity engaged by the Contractor or his Subcontractor or Sub-subcontractor for the performance of a particular unit of work at the project site, including installation, erection, application and similar required operations. It is a general requirement that Installers be recognized experts in the work they are engaged to perform.

K. Product: The term "product" as used in the Project Manual includes materials, systems, and equipment provided by the Contractor for use in the Work.

L. Project Manual: The term "Project Manual" is the volume which includes the Bidding Requirements, Conditions of the Contract, and the Specifications, Divisions 01 through 33 inclusive, as applicable, and as listed in the Table of Contents bound therein.

M. Provide: Except to the extent further defined, the term "provide" means to furnish and install, complete and ready for the intended use.

N. Selected: The term "selected" means "selected by the Architect and Owner"; the Architect shall be the sole judge of the acceptability of a product or an installation.

O. Site: Space available to the Contractor for performing the Work under this Contract, either exclusively or in conjunction with other contractors as part of the overall Project. The Site may be unimproved vacant land, an existing building or space within an existing building. The extent of the Site is shown on the Drawings.

P. Specification Language: Imperative language is used, generally, throughout the Specifications. Requirements expressed imperatively are to be performed by the Contractor. For clarity at certain locations, contrasting subjective language is used to describe responsibilities which must be performed by the Contractor or, when so noted, will be performed by others.

Q. Trades: Using terms such as carpentry is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as carpenter. It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utility installation.

B. Support facilities installation.

C. Security and protection installation.

D. Mold and moisture control.

E. Removal of temporary utilities, facilities and controls.

1.02 RELATED REQUIREMENTS

A. Section 01 70 00 - Execution: For Progress cleaning.

B. Section 01 74 19 - Construction Waste Management and Disposal.

1.03 REFERENCE STANDARDS

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

B. ICC A117.1 - Accessible and Usable Buildings and Facilities.

C. NFPA 70 - National Electrical Code.

1.04 SUBMITTALS

A. Staging: Submit a detailed staging and logistics plan and site specific safety plan on Project Site Plan to Architect, Owner and governing authorities for review and approval prior to commencement of Work.

B. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage, including delivery, handling, and storage provisions for materials subject to water absorption or water damage, discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water damaged Work.

1. Indicate sequencing of work that requires water and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

1.05 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

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

C. Accessible Temporary Egress: Comply with applicable provisions in the ADA Standards and ICC A117.1.

PART 2 PRODUCTS

2.01 TEMPORARY FACILITIES

A. Utility Usage Charges: Owner will pay for utility usage charges.

1. Owner will furnish reasonable quantities of water and electricity to the Contractor without charge. Contractor shall be responsible for both temporary utility connections and disconnects, and shall obtain permission of the Owner prior to accomplishing either.

B. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

C. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate project meetings specified in

Section 01 30 00 - Administrative Requirements. Keep office clean and orderly. Furnish and equip offices as follows:

1. Pay for temporary mobile unit permits as required by the local governing agencies.
2. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
3. Conference room of sufficient size to accommodate meetings of ten individuals. Furnish room with conference table, chairs, and tack and marker boards.
4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 degrees F.
5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

PART 3 EXECUTION

3.01 TEMPORARY UTILITY INSTALLATION

A. Temporary Utility Installation, General:
   1. Engage local utility companies to install temporary service or to make connections to existing service.
   2. Arrange with the companies and existing users for an acceptable time when service can be interrupted to make connections.
   3. Establish a service implementation and termination schedule. As early as possible, change to use of permanent service, to enable removal of the temporary utility and to eliminate any possible interference with completion of the Work.
   4. Provide adequate capacity for each stage of construction.
   5. Obtain and pay for easements required to bring temporary utilities to the site where the Owner's easement cannot be utilized for that purpose.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
   1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. Exercise measures to conserve water.
   1. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.
   2. Use trigger-operated nozzles for water hoses, to avoid waste of water

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
   1. Provide adequate number of facilities for use by all persons and trades employed on Work during construction period.
   2. Supply toilet tissue, hand sanitizer, and similar disposable materials as appropriate for each facility. Provide covered waste containers for used material.
   3. Maintain daily in clean and sanitary condition.
   4. Toilets: Use of Owner's existing toilet facilities will not be permitted.

E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
   1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
      a. Coordinate timing and extent of disconnection of existing rooftop HVAC units with Owner.
      b. Coordinate timing and extent of shutdown of fire-suppression, fire-protection and fire alarm and detection systems with Owner.

F. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
   1. Provide power outlets for construction operations, with branch wiring and distribution boxes located as needed. Provide flexible power cords as required.

2. Power connection and consumption shall not disrupt Owner's need for continuous service.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
   1. Provide and maintain 2 foot candles lighting to exterior staging and storage areas after dark for security purposes.
   2. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
   3. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
   4. Maintain lighting and provide routine repairs.
   5. Permanent building lighting may be utilized during construction.

H. Telecommunication Service: Provide temporary telecommunication service in common-use facilities for use by all construction personnel.
   1. Telephone Land Lines: Install one telephone line(s) for each field office.
      a. At each telephone, post a list of important telephone numbers.
         1) Police and fire departments.
         2) Ambulance service.
         3) Contractor's home office.
         4) Architect's office.
         5) Engineers' offices.
         6) Owner's office.
         7) Principal subcontractors' field and home offices.
   2. Internet Connections: Minimum of one DSL modem or faster.
   3. Email: Account/address reserved for project use.
   4. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

3.02 SUPPORT FACILITIES INSTALLATION

A. Vehicular Access and Parking: Conduct the Work so as to ensure the least possible obstruction to vehicular traffic and inconvenience to the general public and the residents in the vicinity of the Work and to ensure the protection of persons, property and natural resources. No road or street shall be closed to the public except with the permission of the Owner and the proper governmental authority. Make temporary provisions to ensure the use of sidewalks, fire lanes, private and public driveways and proper functioning of gutters, sewer, inlets, drainage ditches and culverts, irrigation ditches and natural water courses, if any on the Work site.
   1. Parking area for project visitors and construction personnel shall be at location designated by Owner.
   2. Construct and maintain temporary access to public thoroughfares to serve construction area, as necessary.
      a. Relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.
   3. Coordinate access and haul routes with governing authorities and Owner.
   4. Provide and maintain access to fire hydrants, free of obstructions.
   5. Provide means of removing mud from vehicle wheels before entering streets.
   6. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
   7. Provide barricades, warning signs, flag men or other traffic regulators which may become necessary for protection of public, construction personnel and property.
   8. Protect existing pavement and driveways from damage from construction equipment.

B. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
   1. Temporary Signs: Provide signs as required to inform public and individuals seeking entrance to Project.
   2. No other signs are allowed without Owner permission except those required by law.

C. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Section 01 70 00 - Execution for progress cleaning requirements.
   1. Comply with requirements of Section 01 74 19 - Construction Waste Management and Disposal.
   2. Provide construction dumpsters. Do not intermingle trash with school dumpsters.
   3. Provide a recycling program for the recycling of waste materials that are generated during construction. Provide waste recycling bins and containers for metal, glass, cardboard, gypsum, etc. Provide for pick-up on a regular basis so as not to encumber the site. Place bins away from any building structures to protect against fires.

D. Temporary Elevator Use: Use of elevators is not permitted.

3.03 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
   1. Burning or burying of rubbish and waste materials on Project Site prohibited. Provide dump box for collection of waste materials.
   2. Disposal of volatile fluid wastes (such as mineral spirits, oil or paint thinner) in storm or sanitary sewer systems is strictly prohibited.

B. Progress Cleaning: Comply with requirements specified in Section 01 70 00 - Execution.

C. Barriers: Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
   1. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
   2. Provide protection for plants designated to remain. Replace damaged plants.
   3. Provide barricades required by governing authorities for work in public right of way.

D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
   1. Provide barricades or fencing and maintain same around all trees, shrubs or other landscaped areas adjacent to work of this Contract to protect such areas from damage of any nature caused by construction operations.
   2. Replace any plantings damaged or destroyed with plants of equivalent size, type and nature as approved by Architect.

E. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
   1. Extent of Fence: As required to enclose portion of site determined sufficient to accommodate construction operations, unless otherwise indicated on Drawings. Coordinate extent with Owner and Architect prior to installing fencing.
   2. Construction: Commercial grade chain link fence, unless otherwise indicated.
   3. Provide 6 foot high fence. Equip with vehicular and pedestrian gates with locks.
      a. Provide support blocks and bracing as required to completely stabilize fencing and gates.
      b. Maintain fencing for duration of construction. Move fencing as required for orderly progression of work; maintain secure enclosure at all times.
      c. Remove fencing and supports prior to Substantial Completion, when such removal will not create a safety hazard for the public.

F. Security: Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
   1. All personnel under the employment of the Contractor and its Subcontractors that travel to, or spend time at, the project site are to wear photo ID badges while on the work site. Individuals not wearing badges will be removed from the project work site. ID badges are to contain:
      a. Individual's full name (no nicknames).
      b. Individual's company affiliation.
      c. Recent photograph of the individual; taken within the last 4 years.
   2. All personnel under the employment of the Contractor and its Subcontractors that spend time at the project site, must be run through formal background screening by the Contractor and pass that screening review, before being allowed on the work site. Background screening is to be done by a professional screening firm meeting the following qualifications:
      a. Must have a minimum of five years of screening experience specifically for construction industry clients.
      b. Must have a minimum of fifteen employees.
      c. Must be able to provide access to an internet based screening management software system which has a feature to allow access by the District to view the pass-no pass result for each screened Contractor/Subcontractor employee working on a District project.
      d. Must be accredited by the National Association of Professional Background Screeners (NAPBS).
   3. Each individual will be screened for having committed any crime as listed in ORS 342.142, most recent edition.
   4. Where materials and equipment must be temporarily stored and are of substantial value, or attractive for possible theft, provide secure lockup.
   5. Enforce strict discipline in connection with the timing of installation and release of materials to minimize the opportunity for theft and vandalism.
   6. Coordinate with Owner's security program.

G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
   1. Prohibit smoking in construction areas.
   2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
   3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
   4. Take all precautions to prevent possibility of fire resulting from construction operations. Particularly avoid hazardous accumulations of rubbish and unsecured, flammable materials.
   5. Provide emergency fire extinguishing equipment of adequate type and quantity, readily available and properly maintained.

I. Temporary First Aid Facilities: Provide adequate first aid facilities for construction personnel.

3.04 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Avoid trapping moisture in finished work. Document visible signs of mold that may appear during construction.

B. When materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
   1. Protect porous materials from water damage.

2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.
6. Discard or replace water-damaged material.
7. Do not install material that is wet.
8. Discard, replace or clean stored or installed material that begins to grow mold.

3.05 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 new permanent facilities used during construction to specified condition.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufacturer's standard warranties and special warranties.

B. General product requirements.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations and procedures.

1.02 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal requirements and electronic submission requirements.

B. Section 01 40 00 - Quality Requirements: Product quality monitoring.

C. Section 01 74 19 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting packaging and substitutions.

1.03 SUBMITTALS

A. Proposed Products List: Electronically submit list of major products and list of finish materials proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 15 days after date of Agreement.
   2. For products specified only by reference standards, list applicable reference standards.
   3. Indicate product lead times.

B. Substitution Requests: Electronically submit each request for consideration as a PDF. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Name of PDF shall reflect the specification Section number and the proposed product manufacturer or product name.
   2. Limit each request to one proposed substitution.
   3. Submit a separate form for each item upon which approval is requested, with the exception of groups of items (e.g., electrical fixtures, plumbing fixtures, etc.) for which an itemized listing may be attached.
   4. Acceptance of the particular product or method on a previous project does not confer or imply acceptance for this project.
   5. Submit samples to Architect upon request.

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

D. Shop Drawing Submittals: Prepared specifically for this Project.

E. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

1.04 QUALITY ASSURANCE

A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
   1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

D. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.

E. Neither the contractual relationships, duties, nor responsibilities of the parties in Contract nor those of the Architect shall be altered by the Contract Documents by mention or inference otherwise in any reference document.

F. Contractor warrants to the Owner that the materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of material and equipment.

1.05 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
   1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
   2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
   1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
   2. Refer to Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 77 00 - Closeout Procedures.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.
   1. Means new material, machinery, components, equipment, fixtures, and systems comprising the Work. Does not include machinery and equipment used for preparation, fabrication, conveying, and erection of the Work.
   2. Products may also include existing materials or components when specifically designated for reuse.

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. Have longer documented life span under normal use.
   2. Result in less construction waste.

2.02 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
   1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
   2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
   3. Two or more items of the same kind shall be considered identical and by the same manufacturer.
   4. Provide products suitable for service conditions.
   5. Adhere to equipment capacities, sizes and dimensions shown or specified unless variations are specifically approved in writing.
   6. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
   7. Where products are accompanied by the term "as selected," Architect will make selection.
   8. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

2.03 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 Products of More than One Manufacturer: Use one of the products named and meeting specifications, no options or substitutions allowed.

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

E. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Submit a request for substitution for other named manufacturers. Use of manufacturers not named not allowed.

F. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
   1. If no product available within specified category matches and complies with other specified requirements, comply with requirements for substitutions

G. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section. Requests received after that time will not be considered except as specified below under "Substitutions Requested After Award of Contract."

B. Submit all requests for substitutions electronically as PDFs.
   1. Submit all requests for substitutions during the Bid Phase via email to bill.conboy@ibigroup.com.
   2. Submit all requests for substitutions after the Bid Phase in accordance with requirements for electronic submittals in Section 01 30 00 - Administrative Requirements.

3. Submit all requests for substitutions after the Bid Phase through the Contractor. Substitution requests received directly from Subcontractors or Suppliers will be returned through the Contractor without review.

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

D. A request for substitution constitutes a representation that the Contractor/Bidder:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Agrees to provide the same warranty for the substitution as for the specified product.
   3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.
   5. Will pay for changes to building design, including architectural or engineering design, detailing, construction costs, or re-approval by authorities caused by the requested substitution.

E. Substitutions after Award of Contract will not be considered when:
   1. Indicated or implied on shop drawings or product data submittals without formal request submitted in accordance with this Section.
   2. Submittal for substitution request has not been reviewed and recommended by Contractor. Substitution requests received directly from Subcontractors or Suppliers will be returned through the Contractor without review.
   3. Acceptance will require substantial revision of Contract Documents or other items of the Work.
   4. Submittal for substitution request does not include point-by-point comparison of proposed substitution with specified product.

F. Substitution Request Form:
   1. Use Substitution Request Form bound at the end of this Section for substitution requests during the bid phase.
   2. Use "Substitution Request (After the Bidding Phase)" form bound at the end of this Section for substitution requests after the Award of Contract.

G. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
   1. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
   2. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
   3. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
   4. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
   5. Samples, where applicable or requested.
   6. Certificates and qualification data, where applicable or requested.
   7. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
   8. List of availability of maintenance services and replacement materials.
   9. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

10. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
11. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
12. Cost information, including a proposal of change, if any, in the Contract Sum.
13. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
14. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

H. Accepted Substitutions prior to Bid Date will be listed in Addenda published in accordance with Advertisement for Bids and the Instructions to Bidders. Bidders will not rely upon approvals made in any other manner.

I. Architect's Action for Substitutions After Award of Contract: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
    1. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
    2. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

3.02 SUBSTITUTIONS REQUESTED AFTER AWARD OF CONTRACT

A. Substitutions will normally not be considered after two days prior to last addendum date, except when required due to unforeseen circumstances. Within a period of 30 days after date of Contract, the Owner may, at its option, consider formal written requests for substitution of products in place of those specified when submitted in accord with the requirements stipulated herein. To receive consideration, one or more of the following conditions must be documented in any such request:
    1. The substitution is required for compliance with final interpretation of Code requirements or insurance regulations.
    2. The substitution is required due to unavailability of a specified product, through no fault of the Contractor.
    3. The substitution is required because subsequent information disclosed the inability of the specified product to perform properly or to fit in the designated space.
    4. Manufacturer's or fabricator's refusal to certify or warrant performance of specified product as required.
    5. Subsequent information that a long delivery date will not be compatible with the Contract construction period.
    6. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

B. Owner reserves the right to reject any and all substitution requests for any reason, without obligation or liability

3.03 TRANSPORTATION AND HANDLING

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

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

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

D. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

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

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

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

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

I. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 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 materials handling and misapplication.

B. Store materials in a manner that will not endanger Project structure.

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

D. Store with seals and labels intact and legible.

E. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

F. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.

G. For exterior storage of fabricated products, place on sloped supports above ground.

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

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

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

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

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

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

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

END OF SECTION

SECTION 01 70 00
EXECUTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Protection of installed construction.

C. Correction of the Work.

D. Progress cleaning.

1.02 RELATED REQUIREMENTS

A. Section 01 74 19 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.

1.03 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.04 QUALITY ASSURANCE

A. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where applicable, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
    a. Description of the Work.
    b. List of detrimental conditions, including substrates.
    c. List of unacceptable installation tolerances.
    d. Recommended corrections.
2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Examine walls and roofs for suitable conditions where products and systems are to be installed.
    a. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings in 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.

D. Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication.

E. Verify space requirements and dimensions of items shown diagrammatically on Drawings.

F. Review Contract Documents and field conditions. Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Architect according to requirements in Section 01 30 00 - Administrative Requirements.

3.03 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
   1. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
   2. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
   3. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
   4. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
   5. Make neat transitions between different surfaces, maintaining texture and appearance.

B. Installer Inspections: Require installer of each major unit of work to inspect substrate and conditions for installation and to report unsatisfactory conditions in writing.
   1. Correct unsatisfactory conditions before proceeding with installation.
   2. Inspect each product immediately before installation.
   3. Do not install damaged or defective products, materials or equipment.
   4. Start of installation shall be understood as acceptance of substrate conditions by the installer.

C. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

D. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

E. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking, attachment plates, anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
   1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
   2. Allow for building movement, including thermal expansion and contraction.
   3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.04 PROTECTION OF INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to minimize damage.

C. Provide and maintain temporary shoring and lateral bracing of structure during erection to resist all loads including:
   1. Wind
   2. Seismic
   3. Construction
   4. Materials
   5. Moving equipment

D. Do not remove temporary bracing and shoring until adequate, permanent connections or structural elements are in final position and positively anchored.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

G. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

H. Comply with manufacturer's written instructions for temperature and relative humidity.

3.05 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
   1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

3.06 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
   1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
   2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 degrees F.
   3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
      a. Utilize containers intended for holding waste materials of type to be stored.
   4. Daily cleaning shall include magnetic sweep of jobsite to pick up all nails and metallic debris.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 74 19 - Construction Waste Management and Disposal.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

END OF SECTION

SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 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 containers.
   2. Corrugated cardboard.
   3. Wood pallets.
   4. Clean dimensional wood: May be used as blocking or furring.
   5. Metals, including packaging banding, metal studs, sheet metal, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
   6. Plastic buckets.
   7. Plastic sheeting.
   8. Rigid foam insulation.

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. Incineration, either on- or off-site.

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.

1.02 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. Section 01 50 00 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

1.03 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. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. 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.

1.04 SUBMITTALS

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

B. Submit Waste Management Plan within 10 calendar days after receipt of Notice of Award of Bid, or prior to any trash or waste removal, whichever occurs sooner; submit projection of all trash and waste that will require disposal and alternatives to landfilling.
   1. Prior to commencing construction on site, develop and have reviewed and approved a construction site waste management plan.

C. Waste Management Plan: The plan will cover all Contractor work on site. Source reduction on the job site should be an integral part of the 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 Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
   3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
   4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
   5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
   6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.
      a. Identify licensed haulers and processors of recyclables; identify markets for salvaged materials; identify deconstruction, salvage and recycling strategies and processes; include waste auditing; and document the cost for recycling, salvaging and reusing materials.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PROCEDURES

A. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.

3.02 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, particularly at:
   1. Pre-bid meeting.
   2. Pre-construction meeting.
   3. Regular job-site 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. Provide containers as required.
   2. Provide construction dumpsters. Do not intermingle trash with school dumpsters.
   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.

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 separated products in preparation for reuse.

I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Substantial Completion.

B. Final Completion.

C. Punch List.

D. Warranties.

E. Cleaning prior to Substantial Completion review.

F. Final Cleaning.

1.02 RELATED REQUIREMENTS

A. Section 01 13 31 - Certificate of Compliance.

B. Section 01 13 32 - Certificate of No Hazardous Materials.

C. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance (O&M) data, warranties and bonds.

D. Section 01 79 00 - Demonstration and Training: Requirements relating to Owner training prior to Closeout.

1.03 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting review for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.

1. In progress payment request coincident with or first following date claimed, show either 100 percent completion for portion of work claimed as "substantially complete", or list incomplete items, value of incompletion, and reasons for being incomplete. Include supporting documentation for completion as indicated in these contract documents.
    a. Submit statement showing accounting of changes to the Contract Sum.
    b. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits and similar releases.
5. Submit completed Certificate of Compliance. Refer to Section 01 13 31.
6. Submit completed Certificate of No Hazardous Materials. Refer to Section 01 13 32.
7. Prepare and submit drafts for Operation and Maintenance Manuals.
8. Prepare and submit drafts for Project Record Documents.
9. Terminate and remove temporary facilities from Project site, along with construction tools, and similar elements.
10. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
11. Complete final cleaning requirements.
12. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
13. Make submittals that are required by governing or other authorities.
    a. Provide copies to Architect and Owner.
    b. Provide copy of Occupancy Permit to Architect and Owner.

B. Review: Submit a written request for review for Substantial Completion. On receipt of request, Architect will either proceed with review or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after review or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
   1. Results of completed review will form the basis of requirements for Final Completion.
   2. Should the Architect have to perform any additional reviews due to failure of Work to comply with claims of completion made by Contractor, the cost for each additional review will be charged to the Owner at the Architect/Engineer's hourly rate. The Owner shall have the right to deduct such charges from the contract amount as provided in the Conditions of the Contract.

1.04 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final review for determining final completion, complete the following:
   1. Submit a final Application for Payment with final waivers according to Section 01 20 00 - Price and Payment Procedures.
      a. Submit updated final statement, accounting for additional (final) changes to Contract Sum.
   2. Submit consent of surety.
   3. Prepare and submit final Project Record Documents within 30 days after date of Substantial Completion or before final completion, whichever occurs first.
   4. Submit final warranties.
   5. Submit final operation and maintenance manuals.
   6. Submit certified copy of Architect's Substantial Completion review list of items to be completed or corrected (punch list). The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
   8. Submit permanent Certificate of Occupancy.
   9. Submit payment and release of liens to requirements of General Conditions. Before final payment, the Contractor shall furnish the following to the Architect:
      a. An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner of property might in any way be responsible, have been paid or otherwise satisfied (use AIA Form G706 or approved).
      b. An affidavit from each Subcontractor on AIA Form G706 or approved.
      c. Letter from Bonding Company addressed to Owner but submitted to the Architect, approving release of final payment and waiving submission of final receipts as well as a statement confirming the extension of the Bond for the warranty period as specified. Final receipts from all Subcontractors and material and equipment suppliers may be required to furnish to the Owner by the Contractor if the Surety does not waive this requirement. Letters to be in substantially the following form:

         (Name of Owner)Re: (Bond No.)
         (Address)(Name of Contractor)
         (Name of Project)
         Gentlemen:
         The (Name of Bonding Company), surety on the above named Bond, consents to payment of retained percentages and agrees to waive submission of final receipts.
         It is also agreed that the final payment to the Contractor shall not relieve the Surety Company of any of its obligations and that the Bond is extended to include guarantees and warranties of workmanship and materials.
         (NAME OF BONDING COMPANY)
         Attorney-in-Fact

d. Submit Contractor's Affidavit of Release of Liens (AIA Form G706A).
e. Return all copies of the Drawings and Specifications in accordance with the General Conditions.

10. Submit Affidavit of Wages Paid for Contractor and all sub-contractors.
11. Submit Department of Revenue Release (for projects over $35,000 only).
12. Instruct Owner's personnel in maintenance of products and systems.
13. Submit attendance record for training of Owner's personnel.
14. Complete requirements of Section 01 78 00 - Closeout Submittals.
15. Complete requirements of Section 01 79 00 - Demonstration and Training.

B. Review: Submit a written request for final review for acceptance. On receipt of request, Architect will either proceed with review or notify Contractor of unfulfilled requirements. Architect will either prepare a letter to Owner recommending final acceptance or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Additional Reviews: Request an additional review when the Work identified in previous reviews as incomplete is completed or corrected.
2. Should the Architect have to perform any such additional reviews due to failure of Work to comply with claims of completion made by Contractor, the cost for each additional review will be charged to the Owner at the Architect/Engineer's hourly rate. The Owner shall have the right to deduct such charges from the contract amount as provided in the Conditions of the Contract.
3. Provide additional cleaning services as required for Work which was not complete at the time of initial review. Reclean as required until all Work is fully complete and recommended for final acceptance by Architect.
4. If the Work does not achieve Final Completion within two weeks of the date originally scheduled to do so, plus any time adjustments by Change Order, the Architect's time and efforts beyond that period shall constitute extra services, the cost of which at the Architect's standard hourly rates will be deducted from the Contractor's Final Payment or retainage by the Owner.
5. Punch list items in the Schedule of Values will be released on any given line item only when all punchlist items relating to that line item are satisfactorily completed.

1.05 CONTRACTOR'S LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Prior to requesting review for Substantial Completion, perform a thorough punch list of the project identifying incomplete items, damaged items and substandard items requiring correction.
1. Distribute the Punch List to applicable subcontractors and indicate corrections made to each item.
2. Reinspect and sign off on all complete items.
3. This Punch List will form the basis of the list to be submitted with the request for Substantial Completion.
4. Supplement Punch List with valuation of incomplete items and reasons for being incomplete.
5. Prepare Punch List in digital format acceptable to Architect.

B. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order by roof area.
2. Include the following information at the top of each page:
a. Project name.
b. Date.
c. Name of Architect.
d. Name of Contractor.
e. Page number.

3. Submit list of incomplete items in the following format:
    a. PDF electronic file.

1.06 WARRANTIES

A. Submittal Time:
    1. Submit summary of warranties included in the bid within seven days after Notice of Intent to Award Contract (Prior to Execution of the Contract). Indicate duration of each warranty and start date.
    2. Submit sample warranties as part of the project submittal process.
    3. Submit final warranties before requesting review for final acceptance.

B. Comply with requirements of Section 01 78 00 - Closeout Submittals.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 EXECUTION

3.01 CLEANING PRIOR TO SUBSTANTIAL COMPLETION REVIEW

A. At time of project close-out, clean or reclean the Work to the condition expected from a normal, commercial building cleaning and maintenance program.

B. Complete the following cleaning operations before requesting the Architect's review for certification of Substantial Completion.
    1. Remove grease, dust, dirt, stains, manufacturer's labels, fingerprints, etc., from sight exposed surfaces.
    2. Remove non-permanent protection and labels.
    3. Repair, patch and touch-up marred surfaces.
    4. Remove construction debris.
    5. Police yards and grounds.

3.02 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and anti-pollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
    1. Complete the following cleaning operations before requesting review for certification of Substantial Completion for entire Project or for a portion of Project:
        a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
        b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
        c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
        d. Remove tools, construction equipment, machinery, and surplus material from Project site.
        e. Remove labels that are not permanent.
        f. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
            1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.

g. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove other foreign substances.
h. Leave Project clean and ready for occupancy.

2. Maintain in cleaned condition until Final Completion or Owner occupancy.

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Manuals.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 01 31 23 - Project Management Database (PMD): Electronic submittal of record documents.

B. Section 01 77 00 - Closeout Procedures: Contract closeout procedures.

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

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

1.03 SUBMITTALS

A. Record Drawings:
   1. Draft: Submit one copy of marked-up record prints in electronic color PDF format prior to request for review for Substantial Completion.
   2. Final: Submit one paper copy set and an electronically scanned copy of marked up prints within 30 days of dated established for Substantial Completion or prior to request for review for final completion, whichever occurs first.
   3. Approved permit set of plans.

B. Record Specifications:
   1. Draft: Submit one copy of marked-up copy of Project Manual in electronic color PDF format prior to request for review for Substantial Completion.
   2. Final: Submit one copy of marked-up copy of Project Manual and one electronically scanned copy within 30 days of date established for Substantial Completion or prior to request for review for final completion, whichever occurs first.

C. Operation and Maintenance Manuals:
   1. Draft: Submit one copy of draft manuals in electronic color PDF format prior to request for review for Substantial Completion. Architect will review draft and return one copy with comments. Revise content of all document sets as required prior to final submission.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Final: Submit three sets of revised Manuals and an electronically scanned copy in final form prior to request for review for final completion.

D. Warranties and Bonds:
   1. Submit a summary of warranties included in the bid within seven days after Notice of Intent to Award Contract (Prior to Execution of the Contract). Indicate duration of each warranty and start date.
   2. Draft: Submit as part of normal submittal process.
   3. Final: Submit final forms of warranties prior to request for review for final completion.

E. PDF Format: Submit searchable PDF electronic files. File names shall clearly identify the Owner, project name, drawing or specification number and name and date. File name shall be established to list in the same order as identified in the Contract Documents.
   1. Submit electronic documents for record documents and Operations and Maintenance Manuals by e-Builder as specified in Section 01 31 23 - Project Management Database (PMD).

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and Construction Change Directives.
   5. ASIs and responses to RFIs.
   6. Reviewed shop drawings, product data, and samples.
   7. Manufacturer's instruction for assembly, installation, and adjusting.
   8. Architect will provide one hard copy and one PDF electronic file of a conformed set of Contract Documents, incorporating addenda for use by Contractor in developing As-Built Drawings.

B. The As-Built documents shall include all disciplines of work whether changes occur or not. These documents, as well as the approved permit set of plans, shall be available to the Architect and Owner at the site and reviewed with them on a monthly basis. Satisfactory maintenance of up-to-date record drawings on a monthly basis will be a requirement for approval of progress payments.

C. Store As-Built documents in the field office apart from the Contract Documents used for construction. Do not use project As-Built documents for construction purposes. Maintain As-Built documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project As-Built documents for Architect's reference during normal working hours.

D. As-Built Drawings:
   1. Content: Types of items requiring marking include, but are not limited to, the following:
      a. Dimensional changes to Drawings.
      b. Revisions to details shown on Drawings.
      c. Actual existing equipment locations.
      d. Changes made by Addenda.
      e. Changes made by Change Order or Construction Change Directive.
      f. Changes made following Architect's written orders, including ASIs and responses to RFIs.
      g. Details not on the original Contract Drawings.
      h. Field records for variable and concealed conditions.
      i. Record information on the Work that is shown only schematically.
   2. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
   3. Mark As-Built sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
   4. Mark important additional information that was either shown schematically or omitted from original Drawings.
   5. Mark revisions and/or clarifications issued by Addenda, ASI, Construction Change Directive, Change Orders or responses to RFIs to reflect the change. Each such revision shall be graphically depicted to represent physical construction and clearly noted with the applicable Addenda, ASI, Change Order or RFI number. Notation of the Addenda, RFI, ASI, Construction Change Directive or Change Order number alone will not be acceptable.
   6. Ensure entries are complete and accurate, enabling future reference by Owner.
   7. Scanned Drawings: After review of draft drawings by Architect, incorporate necessary changes and prepare a full set of scanned Contract Drawings and Shop Drawings on CD-ROM.

E. Specifications: Legibly mark and record at each product section a description of actual products installed, including the following:
   1. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
   2. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
   3. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals.
   4. Mark revisions and/or clarifications issued by Addenda, ASI, Construction Change Directive, Change Orders or responses to RFIs to reflect the change. Each such revision shall be graphically depicted to represent physical construction and clearly noted with the applicable Addenda, ASI, Change Order or RFI number. Notation of the Addenda, RFI, ASI, Construction Change Directive or Change Order number alone will not be acceptable.
   5. Format: Submit record Specifications as scanned PDF electronic file(s) of marked up paper copy of Specifications.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses 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.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
   2. Product data, with catalog number, size, composition, and color and texture designations.
   3. 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. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

D. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

E. Additional information as specified in individual product specification sections.

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

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.

3. Include performance curves, with engineering data and tests.
4. Complete nomenclature and model number of replaceable parts.

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

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

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

E. Include sequence of operation by controls manufacturer.

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

G. Provide control diagrams by controls manufacturer as installed.

H. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

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

J. Include test and balancing reports.

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

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

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

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed Volume Title (e.g., Equipment Operation and Maintenance Manual), name of Project, BSD, Architect, and date of Substantial Completion. Include Contractor's name and date. On bound edge, imprint name of project, BSD and year of Substantial Completion.

E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

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

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

H. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

I. Drawings: Provide with reinforced punched binder tab. Bind in with text. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

J. Arrangement of Contents: Organize each volume in parts as follows:
1. Project Directory.
2. Table of Contents, of all volumes, and of this volume.

3. Operation and Maintenance Data: Arranged by system, then by product category.
   a. Source data.
   b. Product data, shop drawings, and other submittals.
   c. Operation and maintenance data.
   d. Field quality control data.
   e. Photocopies of warranties and bonds.
4. Design Data: To allow for addition of design data furnished by Architect or others, provide a tab labeled "Design Data" and provide a binder large enough to allow for insertion of at least 20 pages of typed text.

K. PDF Electronic File: After review of draft manuals, assemble each manual into a composite electronically-indexed file. Submit on digital media acceptable to Architect.
1. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically-linked operation and maintenance directory.
2. Enable inserted reviewer comments on draft submittals.
3. File Names and Bookmarks: Enable bookmarking of individual documents based upon file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel upon opening file.

3.06 WARRANTIES AND BONDS

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

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

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

D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
2. The Owner reserves the right to refuse to accept or pay for Work for the Project where a Special Warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

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

F. Verify that documents are in proper form and contain full information.

G. Co-execute submittals when required.

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

I. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.

J. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project, BSD, Architect, and date of Substantial Completion. Include name of Contractor and date. On bound edge, imprint name of project, BSD and year of Substantial Completion.

K. Table of Contents: Neatly typed, in the 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 product or work item.
   1. Product or work item.
   2. Installer of product or item, with name of principal, address, and telephone number.
   3. Describe the work provided by this installer/Subcontractor, under this Contract.
   4. Date of beginning of warranty or service and maintenance contract. (See General Condition's Warranty paragraph.)
   5. Duration of warranty or service maintenance contract.
   6. Information for Owner's personnel, including:
      a. Proper procedure in case of failure.
      b. Contact phone numbers of manufacturer.
   7. Instances that might affect validity of warranty or bond.
   8. Contractor, name of responsible principal, address, and telephone number.

L. Schedule of Warranties: Provide a summary schedule of start and end date of each warranty.

M. 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.

END OF SECTION

SECTION 01 79 00
DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

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

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

1.02 RELATED REQUIREMENTS

A. Section 01 78 00 - Closeout Submittals: Operation and maintenance manuals.

B. Other Specification Sections: Additional requirements for demonstration and training.

1.03 SUBMITTALS

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

B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
   1. Submit to Architect for transmittal to Owner.
   2. Submit not less than four weeks prior to start of training.
   3. Revise and resubmit until acceptable.
   4. Provide an overall schedule showing all training sessions.
   5. Include at least the following for each training session:
      a. Identification, date, time, and duration.
      b. Description of products and/or systems to be covered.
      c. Name of firm and person conducting training; include qualifications.
      d. Intended audience, such as job description.
      e. Objectives of training and suggested methods of ensuring adequate training.
      f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
      g. Media to be used, such as slides, hand-outs, etc.
      h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.

C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
   1. Include applicable portion of O&M manuals.
   2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
   3. Provide one extra copy of each training manual to be included with operation and maintenance data.

D. Training Reports:
   1. Identification of each training session, date, time, and duration.
   2. Sign-in sheet showing names and job titles of attendees.
   3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.

E. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.
   1. Format: DVD Disc.
   2. Label each disc and container with session identification and date.

1.04 QUALITY ASSURANCE

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

1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

A. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
   1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.02 TRAINING - GENERAL

A. Conduct training on-site unless otherwise indicated.

B. Owner will provide classroom and seating at no cost to Contractor.

C. Provide training in minimum two-hour segments.

D. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.

E. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
   1. The location of the O&M manuals and procedures for use and preservation; backup copies.
   2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
   3. Typical uses of the O&M manuals.

F. Product- and System-Specific Training:
   1. Review the applicable O&M manuals.
   2. Discuss common troubleshooting problems and solutions.
   3. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.

G. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 02 41 19
SELECTIVE STRUCTURE DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of building elements for alterations purposes.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises and requirements related to abatement of hazardous materials.

B. Section 01 74 19 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

1.03 REFERENCE STANDARDS

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

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SCOPE

A. Remove portions of existing buildings as indicated on Drawings.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

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

B. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

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

D. If hazardous materials are discovered during removal operations, stop work, restrict/isolate work area, and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

E. Hazardous Materials: Comply with 29 CFR 1926 and state and local regulations.

3.03 SELECTIVE DEMOLITION FOR ALTERATIONS

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

B. Separate areas in which demolition is being conducted 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.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.

1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
3. Verify that abandoned services serve only abandoned facilities before removal.
4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

F. 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.
4. Patch as specified for patching new work.

3.04 DEBRIS AND WASTE REMOVAL

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

B. Remove from site all materials not to be reused on site; comply with requirements of Section 01 74 19 - Construction Waste Management and Disposal.

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

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

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete formwork.

B. Floors and slabs on grade.

C. Concrete reinforcement.

D. Joint devices associated with concrete work.

E. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 07 92 00 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.03 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.

C. ACI 301 - Specifications for Structural Concrete.

D. ACI 302.1R - Guide for Concrete Floor and Slab Construction.

E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.

F. ACI 305R - Guide to Hot Weather Concreting.

G. ACI 306R - Cold Weather Concreting.

H. ACI 308R - Guide to Curing Concrete.

I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.

J. ACI 347R - Guide to Formwork for Concrete.

K. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

L. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.

M. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

N. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.

O. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

P. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.

Q. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens).

R. ASTM C150/C150M - Standard Specification for Portland Cement.

S. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.

T. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

U. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.

V. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

W. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.

X. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

Y. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.

Z. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

AA. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

AB. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

AC. OSSC - Oregon Structural Specialty Code, Section 1811, Radon Control Methods Public Buildings.

AD. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113.

1.04 SUBMITTALS

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

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
   1. Provide design mixtures for each concrete mixture containing fly ash as a replacement for Portland cement or other Portland cement replacements and for equivalent concrete mixtures that do not contain Portland cement replacements.

C. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
   2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.
   3. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
   4. Indicate amounts of mixing water to be withheld for later addition at Project site.

D. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

E. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

F. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

2.02 REINFORCEMENT MATERIALS

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).

1. Type: Deformed billet-steel bars.
2. Finish: Unfinished, unless otherwise indicated.
3. Finish: Galvanized in accordance with ASTM A767/A767M, Class I, unless otherwise indicated.

B. Steel Welded Wire Reinforcement (WWR): Plain type, ASTM A1064/A1064M.
1. Form: Coiled Rolls.
2. WWR Style: 6 x 12-W12 x W5.

C. Reinforcement Accessories:
1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
1. Acquire cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C33/C33M.
1. Acquire aggregates for entire project from same source.

C. Fly Ash: ASTM C618, Class C or F.

D. Calcined Pozzolan: ASTM C618, Class N.

E. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.

F. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.04 ACCESSORY MATERIALS

A. Under Slab Vapor Retarder: Sheet material complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
1. Installation: Comply with ASTM E1643.
2. Perm Rating: 0.1 maximum.
3. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
4. Manufacturers:
   a. ISI Building Products; Viper VaporCheck II 15-mil (Class A): www.isibp.com/#sle.
   b. Raven Industries; VaporBlock 15: www.vaporblock.com.
   c. Stego Industries, LLC; Stego Wrap Vapor Barrier 15-mil (Class A): www.stegoindustries.com.
   d. W. R. Meadows, Inc; PERMINATOR Class A - 15 mils: www.wrmeadows.com/#sle.
   e. Substitutions: See Section 01 60 00 - Product Requirements.

B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
1. Grout: Comply with ASTM C1107/C1107M.
2. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
3. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.

C. Coatings, General: Provide products with VOC limits as established in SCAQMD 1113, Architectural Coatings.
1. Floor Coatings: 50 g/L maximum.
2. Sealers: 100 g/L maximum.
3. Concrete Curing Compounds: 100 g/L maximum.
4. Waterproofing Sealers: 100 g/L maximum.

D. Sealer SC-1: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.
   1. Products:
      a. Dayton Superior Corporation; Sure Hard Densifier J17: www.daytonsuperior.com.
      b. Euclid Chemical Company (The); Euco Diamond Hard: www.euclidchemical.com.
      c. L&M Construction Chemicals, Inc; Seal Hard: www.laticrete.com.
      d. Master Builders Solutions by BASF; MasterKure HD 300 WB: www.master-builders-solutions.basf.us.
      e. Meadows, W. R., Inc; Liqui-Hard: www.wrmeadows.com.
      f. US Mix Products Company; US Spec Industraseal: www.usspec.com.

2.05 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.

B. Epoxy Bonding System:
   1. Complying with ASTM C881/C881M and of Type required for specific application.
   2. Manufacturers:
      a. Adhesives Technology Corporation; Crackbond LR-321 G, or Miracle Bond 1450: www.atcepoxy.com/#sle.
      b. Euclid Chemical Company; DURAL FAST SET LV: www.euclidchemical.com/#sle.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

C. Waterstops: Preformed mineral colloid strips, 3/4 inch thick, moisture expanding. Provide products from same manufacturer as sheet waterproofing.
   1. Available Products:
      a. Waterstop RX101 manufactured by Cetco: www.cetco.com.
      b. SuperStop WaterStop manufactured by Tremco: www.tremcosealants.com.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

D. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
   1. Material: ASTM D1751, cellulose fiber.

E. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.
   1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.
   2. Height: To suit slab thickness.

2.06 CURING MATERIALS

A. Moisture-Retaining Sheet: ASTM C171. Provide one of the following:
   1. Curing paper, regular or white.
   2. Polyethylene film, clear or white, minimum nominal thickness of 0.0040 in.
   3. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.

B. Water: Potable, not detrimental to concrete.

2.07 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
   1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Normal Weight Concrete:

1. Water-Cement Ratio: Maximum 40 percent by weight.
2. Maximum Aggregate Size: 5/8 inch.

2.08 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C94/C94M.

C. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

C. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
   2. Use latex bonding agent only for non-load-bearing applications.

D. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.

E. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

F. Slab Construction Recess: Provide 4 mm deep recess at top of concrete stairs to receive resilient rubber finish where concrete is to have flush transition to resilient top tread. Width of recess to match position of joint in Nora tread.

G. Install vapor retarder under interior slabs on grade according to ASTM E1643 and manufacturer's written instructions. Lap joints minimum 12 inches and seal watertight by taping edges and ends with manufacturer's recommended tape. Use vapor retarder sheet to boot around all penetrations and seal with tape to create a continuous vapor retarder. Do not penetrate vapor retarder with screed pins, wood stakes or other items.
   1. Comply with requirements of Section 1811 of the OSSC for Radon Control Methods.
   2. Place vapor retarder under the entire soil-contact area of the floor in a manner that minimizes the required number of joints and seams. Take care to prevent damage to the membrane during the construction process.
   3. Where the slab edge is cast against a foundation wall or grade beam, install the membrane to seal to the foundation element.
   4. Fit membrane to all penetrations to within 1/2 inch of the penetration and seal with tape or mastic.
   5. Repair all damaged portions of the membrane with tape or with a patch made from the same or compatible material as the membrane, cut so as to provide a minimum 12-inch lap from any opening and taped continuously about its perimeter.
   6. Arrange for inspection of the installed membrane by the governing agency prior to placement of concrete.

3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

3.04 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Architect not less than 24 hours prior to commencement of placement operations.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

F. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer. Where approved, record the amount of water added on site and provide with the special inspection reports.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

G. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
   1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
   2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
   3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

H. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
   1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
   2. Maintain reinforcement in position on chairs during concrete placement.
   3. Screed slab surfaces with a straightedge and strike off to correct elevations.
   4. Slope surfaces uniformly to drains where required.
   5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

I. Cold-Weather Placement: Comply with ACI 306R and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When average high and low temperature is expected to fall below 40 degrees F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

J. Hot-Weather Placement: Comply with ACI 305R and as follows:
1. Maintain concrete temperature below 90 degrees F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

K. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.05 SLAB JOINTING

A. Locate joints as indicated on drawings.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

D. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

E. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-third of concrete thickness as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws as indicated below. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
   a. Equipment Control Joint Saw: "Soff-Cut System," early-entry dry-cut saw with Skid Plate, by Soff-Cut. 1112 Olympic Drive, Corona, CA 92881 909-272-2330.
   b. Comply with the Soff-Cut instructions for the SOFF-CUT System
   c. Troweled Finish: Install cuts 0 to 2 hours after final finish at each joint location.
   d. Broom Finish: Install cuts at each control joint location as soon as concrete will support weight of saw and operator without disturbing final finish.
   e. Cut depth not less than 10 percent of slab thickness with a 1-inch minimum.
   f. Remove debris in path of cut and under Skid Plate before cutting. Skid Plate must remain flat on surface.
   g. Use Soff-Cut blades and Skid Plates, using a new Skid Plate with each new blade.
   h. Install Soff-Cut joint protector at saw-cut intersection prior to cross-cut.
   i. Remove dry powder without disturbing finish.

j. Avoid traffic across saw cut until sufficient strength is gained to protect joint edges.

F. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
   2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 07 92 00 - Joint Sealants are indicated.
   3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

G. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

H. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. An independent testing agency, as specified in Section 01 40 00, will inspect finished slabs for compliance with specified tolerances.

B. Maximum Variation of Surface Flatness at Upper Levels:
   1. Exposed Concrete Floors: 1/4 inch in 10 feet.

C. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
   1. Exposed to View and Foot Traffic: F(F) of 20; F(L) of 15, on-grade only.
   2. Under Carpeting and Entry Mats: F(F) of 25; F(L) of 20, on-grade only.
   3. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.

D. Correct defects by grinding if affected area is concealed from view. If not concealed, removal and replacement of the defective work is required. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.07 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
   2. Troweled smooth finish to top of Demo Table.

D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include thin set ceramic tile, resilient flooring, fluid applied flooring, carpeting, and entry mat.
   2. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1/4 inch per foot or as indicated on drawings.

3.08 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than seven days.
   2. High early strength concrete: Not less than four days.

C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

D. Surfaces Not in Contact with Forms:
   1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
      a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.
      b. Spraying: Spray water over floor slab areas and maintain wet.
      c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
   2. Final Curing: Begin after initial curing but before surface is dry.
      a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.

E. Sealer Application: Comply with manufacturer's recommendations.
   1. Sealer SC-1: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
      a. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
      b. Do not apply to concrete that is less than three days' old.
      c. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
      d. Locations of Use: At floors exposed to view, unless indicated otherwise.

3.09 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
   3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.10 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.11 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

B. For concrete floors indicated to remain exposed to view, protect to prevent damage, including staining, gouges and scratching by construction traffic and activities.
   1. Inspect tires for debris prior to use on slab. Remove embedded items which may cause damage to the floor slab.
   2. Clean up spills on slab immediately.

C. Develop a concrete protection procedure which addresses the following:
   1. Communication of protection plan to subcontractors and vendors.
   2. Procedures for cleaning spills, including use of and availability of cleaning chemicals and absorptive materials at site.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural dimension lumber framing.

B. Non-structural dimension lumber framing.

C. Rough opening framing for doors and roof openings.

D. Sheathing.

E. Roof-mounted curbs.

F. Roofing nailers.

G. Preservative treated wood materials.

H. Fire retardant treated wood materials.

I. Miscellaneous framing and sheathing.

J. Concealed wood blocking, nailers, and supports.

K. Miscellaneous wood nailers, furring, and grounds.

1.02 REFERENCE STANDARDS

A. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings.

B. APA PRP-108 - Performance Standards and Qualification Policy for Structural-Use Panels (Form E445).

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

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

E. AWPA U1 - Use Category System: User Specification for Treated Wood.

F. PS 1 - Structural Plywood.

G. PS 2 - Performance Standard for Wood-Based Structural-Use Panels.

H. PS 20 - American Softwood Lumber Standard.

I. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17.

J. WWPA G-5 - Western Lumber Grading Rules.

1.03 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Douglas Fir, unless otherwise indicated. No Larch.
   2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Grading Agency: West Coast Lumber Inspection Bureau; WCLIB (GR).

B. Grading Agency: Western Wood Products Association; WWPA G-5.

C. Sizes: Nominal sizes as indicated on drawings, S4S.

D. Moisture Content: As indicated on structural drawings.

E. Stud Framing (2 by 2 through 2 by 6):
   1. Species: Douglas Fir standard or better.
   2. Grade: As indicated on structural drawings.

F. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16):
   1. Species: Douglas Fir standard or better.
   2. Grade: As indicated on structural drawings.

G. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: As indicated on structural drawings.
   2. Boards: Standard or No. 3.

2.03 STRUCTURAL COMPOSITE LUMBER

A. Structural Composite Lumber: Factory fabricated beams, headers, and columns, of sizes and types indicated on drawings; structural capacity as published by manufacturer.
   1. Columns: Use laminated veneer lumber, laminated strand lumber, or parallel strand lumber with manufacturer's published E (modulus of elasticity): See structural drawings for psi, minimum.
   2. Beams: Use laminated veneer lumber, laminated strand lumber, or parallel strand lumber with manufacturer's published E (modulus of elasticity): See structural drawings for psi, minimum.
   3. Headers Not Longer Than 48 inches: Use laminated veneer lumber, laminated strand lumber, or parallel strand lumber.
   4. Manufacturers:
      a. Weyerhaeuser Company: www.weyerhaeuser.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 CONSTRUCTION PANELS

A. Roof Related Plywood Nailers and Fascias: APA PRP-108, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
   1. Span Rating: 24/0.
   2. Thickness: 3/4 inch, nominal, unless otherwise indicated.

B. Roof Sheathing: Any PS 2 type, rated Sheathing.
   1. Bond Classification: Exterior.
   2. Span Rating: 48.
   3. Performance Category: See structural drawings for PERF CAT.

C. Wall Sheathing: Plywood, Structural I, CDX (42/20, 5-ply), miminum 1/2 inch Species #1 material. Oriented strand board (OSB) is not allowed for structural sheathing.
   1. Moisture resistant sheathing board shall be of marine grade.
   2. Plywood to have the species, grade, glue type, and stamp of the American Plywood Association.

D. Other Applications:
   1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
   2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
   3. Other Locations: PS 1, C-D Plugged or better.

2.05 ACCESSORIES

A. Fasteners and Anchors:

1. Metal and Finish: Hot-dipped galvanized steel per ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
2. Anchors: Toggle bolt type for anchorage to hollow masonry.

B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.

C. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.

2.06 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:
1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
b. Treat lumber exposed to weather.
c. Treat lumber in contact with masonry or concrete.
d. Treat lumber less than 18 inches above grade.
e. Treat lumber in other locations as indicated.
2. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
b. Treat plywood in contact with roofing, flashing, or waterproofing.
c. Treat plywood in contact with masonry or concrete.
d. Treat plywood less than 18 inches above grade.
e. Treat plywood in other locations as indicated.

PART 3 EXECUTION

3.01 PREPARATION

A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.

B. Coordinate installation of rough carpentry members specified in other sections.

C. Coordinate with Work of other Sections for removal of existing roof. Do not remove more sheathing than can be replaced the same day.
1. Inspect existing roof sheathing and remove and replace any damaged decking, fascia or other wood as directed by the Owner or its representative. In particular, remove any wood exhibiting dry rot, mold or mildew. Chase damage to extinction.
2. Provide solid blocking for support of new plywood sections where needed.
3. Record number and lengths of replaced components.
a. Prior to starting work, notify Architect of defects requiring correction.
b. Refer to Section 01 22 00 - Unit Prices.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

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

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

3.03 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWI (WFCM) Wood Frame Construction Manual. Stud spacing to be maxiumum of 16 inches on center.

E. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.

F. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

G. Provide bridging at joists in excess of 8 feet span as detailed. Fit solid blocking at ends of members.

H. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

E. All wall and/or ceiling mounted fixtures shall have adequate backing to be able to withstand the force and/or abuse that may occur in a school environment. Blocking shall be wood with a minimum 1-1/2 inches and provide adequate support for any fixture that hangs on walls or ceilings.

F. Fixtures requiring blocking include, but are not limited to:
   1. Door stops.
   2. Electrical device mounting.

3.05 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

C. Provide nailers as required for a complete roofing assembly.

3.06 INSTALLATION OF CONSTRUCTION PANELS

A. Roof Nailers and Fascia Backing: Secure panels with long dimension perpendicular to framing members with ends staggered and over firm bearing.

B. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
   1. Provide a 1/8-inch space between panel edge and end joints to allow for expansion.
   2. Screw panels to framing; staples are not permitted.

3.07 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.08 CLEANING

A. Waste Disposal:
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, exterior penetrations, and other items indicated in Schedule.

B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Field fabricated roof curbs.

B. Section 07 92 00 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

E. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).

F. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction.

G. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products.

H. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

I. ASTM D1204 - Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature.

J. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

K. ASTM D2178/D2178M - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.

L. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free.

M. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free.

N. SMACNA (ASMM) - Architectural Sheet Metal Manual.

O. SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

1.04 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Design, fabricate and install flashings at roof edges in accordance with SPRI ES-1, except with basic wind speed of 85 mph.

C. Water Infiltration: Provide sheet metal flashing and trim that does not allow water infiltration to building interior.

1.05 SUBMITTALS

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

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Warranties: Special warranties specified in this Section.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with ten years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

1.08 WARRANTY

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

B. Special Project Warranty: Submit Installer's warranty, on Installer's standard or customized form, signed by Installer, covering the Work of this Section, including all components of flashing and sheet metal against defects in materials and workmanship, for the following warranty period:
   1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 SHEET MATERIALS

A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239 inch) thick base metal.

B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239) inch thick base metal, shop pre-coated with PVDF coating.
   1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
   2. Color: As selected by Architect from manufacturer's standard colors.

C. Aluminum: ASTM B209 (ASTM B209M); 20 gage, (0.032 inch) thick; anodized finish of color as selected.

D. Lead: ASTM B749, 4 lb/sq ft thick, unless otherwise indicated.

E. Stainless Steel: ASTM A666, Type 304, soft temper, 22 gage (0.034 inch) inch thick; smooth No. 4 finish.

F. Copper: ASTM B370, cold rolled 16 oz/sq ft (24 gage) (0.0216 inch) thick; natural finish.

2.03 FABRICATION

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA (ASMM) that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
   1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
   2. Obtain field measurements for accurate fit before shop fabrication.
   3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
   4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Field verify dimensions prior to fabrication.

C. Form sections true to shape, accurate in size, square, and free from distortion or defects.

D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal. Fabricate in sizes recommended by SMACNA (ASMM) for application, but not less than thickness of metal being secured.
   1. Provide continuous cleats on outside face of copings.

E. Form pieces in longest possible lengths.

F. Hem exposed edges on underside 1/2 inch; miter and seam corners.

G. Form material with standing seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
   1. Standing Seams: 1-inch high with sealant at folded corners.
   2. Solder-Lap Seams: 1-inch finish width; sweat full with solder.
   3. Double S Lock Seams: Form 1-1/4 inch with S shaped seam on each edge of flashing sheet for concealed fastening.

H. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant. Solder galvanized steel that is not prefinished. Do not solder prefinished steel.
   1. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

I. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

J. Fabricate flashings to allow toe to extend 4 inches over roofing. Return and break edges.

2.04 ACCESSORIES

A. Fasteners: Stainless steel, with soft neoprene washers.

B. Underlayment: ASTM D2178/D2178M, glass fiber roofing felt.

C. Underlayment: Polyethylene, 6 mils thick.

D. Self-Adhering, High-Temperature Sheet (SAHTS): Minimum 30 to 45 mils thick, consisting of polyethylene film coated on one side with a layer of butyl rubber adhesive.
   1. Service Temperature: 300 degrees F per ASTM D1204.
   2. Low-Temperature Flexibility: Unaffected at -20 degrees F per ASTM D1970/D1970M.
   3. Products:
      a. GCP Applied Technologies: Grace Ultra.
      b. Protecto Wrap: Protecto SafSeal 45 Butyl.
      c. Substitutions: See Section 01 60 00 - Product Requirements.
   4. Locations of Use: Below sheet metal copings and as indicated on Drawings.

E. Primer: Zinc chromate type.

F. Protective Backing Paint: Asphaltic mastic, ASTM D4479 Type I.

G. Concealed Sealants: Non-curing butyl sealant.

H. Sealant to be Exposed in Completed Work: Single-Component, Nonsag, Fast-Curing, Silyl-Terminated Polyether Sealant: ASTM C920, Type X, Grade NS, Class 50, for Use NT, M, A, G and O.
   1. Products:
      a. BASF Building Systems; MasterSeal NP 150.
      b. Tremco Incorporated; Dymonic FC.
      c. ChemLink; M-1.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

I. Plastic Cement: ASTM D4586/D4586M, Type I.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA (ASMM). Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Install Work watertight and weathertight, without oil canning, buckles, tool marks, fastening stresses, distortion or defects which impair strength or mar appearance.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection.

D. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
   1. Coat back side of stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
   2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet.

E. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.

F. Apply plastic cement compound between metal flashings and felt flashings.

G. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

H. Install high-temperature self-adhered membrane (SAHTS) flashing where indicated. Apply primer if required by manufacturer. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days or as required by underlayment manufacturer.

I. Seal metal joints watertight.

J. Solder metal joints for full metal surface contact, and after soldering wash metal clean with neutralizing solution and rinse with water.
   1. Clean and flux metals prior to soldering.
   2. Perform soldering with a heavy soldering copper of blunt design, properly tinned for use.
   3. Perform soldering slowly with a wall heated surface and fill with solder.
   4. Do not solder coil-coated galvanized sheet steel.

K. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

L. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches

and bed with sealant. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant.

M. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

N. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.04 SCHEDULE

A. Fabricate sheet metal flashing and trim from the following materials of the minimum thicknesses indicated, unless otherwise required on the Drawings or to meet performance requirements.

B. Cleats:
   1. Galvanized Steel: 22 gage (0.034 inch) thick.
   2. Joint Style: Butt.

C. Base Flashing:
   1. Galvanized Steel: 24 gage (0.028 inch) thick.

D. Counterflashing:
   1. Galvanized Steel: 24 gage (0.028 inch) thick.
   2. Joint Style: Lapped and sealed with interlocking hems.

E. Raised Edge Metal:
   1. Galvanized Steel: 24 gage (0.028 inch) thick.
   2. Joint Style: Lapped and sealed with interlocking hems.

F. Sleeper Cap Flashing:
   1. Stainless Steel: 22 gage (0.027 inch) thick.

G. Flashing Receivers:
   1. Galvanized Steel: 26 gage (0.022 inch) thick.

H. Roof-Penetration Flashing:
   1. Galvanized Steel: 24 gage (0.028 inch) thick.

I. Equipment Support Flashing:
   1. Galvanized Steel: 24 gage (0.028 inch) thick.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Joint sealants.

B. Joint backings and accessories.

C. Precompressed foam sealants.

1.02 REFERENCE STANDARDS

A. ASTM C834 - Standard Specification for Latex Sealants.

B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

D. ASTM C1193 - Standard Guide for Use of Joint Sealants.

E. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.

F. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness.

G. OSSC - Oregon Structural Specialty Code, Section 1811, Radon Control Methods Public Buildings.

H. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

I. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168.

J. SWRI (VAL) - SWR Institute Validated Products Directory.

1.03 SUBMITTALS

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

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following:

1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
2. List of backing materials approved for use with the specific product.
3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
4. Substrates the product should not be used on.
5. Substrates for which use of primer is required.
6. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
7. Sample product warranty.
8. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

E. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

F. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.

G. Field Quality Control Plan: Submit at least two weeks prior to start of installation.

H. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

I. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.

1.04 QUALITY ASSURANCE

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

B. Installer Qualifications: Company specializing in performing the work of this section and with at least five years of documented experience.

C. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

1.05 WARRANTY

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

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period for Silicone Sealants: 20 years from Date of Substantial Completion.
   2. Warranty Period for Polyurea Sealants: 1 year from Date of Substantial Completion.
   3. Warranty Period for All other Types of Sealants: 5 years from Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 JOINT SEALANT APPLICATIONS

A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
      a. Joints between different exposed materials.
      b. Other joints indicated below.
   2. Interior Joints: Seal interior joints unless specifically indicated not to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
      a. Joints between door and other frames and adjacent construction.
      b. All joints between dissimilar materials.
      c. Other joints indicated below.
   3. Do not seal the following types of joints.
      a. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
      b. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
      c. Joints where installation of sealant is specified in another section.

2.02 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

B. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

C. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

D. Colors: As selected by Architect from manufacturer's full range.

2.03 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, for Use NT.
   1. Products:
      a. DOWSIL; 795.
      b. Momentive Performance Materials; SilPruf SCS2000.
      c. Pecora Corporation; 864.
      d. Sika Corporation, Construction Products Division; Sikasil WS-295.
      e. Tremco Commercial Sealants & Waterproofing; Spectrem 2.
   2. Locations of Use:
      a. Control, expansion and isolation joints in steel or aluminum.

B. Mildew-Resistant, Single-Component, Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Use NT.
   1. Products:
      a. DOWSIL; 786 Mildew Resistant Silicone Sealant.
      b. Momentive Performance Materials (formerly GE Advanced Materials); Sanitary SCS1700.
      c. Pecora Corporation; 898.
      d. Sika Corporation, Construction Products Division; Sikasil-GP.
      e. Tremco Commercial Sealants & Waterproofing; Tremsil 200 Sanitary or Tremsil 600.
   2. Locations of Use:
      a. Interior joints between plumbing fixtures and adjoining walls, floors and counters.
      b. Interior joints between cabinetry and counters and adjoining walls.

C. Single-Component, Silicone USDA Approved Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Use NT.
   1. Products:
      a. DOWSIL; 786 Silicone Sealant.
      b. Momentive Performance Materials (formerly GE Advanced Materials); Sanitary SCS1002.
      c. Pecora Corporation; 898.
      d. Sika Corporation, Construction Products Division; Sikasil-N-Plus.
      e. Tremco Commercial Sealants & Waterproofing; Tremsil 600.
   2. Locations of Use:
      a. Interior joints in contact with food.

2.04 URETHANE JOINT SEALANTS

A. Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C920, Type M, Grade NS, Class 25, for Use T.
   1. Products:
      a. BASF Building Systems; MasterSeal NP 2.
      b. Pecora Corporation; Dynatred.
      c. Sika Corporation, Construction Products Division; Sikaflex - 2c NS.
      d. Tremco Commercial Sealants & Waterproofing; Dymeric 240FC.

2. Locations of Use:
    a. Interior ceramic tile expansion control and isolation joints in vertical surfaces.
    b. Vertical joints on exposed surfaces of interior unit masonry and concrete walls.

B. Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C920, Type M, Grade P, Class 25, for Use T and I.
1. Products:
    a. BASF Building Systems; MasterSeal SL 2.
    b. Pecora Corporation; Urexpan NR-200.
    c. Sika Corporation, Construction Products Division; Sikaflex - 2c SL.
    d. Tremco Commercial Sealants & Waterproofing; THC 901 or Vulkem 455 SL.
2. Locations of Use:
    a. Interior ceramic tile expansion, control, construction and isolation joints in horizontal traffic surfaces.

C. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, for Use NT.
1. Products:
    a. BASF Building Systems, MasterSeal NP 100.
    b. Sika Corporation, Construction Products Division; Sika Hyflex 150.
    c. Tremco Commercial Sealants & Waterproofing; Dymonic 100.
2. Locations of Use:
    a. Interior painted concrete and concrete masonry surfaces.

2.05 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
1. Products:
    a. Pecora Corporation; AC-20+.
    b. Tremco Commercial Sealants & Waterproofing; Tremflex 834.
2. Locations of Use: Perimeter joints between interior wall surfaces and frames of interior doors.

2.06 POLYUREA JOINT SEALANTS

A. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, aromatic polyurea with a Type A shore durometer hardness range of 80 to 95 per ASTM D2240.
1. Products:
    a. BASF Building Systems; MasterSeal CR 100.
    b. Euclid Chemical Company, QUIKjoint 200.
    c. L&M Construction Chemicals, Inc; Joint Tite 750.
    d. Sika Corporation, Construction Products Division; Loadflex 524.
2. Locations of Use:
    a. Interior joints in floor slabs.

2.07 PREFORMED JOINT SEALANTS

A. Preformed Foam Joint Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant manufactured from urethane foam with minimum density of 10 lb/cu. ft. and impregnated with a nondrying, water-repellent agent. Factory produce in precompressed sizes in roll or stick form to fit joint widths indicated; coated on one side with a pressure-sensitive adhesive and covered with protective wrapping.
1. Products:
    a. Dayton Superior Specialty Chemicals; Polytite Standard.
    b. DOWSIL 123 Silicone Seal
    c. EMSEAL Joint Systems, Ltd; Emseal 25V.
    d. Sandell Manufacturing Co., Inc; Polyseal.
    e. Tremco Commercial Sealants & Waterproofing; Illmod 600.

2.08 ACOUSTICAL JOINT SEALANTS

A. Acoustical Joint 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. Products:
      a. Pecora Corporation; AC-20 FTR
      b. Tremco Commercial Sealants & Waterproofing; Tremflex 834.
      c. Tremco Commercial Sealants & Waterproofing; Tremco Acoustical Sealant (where fully concealed from view).
      d. USG Corporation; SHEETROCK Acoustical Sealant or Firecode Smoke-Sound Sealant (where fully concealed from view).

2.09 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application. Oversize 30 to 50 percent larger than joint width.
   1. Manufacturers:
      a. Sof Rod manufactured by Nomaco Inc.
      b. MasterSeal 921 manufactured by BASF.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

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

E. Primers: Type recommended by sealant manufacturer to suit application; non-staining. Confirm requirements based on preconstruction field testing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.
   1. Remove existing sealant residue as required to provide a solid bond with new sealants. Where necessary to expose clean, sound surfaces, use wire brush, grind, sandblast or solvent clean as recommended by sealant manufacturer.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
   1. Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction field tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

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

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

3.03 INSTALLATION

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

B. Perform installation in accordance with ASTM C1193.

C. Comply with requirements of OSSC Section 1811 relative to sealing of construction joints, penetrations, cracks and other connections through foundation walls and slabs-on-grade.

D. Seal all exposed joints of dissimilar materials and elsewhere as indicated

E. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

F. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

G. Install bond breaker backing tape where backer rod cannot be used or where 3-sided adhesion may occur.

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

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

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

K. Seal bottoms of hollow metal frames to floor at resilient flooring.

L. Seal thresholds in a full continuous bed of sealant.

M. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping. Do not pull or stretch material. Produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures, apply heat to sealant in compliance with sealant manufacturer's written instructions.
   1. Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

3.04 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

B. Protect sealants until cured.

3.05 POST-OCCUPANCY

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at low temperature in thermal cycle. Report failures immediately and repair.

END OF SECTION

SECTION 08 12 13
HOLLOW METAL FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated hollow metal frames for non-hollow metal doors.

1.02 RELATED REQUIREMENTS

A. Section 08 71 00 - Door Hardware: Hardware and silencers.

B. Section 09 96 00 - High-Performance Coatings: Field painting and primer coordination.

1.03 REFERENCE STANDARDS

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

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors.

C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100).

D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames.

I. ICC A117.1 - Accessible and Usable Buildings and Facilities.

J. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames.

K. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames.

L. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames.

M. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames.

N. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames.

1.04 SUBMITTALS

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

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.

C. Shop Drawings: Details of each opening, showing elevations, glazing, metal thickness and frame profiles.

D. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

F. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

G. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

H. Manufacturer's Qualification Statement.

1.05 QUALITY ASSURANCE

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

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with applicable requirements and in compliance with standards and/or custom guidelines as indicated.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Frames with Integral Casings:
   1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.
   2. Curries, an Assa Abloy Group company: www.assaabloydss.com.
   3. Door Components: www.doorcomponents.com.
   4. Steelcraft, an Allegion brand: www.allegion.com/#sle.
   5. Stiles Custom Metal, Inc: stilesdoors.com.
   6. Basis of Design Products:
      a. Frames: F16 as manufactured by Steelcraft.
   7. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DESIGN CRITERIA

A. Door Frame Type: Provide hollow metal door frames with integral casings.

B. Steel used for fabrication of frames shall conform to one or more of the following requirements; galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.

C. Accessibility: Conform to ICC A117.1 and ADA Standards.

D. Hardware Preparations, Selections and Locations: Comply with BHMA A156.115, NAAMM HMMA 830, NAAMM HMMA 831 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
   1. Closers: 0.093 inch, 12 gage.
   2. Hinges: 0.167 inch, 7 gage.
   3. Continuous Hinges: 0.167 inch, 7 gage, minimum 1-1/4 inch wide.
   4. All other surface applied hardware: 0.067 inch, 14 gage.

2.03 HOLLOW METAL DOOR FRAMES WITH INTEGRAL CASINGS

A. Frame Finish: Factory primed and field finished.
   1. Provide primer compatible with primers specified in Section 09 96 00 - High-Performance Coatings.

B. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 2 - Heavy-duty.
      b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.

2.04 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, and compatible with finish coats specified in Division 09.

2.05 ACCESSORIES

A. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners with hairline joints; prepared for countersink style tamper proof screws.

B. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

C. Jamb Anchors:
   1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

D. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick. Provide clip-type anchors, with two holes to receive fasteners.

2.06 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
   1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
   2. Floor Anchors: Provide adjustable base anchors at bottom of jambs. Provide fixed anchors at mullions.
   3. Jamb Anchors: Provide number and spacing of anchors as follows:
      a. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
         1) Four anchors per jamb up to 90 inches high.
         2) Five anchors per jamb from 90 to 96 inches high.
         3) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
   4. Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
      a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

3.03 INSTALLATION

A. Install frames in accordance with manufacturer's instructions and related requirements of specified frame standards or custom guidelines indicated.

B. Coordinate frame anchor placement with wall construction.

C. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

D. Stud Partitions: Solidly pack mineral-fiber insulation behind frames.

E. Install door hardware as specified in Section 08 71 00.

3.04 TOLERANCES

A. Clearances Between Door and Frame: Conform to related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.

END OF SECTION

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

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

B. Factory finishing.

1.02 RELATED REQUIREMENTS

A. Section 08 12 13 - Hollow Metal Frames.

B. Section 08 71 00 - Door Hardware.

1.03 REFERENCE STANDARDS

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

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards.

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0.

D. WDMA I.S. 1A - Interior Architectural Wood Flush Doors.

1.04 SUBMITTALS

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

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

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

1. Provide product data for adhesives and composite wood products, indicating that product contains no added urea formaldehyde.

D. Samples: Submit two samples of door veneer, 8-1/2 by 11 inch in size illustrating wood grain, stain color, and sheen.

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

F. Specimen warranty.

G. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

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

B. Quality Standard: In addition to requirements specified, comply with WDMA I.S. 1A.

1.06 DELIVERY, STORAGE, AND HANDLING

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

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

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

1.07 WARRANTY

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

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

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

1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. Algoma Hardwoods: www.algomahardwoods.com.
   2. Eggers Industries: www.eggersindustries.com/#sle.
   3. Lynden Door, Inc: lyndendoor.com.
   4. Marshfield DoorSystems, Inc: www.marshfielddoors.com/#sle.
   5. Oregon Door: www.oregondoor.com/sle.
   6. Oshkosh Door Company: www.oshkoshdoor.com.
   7. Vancouver Door Company: www.vancouverdoorco.com.
   8. VT Industries, Inc: www.vtindustries.com.
   9. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS

A. Doors: Refer to drawings for locations and additional requirements.
   1. Quality Standard: Custom Grade, Extra Heavy Duty performance, in accordance with WDMA I.S. 1A.
   2. Wood Veneer Faced Doors: 5-ply. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering. Faces are bonded to core using a hot press.

B. Interior Doors: 1-3/4 inches thick; flush construction.
   1. Provide solid core doors at all locations.
   2. Wood veneer facing with factory transparent finish.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), ANSI A208.1, Grade LD-2, plies and faces as indicated above, made with binder containing no added urea-formaldehyde resin or provide certification for low chemical emissions complying with CA 01350 noted above.
   1. Provide structural composite lumber core for full glazed doors.

2.04 DOOR FACINGS

A. Veneer Facing for Transparent Finish: White maple, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
   1. Vertical Edges: Same species as face veneer.
   2. "Running Match" each pair of doors and doors in close proximity to each other.
   3. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.

B. Facing Adhesive: Type I - waterproof.

2.05 DOOR CONSTRUCTION

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

B. Blocking: Provide minimum 5 inch top rail blocking for all doors with closers. Provide 5 inch bottom rail for auxiliary hardware and undercut flexibility.

C. Stiles (Vertical Edges): Provide manufacturer's standard laminated edge construction with improved screw-holding capability and split resistance. Both inner and outer stiles cannot contain salt treating.

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

E. Factory fit factory finished doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard except as follows:

1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.

F. Bevel edges 1/8 inch in 2 inches at lock and hinge edges.

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

2.06 FACTORY FINISHING - WOOD VENEER DOORS

A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
   1. Transparent:
      a. System - 9, UV Curable, Acrylated Epoxy, Polyester or Urethane.
      b. Stain: As selected by Architect.
      c. Sheen: Semigloss.

B. Factory finish doors in accordance with approved sample.

2.07 ACCESSORIES

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

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

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

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

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.

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

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

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

3.03 TOLERANCES

A. Conform to specified quality standard for fit and clearance tolerances.

B. Conform to specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

C. Rehang or replace doors that do not swing or operate freely.

D. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for wood doors.

1.02 RELATED REQUIREMENTS

A. Section 08 12 13 - Hollow Metal Frames.

B. Section 08 14 16 - Flush Wood Doors.

1.03 REFERENCE STANDARDS

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

B. BHMA A156.18 - American National Standard for Materials and Finishes.

C. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames.

D. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors.

E. ICC A117.1 - Accessible and Usable Buildings and Facilities.

F. NFPA 101 - Life Safety Code.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.

B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

C. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

D. Convey Owner's keying requirements to manufacturers. Coordinate keying requirements with District prior to ordering the door hardware.

1.05 PREINSTALLATION CONFERENCE

A. Preinstallation Conference: Convene a preinstallation meeting one week prior to commencing work of this section; require attendance by all affected installers.

1.06 SUBMITTALS

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

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components. Submittals containing complete product line catalogs will be rejected without review.

C. Door Hardware Sets: Prepared by or under the supervision of Architectural Hardware Consultant, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final door hardware sets with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
2. Content: Include the following information:
    a. Identification number, location, hand, fire rating, and material of each door and frame, as applicable.
    b. Type, style, function, size, quantity, and finish of each door hardware item identified by BHMA designation. Include description and function of each lockset and exit device.

c. Complete designations of every item required for each door or opening including name and manufacturer.
d. Fastenings and other pertinent information.
e. Explanation of abbreviations, symbols, and codes contained in schedule.
f. Mounting locations for door hardware.
g. Door and frame sizes and materials.
h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
i. List of related door devices specified in other Sections for each door and frame.

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

E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
1. Submit manufacturer's parts lists and templates.
2. Bitting List: List of combinations as furnished.
3. Provide factory invoice number for each item.

F. Hardware Supplier Qualifications: Verification that hardware supplier meets specified requirements.

G. Architectural Hardware Consultant Qualifications: Verification that architectural hardware consultant meets specified requirements.

H. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

I. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Tools: One set of each special wrench or tool applicable for each different or special hardware component, whether supplied by hardware component manufacturer or not.

1.07 QUALITY ASSURANCE

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

B. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with 5 years of experience in the vicinity of the Projects. Supplier must maintain factory direct status with manufacturers listed.
1. Installer's responsibilities include supplying and installing door hardware and providing a qualified Architectural Hardware Consultant available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
2. Installer shall have warehousing facilities in Project's vicinity. Installer shall maintain a limited parts inventory of items supplied for future service to the Owner.
3. Scheduling Responsibility: Preparation of door hardware and keying schedules.

C. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
1. Consultant must be an employee of the supplier and readily available for consultation with Architect, Owner and Contractor.
2. The Consultant will obtain keying information in a meeting with the Owner.
3. Consultant shall make at least two jobsite inspections during installation of hardware and one final inspection to see that all hardware has been installed according to manufacturer's recommendations.
4. Consultant shall be knowledgeable on local, State and Federal life safety, fire and accessibility codes and shall assist Architect as required.

1.08 DELIVERY, STORAGE, AND HANDLING

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

1.09 WARRANTY

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

B. Warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including excessive deflection, cracking, or breakage.
      b. Faulty operation of operators and door hardware.
      c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
   2. Warranty Period:
      a. Closers: 30 years, minimum.
      b. Locksets and Cylinders: Seven years, minimum.
      c. Other Hardware: Two years, minimum.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

B. Provide individual items of single type, of same model, and by same manufacturer.

C. Provide door hardware products that comply with the following requirements:
   1. Applicable provisions of federal, state, and local codes.
   2. Accessibility: ADA Standards and ICC A117.1.
      a. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
      b. Comply with the following maximum opening-force requirements for closers:
         1) Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
   3. Applicable provisions of NFPA 101.
      a. Latches shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
      b. Door closers shall not require more than 30 lbf to set door in motion and not more than 8.5 lbf to open door to minimum required width.

D. Lock Function: Provide lock and latch function numbers and descriptions of manufacturer's series. Refer to Hardware Schedule.

E. Fasteners:
   1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
      a. Aluminum fasteners are not permitted.
      b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.

2.02 MANUFACTURERS

A. Hinges:
   1. Bommer Industries, Inc: www.bommer.com.
   2. Hager Companies: www.hagerco.com.
   3. Ives: http://us.allegion.com/brands/ives.
   4. McKinney: www.mckinneyhinge.com
   5. Stanley Hardware: www.stanleyworks.com.

B. Lock and Latch Sets:
   1. Best Access Systems: www.bestlock.com.

2. Sargent Manufacturing: www.sargentlock.com.
3. Schlage: http://us.allegion.com/brands/schlage.

C. Closers:
1. LCN: http://us.allegion.com/brands/lcn.

D. Wall and Floor Stops/Holders:
1. Ives: http://us.allegion.com/brands/ives.
2. Rockwood: www.rockwood.com.
3. Trimco Inc: www.trimcobbw.com.

E. Silencers:
1. Ives: http://us.allegion.com/brands/ives.
2. Trimco Inc: www.trimcobbw.com.

F. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 LOCKS AND LATCHES

A. Lock Cylinders: Manufacturer's standard tumbler type, seven-pin interchangeable core.
1. Provide cams and/or tailpieces as required for locking devices required.

B. Lockset/Latchset Design:
1. All locks to have a 2-3/4 inch backset, unless otherwise indicated.
2. Provide strikes with appropriate lip length to suit conditions.

2.04 FINISHES

A. Finishes: Identified in Schedule.
1. Exceptions:
a. Where base metal is specified to be different, provide finish that is an appearance equivalent according to BHMA A156.18.

PART 3 EXECUTION

3.01 INSTALLATION

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

B. Use templates provided by hardware item manufacturer.

C. Do not install surface mounted items until application of finishes to substrate are fully completed.

D. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list, unless noted otherwise on drawings.
1. For Wood Doors: Install in compliance with DHI WDHS.3 recommendations.

3.02 FIELD QUALITY CONTROL

A. Provide an Architectural Hardware Consultant (AHC) to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.03 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
1. Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

3.04 CLEANING

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

B. Clean adjacent surfaces soiled by hardware installation.

C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.05 PROTECTION

A. Protect finished Work under provisions of Section 01 70 00 - Execution.

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

3.06 SCHEDULE

HW SET: 01

FOR USE ON DOOR(S):

Door from mezzanine storage to above freezer

EACH OPENING TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	ND96PD RHO		626	SCH
1	EA	PRIMUS CORE	20-740 OR 23-030 (SCHLAGE CLASSIC KEYWAY WITH “F” KEY CORE)		626	SCH
1	EA	WALL STOP	WS406/407CVX		630	IVE

END OF SECTION

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gypsum wallboard.

B. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Building framing.

B. Section 07 92 00 - Joint Sealants: Acoustic sealants installed as Work of this Section.

1.03 REFERENCE STANDARDS

A. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire.

B. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

C. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board.

D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.

E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

F. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

G. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.

H. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

I. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base.

J. ASTM C1396/C1396M - Standard Specification for Gypsum Board.

K. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

L. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

M. ASTM E413 - Classification for Rating Sound Insulation.

N. GA-214 - Recommended Levels of Gypsum Board Finish.

O. GA-216 - Application and Finishing of Gypsum Board.

P. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113.

Q. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168.

1.04 SUBMITTALS

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

B. Shop Drawings: Indicate special details associated with acoustic sound isolation clips.

C. Product Data: Provide data on gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.
   1. Indicate profiles and products for wall and ceiling trim accessories.

D. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum five years of experience.

1.06 STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.07 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install interior products until installation areas are enclosed and conditioned.

C. Moisture test wood stud framing and confirm moisture content is less than specified for framing material in Section 06 10 00 - Rough Carpentry. Do not commence installation until moisture content of framing is within tolerances.

D. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.
   1. See PART 3 for finishing requirements.

2.02 BOARD MATERIALS

A. Gypsum Board, General: Provide Type X or Type C as required for fire-resistant ratings indicated on Drawings.
   1. Lightweight gypsum wallboard is not allowed.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
      a. Moisture-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
   3. Thickness:
      a. Vertical Surfaces: 5/8 inch.
      b. Ceilings: 5/8 inch.
      c. Multi-Layer Assemblies: 5/8 inch, unless otherwise indicated on drawings.
   4. Edges: Tapered.
   5. Paper-Faced Products:
      a. American Gypsum Company; FireBloc Type X and FireBloc Type C Gypsum Wallboard.
      b. CertainTeed Corporation; ProRoc Brand Gypsum Board or CertainTeed Gypsum Board.
      c. Georgia-Pacific Gypsum; ToughRock, ToughRock Fireguard, and ToughRock FireGuard C Gypsum Wallboard.
      d. National Gypsum Company; Gold Bond Brand Gypsum Wallboard.
      e. USG Corporation; Sheetrock Brand Firecode and Firecode C Gypsum Panels.
      f. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 ACCESSORIES

A. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
   1. Cornerbead. Provide 1-1/4-inch minimum width flange at outside corners.
   2. L-Bead: L-shaped; exposed long flange receives joint compound.
   3. U-Bead: J-shaped; exposed short flange does not receive joint compound.
   4. Expansion (control) joint.
   5. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
      a. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B211, Alloy 6063-T5.
      b. Finish: Chemical conversion coat suitable for field painting.
      c. Types:
         1) Reveal Channel Screed: Fry Reglet DCS-625-50 for use at ceilings and at intermediate soffit joints.
         2) Reveal Molding: Fry Reglet DRM-625-50 for use at walls.
         3) "F" Reveal: Fry Reglet FDM-625-75 for use at perimeters of soffits.
         4) Substitutions: See Section 01 60 00 - Product Requirements.

B. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   1. Tape: 2 inch wide, creased paper tape for joints and corners.
   2. Ready-mixed vinyl-based joint compound.

C. All paints and coating wet applied on the building interior must meet the applicable limits of SCAQMD 1113.

D. Basecoat/Surfacer: Flat latex basecoat for use on surfaces indicated to receive Level 4 and 5 finish. Basecoat/surfacer does not replace skim coating for Level 5. Basecoat is in addition to primer specified in Section 09 91 23 - Interior Painting.
   1. Products:
      a. "PrepRite High Build Interior Latex Primer/Surfacer", B28W601; Sherwin Williams.
      b. "SHEETROCK Brand Primer-Surfacer, Tuff-Hide; USG Corporation.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

E. Nails for Attachment to Wood Members: ASTM C514.

F. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence. Start of wall and ceiling system Work will indicate acceptance of surfaces and conditions within each area.

B. Protection: Provide temporary covering to eliminate splattering of joint compound onto adjacent surfaces.

3.02 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board perpendicular to framing, with ends and edges occurring over firm bearing.

C. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For non-rated assemblies, install as follows:
   1. Single-Layer Applications: Screw attachment.

3.03 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated. In public areas, confirm locations with Architect for visual effect. Frame both sides of joints independently.
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.
   1. U-Bead: Use at exposed panel edges.
   2. L-Bead: Use at all exposed terminations of gypsum board, at all floor joints and joints to receive sealants.

D. Aluminum Trim: Install in locations indicated.

3.04 JOINT TREATMENT

A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

B. Finish gypsum board in accordance with levels defined in ASTM C840 or GA-214, except as indicated below and as follows:
   1. Level 4:
      a. Locations of Use:
         1) Walls and ceilings at all other public areas (including Kitchen).
      b. Apply one coat of specified basecoat/surfacer to entire surface at manufacturer's recommended coverage rate of mil thickness.
      c. Primer and its application to surfaces are specified in Section 09 91 23 - Interior Painting and are in addition to basecoat/surfacer.
   2. Level 2: In utility areas such as Janitors Closets, Electrical Closets and Storage Rooms, in areas behind cabinetry and on backing board to receive tile finish.
   3. Level 1: Wall areas above finished ceilings and permanently concealed areas, whether or not accessible in the completed construction, except provide a higher level of finish as required to comply with fire resistance ratings and acoustical ratings.

C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.

3.05 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 30 00
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Non-ceramic trim.

1.02 RELATED REQUIREMENTS

A. Section 07 92 00 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.

1.03 REFERENCE STANDARDS

A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).

B. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).
   1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar.
   2. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar.
   3. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement.
   4. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive.
   5. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
   6. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy.
   7. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout.
   8. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout.
   9. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework.
   10. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar.
   11. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone.
   12. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar.
   13. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive.
   14. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar.
   15. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation.
   16. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation.

17. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes For Thin-Set Ceramic Tile And Dimension Stone Installation.
18. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.
19. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar.
20. ANSI A137.1 - American National Standard Specifications for Ceramic Tile.

C. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products.

D. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168.

E. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation.

1.04 SUBMITTALS

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

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
   1. For sealants, include printed statement of VOC content.

C. Selection Samples: Provide manufacturer's full range of available colors for grout selection.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Provide 2 percent of each size, color, and surface finish of tile specified.

1.05 QUALITY ASSURANCE

A. Maintain one copy of and ANSI A108/A118/A136 and TCNA (HB) on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.

C. Installer Qualifications: Installer specializing in performing tile installation, with minimum of 5 years of documented experience and approved by product manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not install solvent-based products in an unventilated environment.

B. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

PART 2 PRODUCTS

2.01 TILE

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

B. Manufacturers:
   1. American Olean Corporation: www.americanolean.com/#sle.
   2. Dal-Tile Corporation: www.daltile.com/#sle.
   3. Emser Tile, LLC: www.emser.com/#sle.

4. Terrazzo & Marble Supply Companies: www.tmsupply.com/#sle.
5. Substitutions: See Section 01 60 00 - Product Requirements.

C. Ceramic Mosaic Tile: ANSI A137.1, standard grade.
1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
2. Size: 1 by 1 inch, nominal.
3. Shape: Square.
4. Edges: Square.
5. Surface Finish: Unglazed.
6. Color(s): To be selected by Architect from manufacturer's standard range.
7. Trim Units: Matching bead, cove, and surface bullnose shapes in sizes coordinated with field tile.
8. Products:
   a. Dal-Tile Corporation: www.daltile.com/#sle.
   b. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 TRIM AND ACCESSORIES

A. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
1. Applications:
   a. Open edges of floor tile.
   b. Thresholds at door openings.
   c. Expansion and control joints, floor and wall.
   d. Floor to wall joints.
2. Manufacturers:
   a. Blanke Corporation: www.blankecorp.com.
   b. Schluter-Systems: www.schluter.com/#sle.
   c. Genesis APS International: www.genesis-aps.com/#sle.
   d. Substitutions: See Section 01 60 00 - Product Requirements.

B. Sealants and Primers: As specified in Section 07 92 00 - Joint Sealants.
1. Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.
   a. Architectural Sealants: 250 g/L.
   b. Sealant Primers for Nonporous Substrates: 250 g/L.
   c. Sealant Primers for Porous Substrates: 775 g/L.
2. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.
3. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

C. Trowelable Underlayments, Self-Leveling Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
1. Available Products: Ardex Engineered Cements, self-leveling underlayments and pre-tile repair mortar.

2.03 SETTING MATERIALS

A. Tile Setting Materials - General: Provide only products having lower volatile organic compound (VOC) content than required by SCAQMD 1168.

B. Manufacturers:
1. ARDEX Engineered Cements: www.ardexamericas.com.
2. Bostik Inc: www.bostik-us.com/#sle.
3. Custom Building Products: www.custombuildingproducts.com/#sle.
4. LATICRETE International, Inc: www.laticrete.com/sle.
5. Merkrete, by Parex USA, Inc: www.merkrete.com/#sle.
6. TEC, an H.B. Fuller Construction Products Brand: www.tecspecialty.com/#sle.

7. Substitutions: See Section 01 60 00 - Product Requirements.

C. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4 or ANSI A118.15.
1. Applications: Use this type of bond coat where indicated and where no other type of bond coat is indicated.
2. Products:
a. ARDEX Engineered Cements; ARDEX X 5: www.ardexamericas.com.
b. Custom Building Products; ProLite Premium Rapid Setting Large Format Tile Mortar, with Multi-Surface Bonding Primer: www.custombuildingproducts.com/#sle.
c. LATICRETE International, Inc; LATICRETE 254 Platinum: www.laticrete.com/#sle.
d. Merkrete, by Parex USA, Inc; Merkrete 735 Premium Flex: www.merkrete.com/#sle.
e. TEC, an H.B. Fuller Construction Products Brand; TEC Ultimate Large Tile Mortar: www.tecspecialty.com/#sle.
f. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 GROUTS

A. Manufacturers:
1. ARDEX Engineered Cements: www.ardexamericas.com.
2. Flextile Ltd: www.flextile.net.
3. Bostik Inc: www.bostik-us.com/#sle.
4. Custom Building Products: www.custombuildingproducts.com/#sle.
5. LATICRETE International, Inc: www.laticrete.com/#sle.
6. Merkrete, by Parex USA, Inc; Merkrete Duracolor Non-Sanded Color Grout: www.merkrete.com/#sle.
7. TEC, an H.B. Fuller Construction Products Brand: www.tecspecialty.com/#sle.
8. TEC: www.tecspecialty.com.
9. Substitutions: See Section 01 60 00 - Product Requirements.

B. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
1. Color(s): As selected by Architect from manufacturer's full line.
2. Products:
a. ARDEX Engineered Cements; ARDEX WA: www.ardexamericas.com/#sle.
b. Custom Building Products; CEG-IG 100% Solids Industrial Grade Epoxy Grout: www.custombuildingproducts.com/#sle.
c. LATICRETE International, Inc; LATICRETE SPECTRALOCK 2000 IG: www.laticrete.com/#sle.
d. Merkrete, by Parex USA, Inc; Merkrete Pro Epoxy: www.merkrete.com/#sle.
e. Stuart Dean Company, Inc; Marcoat GS: www.stuartdean.com/#sle.
f. TEC, an H.B. Fuller Construction Products Brand; TEC AccuColor EFX Epoxy Special Effects Grout: www.tecspecialty.com/#sle.
g. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI for installations indicated.

C. Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.1b for installations indicated.
1. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
2. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

D. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.

E. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

F. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer. Level existing substrate surfaces to acceptable flatness tolerances.

3.03 INSTALLATION - GENERAL

A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.19 , manufacturer's instructions, and TCNA (HB) recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor and base joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
   1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
   2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.

F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
   1. Unglazed Floor Tile: 1/4 inch.

G. Form internal angles square and external angles bullnosed.

H. Install non-ceramic trim in accordance with manufacturer's instructions.

I. Sound tile after setting. Replace hollow sounding units.

J. Keep control and expansion joints free of mortar, grout, and adhesive.
   1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
   2. Space control joints at 12 foot to 16 foot intervals in each direction, unless otherwise indicated.
   3. Provide joints at perimeter walls and at fixtures or structural elements.

K. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

L. Grout tile joints unless otherwise indicated.

M. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F115, with epoxy grout.

3.05 CLEANING

A. Clean tile and grout surfaces.

B. Apply sealer to all grout joints that are not epoxy grout.

3.06 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Acoustical units ACT-1.

1.02 RELATED REQUIREMENTS

A. Section 01 23 00 - Alternates.

B. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

C. Section 13 48 53 - Seismic Anchorage Requirements.

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.

E. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

G. CISCA - CISCA Seismic Zones 3-4 Guidelines for Seismic Restraint for Direct-Hung Suspended Ceiling Assemblies.

H. Northwest Wall and Ceiling Bureau, Technical Bulletin 401 - Suspension Systems for Acoustical Lay-in Ceilings.

I. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168.

J. UL (FRD) - Fire Resistance Directory.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

1.05 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design acoustical ceiling suspension systems, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Oregon, using the seismic standards indicated in the Quality Assurance Article.

1.06 SUBMITTALS

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

B. Shop Drawings: Indicate grid layout and related dimensioning.

C. Product Data: Provide data on suspension system components and acoustical units.

D. Delegated-Design Submittal: For ceiling suspension system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Submit submittals as "Deferred Submittals" in accordance with Section 01 30 00 - Administrative Requirements. Transmit a copy of each submittal indicating agency approval to the Architect for record.

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

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

1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

G. Research/Evaluation Reports: For each acoustical panel ceiling and components and anchor and fastener type.

H. Maintenance Data: For finishes to include in maintenance manuals.

1.07 QUALITY ASSURANCE

A. Designer Qualifications for Seismic Design: Perform under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at Oregon.

B. Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with ASTM E1264 for Class A materials as determined by testing identical products per ASTM E84:
1. Smoke-Developed Index: 50 or less.

C. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:
1. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E580/E580M.
2. CISCA: Comply with CISCA's "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies--Seismic Zones 3 & 4."
3. ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."
4. Northwest Wall and Ceiling Bureau, Technical Bulletin 401 - Suspension Systems for Acoustical Lay-in Ceilings.

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

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

1.08 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

A. Acoustical Tile ACT-1: Vinyl faced mineral fiber, ASTM E1264 Type IV, with the following characteristics:
1. Meets USDA/FSIS guidelines for use in food processing areas.
2. Light Reflectance: 0.78 to 0.80, determined in accordance with ASTM E1264.
3. Ceiling Attenuation Class (CAC): 35 - 41, determined in accordance with ASTM E1264.
4. Products:
   a. Clean Room VL Item No. 870 manufactured by Armstrong: www.armstrong.com.
   b. VinylShield A Item No. 1100-CRF-1 manufactured by CertainTeed Corporation: www.certainteed.com.
   c. Clean Room ClimaPlus Item No. 56091 manufactured by USG: www.usg.com.

2.02 SUSPENSION SYSTEM(S)

A. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty. Provide additional grid members as required to support light fixtures.
1. Finish: White painted.
2. Products:
   a. Prelude XL manufactured by Armstrong: www.armstrong.com.
   b. Seismic Secure 15/16 inch Classic Stab: www.certainteed.com.
   c. DX manufactured by USG: www.usg.com.

2.03 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
   1. Wire Gage: 12 gage (0.1055-inch) minimum.

B. Hanger Wire: 12-gage 0.08 inch galvanized steel wire.

C. Hold-Down Clips: Manufacturer's standard clips to suit application.

D. Seismic Clips: Manufacturer's standard clips for seismic conditions and to suit application.

E. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by SCAQMD 1168.

F. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636/C 636M and seismic design requirements indicated, per manufacturer's written instructions, CISCA's "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies--Seismic Zones 3 & 4" as modified by ASCE 7 and NWCB Technical Bulletin 401.
   1. Comply with restrictions of ASCE 7 on use of power actuated fasteners.
   2. Power actuated fasteners shall not be used for sustained tension loads or for brace applications unless approved for seismic loading, with the following exceptions:
      a. Power actuated fasteners in concrete where the service load on any individual fastener does not exceed 90 lb.
      b. Power actuated fasteners in steel where the service load on any individual fastener does not exceed 250 lb.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.

D. Locate system on room axis according to reflected plan.

E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Seismic Suspension System, Seismic Design Category C: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Maintain a 3/8 inch clearance between grid ends and wall.

G. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.

H. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

I. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.

J. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

K. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

L. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

M. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

N. Do not eccentrically load system or induce rotation of runners.

O. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

P. Install light fixture boxes constructed of gypsum board above light fixtures in accordance with fire rated assembly requirements and light fixture ventilation requirements.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Lay directional patterned units with pattern parallel to longest room axis.

D. Fit border trim neatly against abutting surfaces.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.
   3. Double cut and field paint exposed reveal edges.

G. Where round obstructions occur, provide preformed closures to match perimeter molding.

H. Lay acoustical insulation for a distance of 48 inches either side of acoustical partitions as indicated.

I. Install hold-down clips on panels within 20 ft of an exterior door.

3.04 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.05 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections and prepare reports:
   1. Suspended ceiling system.
   2. Hangers, anchors and fasteners.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.

C. Tests and Inspections: Testing and inspecting of completed installations of acoustical panel ceiling hangers and anchors and fasteners shall take place in successive stages, in areas of extent and using methods as follows. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.
   1. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.
      a. Within each test area, testing agency will select 1 or every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 100 lbf of tension; it will also select 1 of every 2 postinstalled anchors used to attach bracing wires to concrete and will test them for 250 lbf of tension.

1) When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

b. Within each test area, testing agency will select 5 percent of power-actuated and post-installed anchors used to attach hangers to concrete over metal deck and will test them for a minimum 250 lbs for not less than 10 seconds. Test samples will be selected from dispersed locations.

1) When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test a minimum of 6 anchors in the immediate vicinity of the failed anchor. In the event of any additional failure, all anchors placed on the same day will be tested.

c. Replace all failed anchors.

D. Remove and replace acoustical panel ceiling hangers and anchors and fasteners that do not pass tests and inspections and retest as specified above.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient base.

B. Installation accessories.

1.02 REFERENCE STANDARDS

A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.

B. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

C. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

D. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

E. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.

F. ASTM F1861 - Standard Specification for Resilient Wall Base.

G. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

H. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; Resilient Floor Covering Institute.

I. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168.

1.03 SUBMITTALS

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

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
   1. Provide product data for adhesives, including printed statement of VOC content and chemical components.

C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection for moldings and transition strips.

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

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Wall Base: 10 linear feet of each type and color.

1.04 DELIVERY, STORAGE, AND HANDLING

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

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

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

D. Do not double stack pallets.

1.05 FIELD CONDITIONS

A. Store materials for not less than 72 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 68 degrees F.

1.06 WARRANTY

A. Manufacturer's Warranty: Submit manufacturer's standard warranty document.

1. Warranty Period: Five year limited warranty commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 RESILIENT BASE

A. Resilient Base B-1: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.
   1. Manufacturers:
      a. Flexco, Inc: www.flexcofloors.com.
      b. Johnsonite, a Tarkett Company: www.johnsonite.com.
      c. Roppe Corp: www.roppe.com.
      d. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
   3. Height: 4 inch.
   4. Thickness: 0.125 inch.
   5. Finish: Satin.
   6. Length: Roll.
   7. Color: To match existing.

2.02 ACCESSORIES

A. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer. Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.
   1. VCT, Vinyl, and Linoleum Adhesives: Use adhesives that have a VOC content of not more than 50 g/L.
   2. Color as selected by Architect from manufacturer's full range of available colors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

B. Install resilient flooring material and accessories after other finishing operations, including painting, have been completed.

3.02 PREPARATION

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

B. Prepare substrates according to manufacturer's written instructions to ensure adhesion of floor coverings.

C. Do not install floor coverings until they are same temperature as space where they are to be installed.
   1. Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of surface conditions.

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

C. Unroll floor coverings and allow them to stabilize before cutting and fitting.

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

E. Fit joints and butt seams tightly.

F. Set flooring in place, press with heavy roller to attain full adhesion.

3.04 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.05 CLEANING

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

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

C. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Perform initial maintenance on installed products in accordance with manufacturer's instructions, prior to owner's acceptance. Remove construction site debris from project site and legally dispose of debris.

1. Remove visible adhesive and other surface blemishes using cleaning methods recommended by flooring manufacturer.
2. Sweep vacuum floor after installation.
3. Do not perform initial maintenance for a minimum of 5 days after installation has been completed to allow the adhesive the proper time to set.
4. Damp mop flooring to remove black marks and soil.

3.06 PROTECTION

A. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION

SECTION 09 91 23
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paint systems indicated as "P" (Paint) and "EP" (Epoxy) on the following substrates:
   1. Gypsum board.
   2. Wood.

C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Mechanical and Electrical:
      a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
         1) Protect sprinkler heads.
      b. In finished areas, paint shop-primed items.
      c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
      d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

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

1.02 RELATED REQUIREMENTS

A. Section 09 96 00 - High-Performance Coatings: Painting of metals with high-performance coatings indicated as "HPC" on Drawings.

1.03 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

B. Paint Gloss and Sheen: Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI values:

Gloss Level	Description	Units @ 60 Degrees	Units @ 85 Degrees
G1	Matte or Flat Finish	0 to 5	10 maximum
G2	Velvet Finish	0 to 10	10 to 35
G3	Eggshell Finish	10 to 25	10 to 35
G4	Satin Finish	20 to 35	35 minimum
G5	Semi-Gloss Finish	35 to 70	
G6	Gloss Finish	70 to 85	
G7	High-Gloss Finish	85	

1.04 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.

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

C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.

D. MPI - Master Painters Institute Repainting Manual.

E. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113.

1.05 SUBMITTALS

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

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "acrylic enamel").
   2. Manufacturer's installation instructions.

C. Product List: For each product indicated, include the following:
   1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
   2. Include printed statement of VOC content and chemical components.

D. Samples for Verification: For each color and material to be applied, provide three 8-inch by 10-inch color drawdowns with texture to simulate actual conditions, and representing color and sheen.

E. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

F. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.

G. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
   1. At project completion, provide an itemized list complete with manufacturer, paint type and color coding for all colors used for Owner's later use in maintenance.
   2. Include color drawdowns and sample chips for each color and sheen.

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

1.06 PREINSTALLATION CONFERENCE

A. Pre-installation Conference: Convene a pre-installation meeting one week before starting work of this section; require attendance by all relevant installers. Agenda items will include field conditions, substrate conditions, coordination of shop applied primers with finish coatings, application methods, and field quality control testing and inspection, schedule of painting applications and notifications to Owner of start of painting operations.
   1. Bring copies of reviewed color draw-downs for all required colors.

1.07 QUALITY ASSURANCE

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

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years documented experience.

C. MPI Standards:
   1. Preparation and Workmanship: Comply with requirements in MPI (APSM) - "Master Painters Institute Architectural Painting Specification Manual" and paint manufacturer's recommendations for products and paint systems indicated.

D. Surface Preparation: Obtain written confirmation of the specific surface preparation procedures and primers used for all fabricated steel items from the fabricator(s) to ascertain appropriate and manufacturer compatible finish coat materials to be used before painting any such work.

1.08 DELIVERY, STORAGE, AND HANDLING

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

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

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

1.09 FIELD CONDITIONS

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

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

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

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

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

PART 2 PRODUCTS

2.01 MANUFACTURERS

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

B. Products: Provide one of the products listed in Part 2.

C. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in Part 2:
   1. Kelly-Moore Paints (Kelly).
   2. Miller Paint Co. (Miller).
   3. Rodda Paint / Cloverdale Paint Co. (Rodda).
   4. Sherwin-Williams Co. (S-W).

D. Substitutions: Not permitted.

2.02 PAINTS AND FINISHES - GENERAL

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

B. Volatile Organic Compound (VOC) Content:
   1. All paints and coating wet applied on site must meet the applicable limits of the SCAQMD 1113. VOC shall not exceed the limits indicated below:
      a. Dry Fog Coatings: 150 g/L.
      b. Flat Paints: 50 g/L.
      c. Nonflat Paints: 50 g/L.
      d. Primers, Sealers and Undercoaters: 100 g/L
      e. Rust Preventative Coatings/Industrial Maintenance Coatings: 100 g/L.
      f. Clear Wood Finishes, Varnish: 275 g/L.
      g. Clear Wood Finishes, Sanding Sealers: 275 g/L.

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

D. Colors: As indicated in Section 09 90 01 - Finish Legend.
   1. Extend colors to surface edges; colors may change at any edge as directed by Architect.
   2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - INTERIOR

A. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:
   1. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a primer.
      a. Primer Over Existing Painted Surfaces:
         1) Kelly: 295 Kel-Bond Universal Acrylic Primer.
         2) Miller: 6060 Miller Prime All Purpose Acrylic Primer.
         3) Rodda: First Coat Primer 501601.
         4) S-W: Multi-Purpose Latex Primer B51-450 Series.
      b. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
         1) Kelly: 95-100 Pre-Cote Wallboard & Masonry Primer/Sealer.
         2) Miller: 130010 Performance Plus Primer Sealer.
         3) Rodda: Master Painter UL VOC Primer 503601.
         4) S-W: Contractors Interior Latex Primer B28WF0162.
      c. First and Second Coats: Semigloss, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils.
         1) Kelly: 1050 KM Professional Acrylic Semi-Gloss Enamel.
         2) Miller: 4580 Premium Semi-Gloss.
         3) Rodda: Master Painter Ultra Low VOC Semi-Gloss 543601.
         4) S-W: ProMar 200 Zero VOC Semi-Gloss, B20-2600 Series.
   2. Semigloss, Water-Based Epoxy (EP): 2 finish coats over a primer.
      a. Primer Over Existing Painted Surfaces:
         1) Kelly: 295 Kel-Bond Universal Acrylic Primer.
         2) Miller: 6060 Miller Prime All Purpose Acrylic Primer.
         3) Rodda: First Coat Primer 501601.
         4) S-W: Multi-Purpose Latex Primer B51-450 Series.
      b. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils.
         1) Kelly: Sierra Performance S30 Griptec Sandable Primer.
         2) Miller: 130010 Performance Plus Primer Sealer.
         3) Rodda: Master Painter UL VOC Primer 503601.
         4) S-W: Contractors Interior Latex Primer B28WF0162.
      c. First and Second Coats: Odorless, semigloss, interior water-based epoxy enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 3 mils.
         1) Kelly: Sierra Performance S-16 Epoxy Acrylic Semi-Gloss.
         2) Miller: 4200 Water Base Epoxy.

3) Rodda: Rustoleum Sierra Performance S60/S62 WB Epoxy Coating.
4) S-W: Pro Industrial Waterborne Catalyzed Epoxy, B73 Series.

C. Woodwork and Hardboard: Provide the following paint finish systems over new, interior wood surfaces:
1. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a primer or wood undercoater.
a. Primer Over Existing Painted Surfaces:
1) Kelly: 295 Kel-Bond Universal Acrylic Primer.
2) Miller: 6060 Miller Prime All Purpose Acrylic Primer.
3) Rodda: First Coat Primer 501601.
4) S-W: Multi-Purpose Latex Primer B51-450 Series.
b. Undercoat: Acrylic-latex-based, interior wood undercoater, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
1) Kelly: 295 Kel-Bond Universal Acrylic Primer.
2) Miller: 2840 Acrylic Enamel Undercoat.
3) Rodda: Unique II 100% Acrylic Enamel Undercoater 502001.
4) S-W: Multi-Purpose Int/Ext Latex Primer Sealer B51 Series.
c. First and Second Coats: Semigloss, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils.
1) Kelly: 1685 Dura-Poxy +100% Acrylic Semi-Gloss Enamel.
2) Miller: 7200 Semi-Gloss Acrinamel.
3) Rodda: Master Painter Ultra Low VOC Semi-Gloss 543601.
4) S-W: Pro Industrial Acrylic Semi-Gloss, B66 Series.
4) S-W: Minwax Polycrylic Protective Finish 3333.

2.04 ACCESSORY MATERIALS

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

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

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

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

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

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

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Gypsum Wallboard: 12 percent.
2. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in MPI (APSM) applicable to substrates indicated.

B. Previously Painted Surfaces: Comply with manufacturer's written instructions and recommendations in "MPI Maintenance Repainting Manual" applicable to substrates indicated for existing painted surfaces.

1. Follow general surface preparations guidelines. Remove loose or failing paint and spot prime bare areas or entire surface with appropriate primer. Sand or provide bonding primer for hard, glossy surfaces as necessary for bond.

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

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

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

F. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
1. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating or nomenclature plates.

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

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

I. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease and incompatible paints and encapsulants.
1. Remove incompatible primers and re-prime substrate with compatible primers as required to produce paint systems indicated.

J. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair. Do not begin paint application until finishing compound is dry and sanded smooth.

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

3.03 APPLICATION

A. Apply paints according to manufacturer's written instructions.
1. Use applicators and techniques suited for paint and substrate indicated.
2. If spray equipment is utilized, a spray/backroll application is considered one coat of paint.
3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
4. Continue paint finish behind all wall-mounted items.
5. Apply block filler to concrete masonry block at a rate to ensure complete coverage with pores filled (pinhole free).

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.

C. Paint access doors, prime coated hardware, exposed piping and electrical panels to match adjacent surfaces in color, texture and sheen, unless otherwise noted or where pre-finished.
1. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.

D. When the color of a door frame changes from side to side, the change shall be made at the edge of the stop, where the transition is not visible when the door is in a closed position.

E. Back-prime and paint plywood service panels such as electrical, telephone and cable vision panels, as applicable, including edges, to match painted wall it is mounted on or white where mounted on unpainted wall.

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

G. Paint the inside of all ductwork behind louvers, grilles and diffusers for a minimum of 18 inches or beyond sightline, whichever is greater, using flat black (non-reflecting) paint.

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

I. Prime surfaces to receive cabinetry and similar items.
   1. Provide primer and all finish coats behind wainscots, wall coverings, markerboards, tackboards, and tack surfaces.

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

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

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

M. Regardless of number of coats specified, apply as many coats as necessary for complete hide.

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

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

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

3.04 FIELD QUALITY CONTROL

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

B. Painted surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to Architect.
   1. Brush/roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, or foreign materials in paint coatings.
   2. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners, reentrant angles or similar conditions.
   3. Damage due to touching before paint is sufficiently dry or any other contributory cause.
   4. Damage due to application on moist surfaces or caused by inadequate protection from the weather.
   5. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).

C. Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces:
   1. Visible defects are evident on vertical or horizontal surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
   2. Visible defects are evident on ceilings, soffits and other overhead surfaces when viewed at normal viewing angles.
   3. When the final coat on any surface exhibits a lack of uniformity of color, sheen texture and hiding across full surface area.
   4. Dry mil thicknesses do not meet manufacturer’s recommended thickness or specified thickness.

D. Owner may provide field inspection and testing.
   1. Painted surfaces will be tested for dry mil thickness for each coat.
   2. Shop primers and painted surfaces will be tested for adhesion.
   3. Surfaces will be tested at frequency discussed in the pre-installation conference and as deemed appropriate by Owner.

E. Touch-up and restore painted surfaces damaged by testing.
   1. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.05 CLEANING

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

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.06 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.07 SCHEDULE - PAINT SYSTEMS

A. Gypsum Board - Semigloss, Acrylic-Enamel Finish.
   1. Provide primer without finish coats at areas indicated to receive fixed equipment, cabinetry and similar fixed items.
   2. Provide primer and all finish coats behind wainscots, wall covering, markerboards, tackboards, and tack surfaces.

B. Gypsum Board: Semigloss, Water-Based Epoxy:
   1. Walls and ceilings in kitchens, restrooms, food service areas, custodial/janitor closets.

C. Woodwork and Hardboard - Semigloss, Acrylic-Enamel Finish:
   1. Wood doors indicated to receive opaque finish.

D. Refer to Section 09 96 00 - High-Performance Coating for metals not listed to be painted as Work of this Section.

E. Steel Doors and Frames: As specified in Section 09 96 00 - High-Performance Coatings.

END OF SECTION

SECTION 09 96 00
HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. High performance coatings (HPC) for the following conditions:
   1. Interior Substrates:
      a. Steel.
      b. Galvanized steel.

B. Surface preparation.

1.02 RELATED REQUIREMENTS

A. Section 09 91 23 - Interior Painting: Requirements for mechanical and electrical equipment surfaces.

1.03 REFERENCE STANDARDS

A. ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.

C. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113.

D. SSPC-PA 2 - Procedure For Determining Conformance To Dry Coating Thickness Requirements.

E. SSPC-SP 3 - Power Tool Cleaning.

F. SSPC-SP 6 - Commercial Blast Cleaning.

1.04 SUBMITTALS

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

B. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. Include printed statement of VOC content and chemical components for interior coatings.

C. Samples for Verification: For each type of coating system and in each color and gloss of finish coat indicated.
   1. Submit Samples on shop primed and galvanized steel, 8 inches square.

D. Product List: For each product indicated. Cross-reference products to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules.

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

F. Maintenance Data: Include cleaning procedures and repair and patching techniques.
   1. At project completion, provide an itemized list complete with manufacturer, coating type and color coding for all colors used for Owner's later use in maintenance.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Coating Materials: 1 gallon of each type and color. All extra stock containers are to be new and unopened.
   2. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.05 PREINSTALLATION CONFERENCE

A. Preinstallation Conference: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers. Agenda items will include field

conditions, substrate conditions, coordination of shop applied primers with finish coatings, application methods, and field quality control testing and inspection.

1. Bring copies of reviewed color draw-downs for all required colors.

1.06 QUALITY ASSURANCE

A. Master Painters Institute (MPI) Standards:
   1. Preparation and Workmanship: Comply with requirements in MPI (APSM) - "Master Painters Institute Architectural Painting Specification Manual" for products and coating systems indicated.

B. Surface Preparation: Obtain written confirmation of the specific surface preparation procedures and primers used for all fabricated steel items from the fabricator(s) to ascertain appropriate and manufacturer compatible finish coat materials to be used before painting any such work.

C. Comply with requirements of SSPC-PA 2 for measurement of coating thickness.

1.07 DELIVERY, STORAGE, AND HANDLING

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

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

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

1.08 FIELD CONDITIONS

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

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the coating product manufacturer.

C. Do not install materials when temperature is below 55 degrees F or above 90 degrees F.

D. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.

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

F. Restrict traffic from area where coating is being applied or is curing.

G. Lead Paint: Lead paint is present in buildings and structures to be painted. A report on the presence of lead paint is included in Document 00 31 00 - Available Project Information. Examine report to become aware of locations where lead paint is present.
   1. Do not disturb lead paint or items suspected of containing hazardous materials except under procedures specified.
   2. Perform preparation for painting of substrates known to include lead paint in accordance with Section 02 26 26 - Lead Coated Surfaces.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Products: Provide one of the products listed in Part 2.

B. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in Part 2:
   1. Kelly-Moore Paints (Kelly).
   2. Miller Paint Co. (Miller).
   3. Rodda Paint / Cloverdale Paint Co. (Rodda).
   4. Sherwin-Williams Co. (S-W).

C. Substitutions: Not permitted.

2.02 MATERIALS

A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated.
   1. For shop primed items, omit specified primer if shop primer is compatible with finish coats and in good condition as determined by finish coating manufacturer.

B. Material Compatibility: Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

C. Volatile Organic Compound (VOC) Content:
   1. All paints and coating wet applied on site must meet the applicable limits of the SCAQMD 1113. VOC shall not exceed the limits indicated below:
      a. Rust Preventative Coatings/Industrial Maintenance Coatings: 100 g/L.

D. Colors: As indicated on drawings.

2.03 ACCESSORY MATERIALS

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

2.04 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Ferrous Metal: Provide the following finish systems over interior ferrous metal. Primer is not required on appropriately shop-primed items.
   1. Semi-Gloss, Two-Component, VOC Compliant or Waterborne Pigmented Aliphatic Acrylic Polyurethane: One or two finish coats, of two-component, aliphatic acrylic polyurethane coating, over metal primer with total dry film thickness not less than 6.0 mils, unless noted otherwise.
      a. 1st Coat:
         1) Miller: PPG Aquapon WB Waterborne Epoxy Primer 98-46.
         2) Rodda: Precision Coatings DTM 1300v100 HB Epoxy Primer.
         3) S-W: Waterbased Tile Clad Epoxy Primer at 2 - 4 mils DFT.
      b. 2nd Coat:
         1) Miller: PPG Amershield VOC.
         2) Rodda: Precision Coatings PC3v100 Acrylic Polyurethane Semi-Gloss.
         3) S-W: Waterbased Acrolon 100 Polyurethane at 2 - 4 mils DFT.
      c. 3rd Coat:
         1) Miller: PPG Amershield VOC.
         2) Rodda: Precision Coatings PC3v100 Acrylic Polyurethane Semi-Gloss.
         3) S-W: Waterbased Acrolon 100 Polyurethane at 2 - 4 mils DFT.
   2. Metallic Acrylic Polyurethane: One or two finish coats, as required for full coverage, over metal primer with total dry film thickness not less than 6 mils, unless noted otherwise:
      a. Primer:
         1) PCI: Precision DTM 1300v100 Series at 2 to 6 mils.
         2) Tnemec: Series 27 FC Typoxy at 2 to 2.5 mils.
      b. Finish Coat(s):
         1) PCI: PC3v100 at 1 to 3 mils.
         2) Tnemec: Series 1077 Enduralume at 2 to 2.5 mils.

B. Zinc-Coated Metal: Provide the following finish systems over zinc-coated metal:
   1. Semi-Gloss, Two-Component, VOC Compliant or Waterborne Pigmented Aliphatic Acrylic Polyurethane: Two finish coats, of two-component, aliphatic acrylic polyurethane coating, over metal primer with total dry film thickness not less than 6.0 mils, unless noted otherwise.
      a. 1st Coat:
         1) Miller: PPG Aquapon WB Waterborne Epoxy Primer 98-46.
         2) Rodda: Precision Coatings DTM 1300v100 HB Epoxy Primer.
         3) S-W: Waterbased Tile Clad Epoxy Primer at 2 - 4 mils DFT.

b. 2nd Coat:
   1) Miller: PPG Amershield VOC.
   2) Rodda: Precision Coatings PC3v100 Acrylic Polyurethane Semi-Gloss.
   3) S-W: Waterbased Acrolon 100 Polyurethane at 2 - 4 mils DFT.
c. 3rd Coat:
   1) Miller: PPG Amershield VOC.
   2) Rodda: Precision Coatings PC3v100 Acrylic Polyurethane Semi-Gloss.
   3) S-W: Waterbased Acrolon 100 Polyurethane at 2 - 4 mils DFT.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Do not begin application of coatings until substrates have been properly prepared.

C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.

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

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

F. Proceed with coating application only after unacceptable conditions have been corrected.
   1. Commencing coating application constitutes Contractor's acceptance of substrates and conditions.

3.02 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in MPI (APSM) applicable to substrates indicated.

B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
   1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.

C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.
   2. At interior steel abrade the top layer of primer, unless otherwise required by coating manufacturer.
   3. At exterior steel, provide surface preparation equivalent to SSPC-SP 6 "Commercial Blast Cleaning."

D. Steel Substrates: Remove rust and loose mill scale.
   1. Prepare interior surfaces as recommended by coating system manufacturer and according to SSPC-SP 3 "Power Tool Cleaning."
   2. Blast steel surfaces clean as recommended by coating system manufacturer and according to SSPC-SP 6 "Commercial Blast Cleaning," unless otherwise recommended by manufacturer.
   3. Level of surface preparation specified is a minimum. If the coating manufacturer requires a higher degree of preparation, comply with the coating manufacturer's recommendations.

E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.

F. Remove finish hardware, fixture covers, and accessories and store.

G. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

3.03 PRIMING

A. Apply primer to unprimed surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

3.04 COATING APPLICATION

A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified. Use applicators and techniques suited to coating and substrate indicated.
   1. Apply Metallic Acrylic Polyurethane with spray equipment.

B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color and appearance.

D. When the color of a door frame changes from side to side, the change shall be made at the edge of the stop, where the transition is not visible when the door is in a closed position.

3.05 FIELD QUALITY CONTROL

A. Painted surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to Architect.
   1. Brush/roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, or foreign materials in paint coatings.
   2. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners, reentrant angles or similar conditions.
   3. Damage due to touching before paint is sufficiently dry or any other contributory cause.
   4. Damage due to application on moist surfaces or caused by inadequate protection from the weather.
   5. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).

B. Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces:
   1. Visible defects are evident on vertical or horizontal surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
   2. Visible defects are evident on ceilings, soffits and other overhead surfaces when viewed at normal viewing angles.
   3. When the final coat on any surface exhibits a lack of uniformity of color, sheen texture and hiding across full surface area.
   4. Dry mil thicknesses do not meet manufacturer’s recommended thickness or specified thickness.
   5. Lack of adhesion. Test surfaces indicating lack of adhesion in accordance with ASTM D3359 or as recommended by coating manufacturer.

C. Owner may provide field inspection and testing.
   1. Painted surfaces will be tested for dry mil thickness for each coat.
   2. Shop primers and painted surfaces will be tested for adhesion.
   3. Surfaces will be tested at frequency discussed in the preinstallation conference and as deemed appropriate by Owner.

D. Touch-up and restore painted surfaces damaged by testing.
   1. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.06 CLEANING

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

B. Clean surfaces immediately of overspray, splatter, and excess material.

C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

D. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

E. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.07 PROTECTION

A. Protect finished work from damage.

END OF SECTION

SECTION 11 40 00

FOOD SERVICE EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. The work referred to in this section consists of furnishing all labor and material required to provide and deliver all food service equipment hereinafter specified into the building, uncrate, assemble, hang, set in place, level, and completely install, exclusive of final utility connections. Final utility connections to all equipment, shall be part of the work under additional appropriate sections of the work and not part of the food service work.

1. The equipment and its component parts shall be new and unused. All items of standard manufactured equipment shall be current models at the time of delivery. Parts subject to wear, breakage, or distortion shall be accessible for adjustment, replacement and repair.

2. The materials or products specified herein by trade names, manufacturer's name or catalog number shall be provided as specified. Substitutions will not be permitted unless approved by owner's representative in writing no later than 10 days prior to bidding. This stipulation applies to all equipment and materials.

   a. Any request for substitution or alternate must include documentation supporting that the requested substitution/alternate will perform in all aspects as well as the original specification. Alternative exhaust hood manufacturers are required to provide heat load-based design exhaust volume calculations prior to alternate being considered. Request must include the following:

      1) Grease filtration performance data and manufacturer's own airflow calculations based on convective heat load of cooking equipment beneath the hood.

      2) Efficiency comparison data performed in accordance with ASTM Standard F1704-96 for a standard 24" high exhaust hood.

      3) A written guarantee of compliance with Title 24 Part 6 with Kitchen Ventilation acceptance tests NA7.11.1.2 and NA7.11.1.3.

   b. Should no request for substitution be received and approved as stated above, the project is to be provided as specified.

3. The food service equipment contractor shall be responsible for all costs associated with the acceptable alternate or approved alternate items, if the item requires additional space or specific utilities that differ from specifications or drawings. The FSEC is responsible for all coordination, documentation and costs associated with any alternate item that was not submitted for approval and accepted by the consultant prior to bid. The FSEC shall be responsible for any costs associated with building changes, utility changes and drawings changes. The food service equipment contractor shall be responsible to pay the architect

or its food service consultant to review proposed substitutions. These costs will be billed at an hourly rate of $135/hr. All proposed substitutions shall be accompanied with supporting factory quotes for both specified and proposed manufacturer including factory contact information. Food service equipment contractor must completely fill out the foodservice substitution request form. The substitution form may be downloaded at the following link: https://webbfoodservicedesign-my.sharepoint.com/:b:/g/personal/coca_webbfsd_com/ESjs7rGVdF9CgFIUKzREDs8BjIiPN8x9dma29WrjxegncQ?e=2FgU1d

B. Coordinate Owner and Vendor-supplied equipment noted on the drawings or in the specifications as NIFSEC, "not in food service equipment contract". Show on roughing in Plans and sizes, utilities, and other requirements as furnished in the specifications, by owner or appropriate supplier in submittals as if the equipment is contractor furnished.

C. Bidders shall carefully examine the specifications and the project site including location and condition of existing equipment to determine cost for each “Existing-Reset” and “Existing-Modify” item to cover removal, modification (including materials), cleaning, inspection for damage, repair and resetting.

D. Field measurements shall be made prior to fabrication or installation of any equipment item.

E. The cutting of holes in equipment for pipe, drains, electrical outlets, etc., required for this installation, shall be part of this work. Work shall conform to the highest standards of workmanship and shall include welded sleeves, collars, ferrules and escutcheons.

F. Repair of all damage to the premises as a result of the equipment installation as well as the removal of all debris left by the work of this section.

G. Food service equipment and fixtures shall be cleaned and ready for operation at the time the facility is turned over to the Owner for final inspection by the Owner’s Representative.

H. Food Service Equipment Contractor shall be responsible for coordinating with the Architect and Contractor in submitting all applicable documents.

I. All bidders shall submit with their itemized costing a list of the subcontractors that are included in their bids and a complete "schedule of values" for all equipment and labor.

The food service equipment contractor shall submit an itemized Schedule of Values for acceptance no later than 10 days after bid date using the “Schedule of Values” form. The substitution form may be downloaded at the following link: https://webbfoodservicedesign-my.sharepoint.com/:x:/g/personal/coca_webbfsd_com/EfTf-zcAJJJMkwocQ8bOMZYBb2fAGz5KWGpGQGlgTZSR7A?e=7w1Idx

1.2 RELATED SECTIONS

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

B. Related Work In Other Sections by appropriate trades include the following:

1. Refer to Division 26 & 28 Sections for connections to fire alarm systems, wiring, disconnects, and other electrical materials required to complete food service equipment installation.

C. All electric services including wiring to, and final connections to, the fixtures except, as specified differently in the specifications, drawings, or herein.

D. Floors, quarry tile, concrete bases, walls, ceilings, finishes and related building work, except as specified differently in the specifications, drawings or herein.

1.3 DEFINITIONS

A. Terminology Standard: Refer to NSF 2, "Food Equipment", NSF 4, Heated Cabinets, NSF 7, Refrigerated Equipment, or other applicable NSF standards for definitions of food service equipment and installation terms not otherwise defined in this Section or in other referenced standards.

B. FSEC: Food Service Equipment Contractor

C. Owner-Furnished Equipment: Where indicated, Owner will furnish equipment items.

D. Vendor-Furnished Equipment: Where indicated the Owner's or operator's vendor will furnish equipment items.

E. NIFSEC: Not Included in Food Service Equipment Contract.

1.4 SUBMITTALS

A. Submittal Process: All submittals will be separated as a stand-alone file and submittal by discipline with identifying tracking number (i.e. 11400.1, 11400.2 etc..) as listed below. Any other disciplines for particular project will be submitted and given the next available tracking number.

1. 11400.1 Product Data Submittal Book

2. 11400.2 FSEC Utility Rough-in Construction Documents Drawings

3. 11400.3 Walk In Box Submittal

4. 11400.4 Refrigeration Rack Submittal

5. 11400.7 Custom Stainless Steel Submittal

B. Regardless of drawing formats provided it will remain the responsibility of equipment supplier to develop submittals in accordance with the Specific Conditions and assume all required responsibilities there to. The consultant is not to be liable for errors or omissions by the FSEC’s use of electronic data provided by the Consultant or the development of data used in the submittal approval process. Checking product data, rough-in drawings, wall backing drawings, shop drawings, and refrigeration drawings by Designer is for design concept only, and does not relieve the Food Service Equipment Contractor of responsibility for compliance with Contract Documents, verification of utilities with equipment requirements for conformity and location, verification of all dimensions of equipment and building conditions or reasonable adjustments due to deviations.

C. The Food Service Equipment Contractor shall review and provide an affidavit with each submittal that such review has been completed by an authorized agent of the contractor.

D. Product Data: For each type of food service equipment indicated. Include manufacturer's model number and accessories and requirements for access and maintenance clearances, water and drainage, power or fuel, and service-connections including roughing-in dimensions.

E. Shop Fabrication Drawings: For food service equipment not manufactured as standard production and/or catalog items by manufacturers the fabricator of the equipment shall prepare and submit through the Food Service Equipment Contractor one electronic file or two bond or original prints of all shop drawings showing all information necessary for the fabrication and installation of the work of this section. Include plans, elevations sections, material schedule, roughing-in dimensions, fabrication details, service requirements and attachments to other work. All drawings to be fully detailed and dimensioned to a minimum scale of ¾ inch to the foot for plan and elevation views and 1 ½ inch to the foot for section views. Reduced or enlarged drawings are not acceptable. Drawings not submitted in the proper format will be returned as unreviewed.

1. Wiring Diagrams: Details of wiring for power, signal, and control systems and differentiating between manufacturer-installed and field-installed wiring.

2. Piping Diagrams: Details of piping systems and differentiating between manufacturer-installed and field-installed piping.

F. Coordination Drawings: For locations of food service equipment and service utilities. Key equipment with item numbers and descriptions indicated in Contract Documents. Include plans and elevations of equipment, access- and maintenance-clearance requirements, details of concrete, masonry or metal bases and floor depressions, and service-utility characteristics. Ventilation requirements for refrigerated equipment shall be identified in these drawings.

G. Contract Document Drawings:

1. Drawings furnished, constitute a part of these specifications and show locations of equipment and general arrangement of mechanical and electrical services. Necessary deviation from the illustrated arrangements to meet structural conditions, shall be considered a part of the work of this section. Such deviations shall be made without expense to the owner. Equipment drawings are definitive only and should not be used as construction documents or shop details.

2. The drawings are for the assistance and guidance of the Food Service Equipment Contractor. Exact locations shall be governed by the building configuration. The Food Service Equipment Contractor shall accept his contract with this understanding.

3. Should there be a conflict between the drawings and the specifications, the FSEC shall submit a “Request for Information” (RFI) for clarification.

H. Utility Roughing-in Drawings:

1. The Food Service Equipment Contractor shall prepare and submit one electronic file or two bound sets of a valid prints, of all roughing-in drawings, showing information necessary for the roughing-in of refrigerant lines, syrup/beer lines, plumbing, steam, mechanical and

electrical utility requirements. Drawings shall also include construction requirements necessary for all equipment including floor depressions, raised bases, wall blocking, wall recesses and any critical dimensions for specific equipment requirements. Acceptance will be made upon the electronic file or one print which will be returned to the Food Service Equipment Contractor for reproduction purposes. Drawings not properly submitted in this format, will not be reviewed. Drawings without an “Accepted” or ”Accepted as noted” stamp, will not be considered an authorized shop drawing and will not be allowed on the job site.

a. Furnish four (4) sets “Accepted” and/or “Accepted as Noted” shop drawings, for distribution to the field, as directed.

I. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for exposed products with color finishes.

J. Samples for Verification: Of each type of exposed finish required, minimum 4-inch- (100-mm-) square or 6-inch- (150-mm-) long sections of linear shapes and of same thickness and material indicated for work. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.

K. Product Certificates: Signed by manufacturers of refrigeration systems, refrigerated equipment or their authorized agents certifying that systems furnished comply with NSF 7 requirements and will maintain operating temperatures indicated in the areas or equipment that they will serve.

L. Maintenance Data: Operation, maintenance, and parts data for food service equipment to include in the maintenance manuals specified in Division 1. Include a product schedule as follows:

1. Product Schedule: For each food service equipment item, include item number and description indicated in Contract Documents, manufacturer's name and model number, and authorized service agencies' addresses and telephone numbers.

2. See itemized specifications for closeout and owner’s maintenance manual requirements.

1.5 QUALITY ASSURANCE AND LAWS AND ORDINANCES

A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing food service equipment, who has completed installations similar in design and extent to that indicated for this Project, and who has a record of successful in-service performance. See itemized specifications for installation requirements pertaining to refrigeration, fire suppression, and walk in box installation.

B. Manufacturer Qualifications: Engage a firm experienced in manufacturing food service equipment similar to that indicated for this Project and with a record of successful in-service performance. See itemized specifications for custom fabricated stainless steel and/or millwork. Food Service Equipment Contractor to submit and procure specified custom manufacturer as listed in the itemized specifications as this company has demonstrated quality control and proper coordination from design development through closeout requirements.

C. Source Limitations: Obtain each type of food service equipment through one source from a single manufacturer.

D. Product Options: Drawings indicate food service equipment based on the specific products indicated. Other manufacturers' equipment with equal size and performance characteristics may be considered. Refer to Division 1 Section "Substitutions."

E. Regulatory Requirements: Comply with the following National Fire Protection Association (NFPA) codes:

1. NFPA 17, "Dry Chemical Extinguishing Systems."

2. NFPA 17A, "Wet Chemical Extinguishing Systems."

3. NFPA 54, "National Fuel Gas Code."

4. NFPA 70, "National Electrical Code."

5. NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations."

6. The FSEC shall certify that all work and materials comply with Federal, State and Local laws, ordinances, and regulations and is confirmed by the local inspector having jurisdiction.

a. US PUBLIC HEALTH SERVICE

b. LOCAL HEALTH DEPARTMENT

c. OSHA

d. UL

e. HACCP

f. NFPA 96 – Current

g. ADA

F. Listing and Labeling: Provide electrically operated equipment or components specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.

2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

G. AGA Certification: Provide gas-burning appliances certified by the American Gas Association (AGA).

H. ASME Compliance: Fabricate and label steam-generating and closed steam-heating equipment to comply with ASME Boiler and Pressure Vessel Code.

I. ASHRAE Compliance: Provide mechanical refrigeration systems complying with the American Society of Heating, Refrigerating and Air-Conditioning Engineers' ASHRAE 15, "Safety Code for Mechanical Refrigeration."

J. Food Service Equipment: Where provided, check-out aisles, sales counters, service counters, food service lines, queues, and waiting lines shall comply with 2010 ADA Standards. The top of tray slides shall be 28” minimum and 34” maximum above finish floor. Space and elements within food service employee work areas shall meet the requirements of 2004 ADA Standards. Food service equipment required to be accessible shall conform to all reach requirements in 2010 ADA Standards.

K. NSF Standards: Comply with applicable NSF International (NSF) standards and criteria and provide NSF, UL Sanitation or ETL Sanitation Certification Mark on each equipment item, unless otherwise indicated.

L. ANSI Standards: Comply with applicable ANSI standards for electric-powered and gas-burning appliances; for piping to compressed-gas cylinders; and for plumbing fittings, including vacuum breakers and air gaps, to prevent siphonage in water piping.

M. SMACNA Standard: Where applicable, fabricate food service equipment to comply with the Sheet Metal and Air Conditioning Contractors National Association's (SMACNA) "Food Service Equipment Fabrication Guidelines," unless otherwise indicated.

N. Seismic Restraints: Provide seismic restraints for food service equipment according to the Sheet Metal and Air Conditioning Contractors National Association's (SMACNA) "Food Service Equipment Fabrication Guidelines," appendix 1, "Guidelines for Seismic Restraints of Kitchen Equipment," unless otherwise indicated.

O. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

P. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings." Review methods and procedures related to food service equipment including, but not limited to, the following:

1. Review access requirements for equipment delivery.

2. Review equipment storage and security requirements.

3. Inspect and discuss condition of substrate and other preparatory work performed by other trades.

4. Review structural loading limitations.

5. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

Q. Walk-in cooler and/or freezer shall comply with 2010 ADA Standards and local codes for accessibility.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver food service equipment as factory-assembled units with protective crating and covering.

B. Store food service equipment in original protective crating and covering and in a dry location.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions of food service equipment installation areas by field measurements before equipment fabrication and indicate measurements on Shop Drawings and Coordination Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish required dimensions and proceed with fabricating equipment without field measurements. Coordinate construction to ensure actual dimensions correspond to established dimensions.

2. Food service aisles shall be a minimum 36” wide and tray slides shall be mounted at 34” maximum above the floor or in accordance with 2010 ADA standards and/or local code for accessible counters.

3. Pass-thru windows for food service shall conform to the reach and access requirements of 2010 ADA Standards and/or local code for accessible transaction areas.

1.8 COORDINATION

A. Coordinate equipment layout and installation with other work, including light fixtures, HVAC equipment, and fire-suppression system components.

B. Coordinate location and requirements of service-utility connections.

C. Coordinate size, location, and requirements of concrete bases, positive slopes to drains, floor depressions, and insulated floors. Concrete, reinforcement, and formwork requirements are specified in Division 3 Section "Cast-in-Place Concrete."

D. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 7 Section "Roof Accessories."

1.9 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents. Warranty period: 1 year from date of substantial completion.

B. Refrigeration Compressor Warranty: 5 years from date of substantial completion. Submit a written warranty signed by manufacturer agreeing to repair or replace compressors that fail in materials or workmanship within the specified warranty period.

PART 2 - PRODUCTS

2.1 MATERIALS - METAL

A. Submit a certified copy of the mill analysis of materials if requested by the Architect.

B. Finish shall be 304 #4 brushed finished except edges where it shall be #8 polished finish.

C. Protective covering shall be provided on all polished surfaces of stainless steel sheet work, and retained and maintained until time of final testing, cleaning, start-up and substantial completion.

D. Stainless-Steel Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304, stretcher leveled, and in finish specified in "Stainless-Steel Finishes" Article.

1. Stainless steel finishes

a. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

1) Remove or blend tool and die marks and stretch lines into finish.

2) Grind and polish surfaces to produce uniform, directional textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

b. Concealed surfaces: No. 2B finish (bright, cold-rolled, unpolished finish).

c. Exposed surfaces: No. 4 finish (bright, directional polish).

d. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

e. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

E. Stainless-Steel Tube: ASTM A 554, Grade MT-304, and in finish specified in "Stainless-Steel Finishes" Article.

F. Zinc-Coated Steel Sheet: ASTM A 653, G115 (ASTM A 653M, Z350) coating designation; commercial quality; cold rolled; stretcher leveled; and chemically treated.

G. Zinc-Coated Steel Shapes: ASTM A 36 (ASTM A 36M), zinc-coated according to ASTM A 123 requirements.

H. Sealant: ASTM C 920; Type S, Grade NS, Class 25, Use NT. Provide elastomeric sealant NSF certified for end-use application indicated. Provide sealant that, when cured and washed, meets requirements of Food and Drug Administration's 21 CFR, Section 177.2600 for use in areas that come in contact with food.

1. Color: As selected by Architect from manufacturer's full range of colors.

Backer Rod: Closed-cell polyethylene, in diameter larger than joint width.

2.2 FABRICATION, GENERAL, METAL,

A. Fabricate food service equipment according to NSF (standards 2, 4 & 7) requirements. Factory assemble equipment to the greatest extent possible.

B. Fabricate field-assembled equipment prepared for field-joining methods indicated. For metal butt joints, comply with referenced SMACNA standard, unless otherwise indicated.

C. Where stainless steel is joined to a dissimilar metal, use stainless-steel welding material or fastening devices.

D. Form metal with break bends that are not flaky, scaly, or cracked in appearance; where breaks mar uniform surface appearance of material, remove marks by grinding, polishing, and finishing.

E. Sheared Metal Edges: Finish free of burrs, fins, and irregular projections.

F. Provide surfaces in food zone, as defined in NSF 2, free from exposed fasteners.

G. Cap exposed fastener threads, including those inside cabinets, with stainless-steel lock washers and stainless-steel cap (acorn) nuts.

H. Provide pipe slots on equipment with turned-up edges and sized to accommodate service and utility lines and mechanical connections.

I. Provide enclosures, including panels, housings, and skirts, to conceal service lines, operating components, and mechanical and electrical devices including those inside cabinets, unless otherwise indicated.

J. Seismic Restraints:

1. Fabricate to comply with referenced “SMACNA Guidelines for Seismic Restraint of Kitchen Equipment” in any State, province, or jurisdiction that has legislated this requirement as necessary for acceptance. This shall include:

a. Identifying these items on his submittal drawings, Plans, Elevations, and Sections.

b. Showing required SMACNA methods of restraint on his submittal drawings.

c. Referencing the appropriate detail(s).

d. Obtain regulatory approval for all seismic engineering details

2.3 WALK-IN COOLERS/FREEZERS

A. Panel Construction:

1. Panels shall be pre-fabricated, sectional construction (minimum 5-inches thick for Coolers and Freezers), of tongue and groove design with foamed-in-place “double bubble” PVC gaskets (not glued, stapled, or nailed) on the male side of all interior and exterior panels and rigid urethane frame. Every panel shall be NSF and UL factory approved and bear the certifying labels. Walk-in box height to be 108”; Interior Height, except freezers with pre-fab floor in combination with cooler without floor to be 104” or unless otherwise specified.

2. Gaskets shall be impervious to stains, greases, oils, and mildew and be resistant to chemical corrosion and ultraviolet radiation. Gasket operating temperature shall be -30 degrees F to 160 degrees F (-34 degrees C to +71 degrees C).

3. Corner panels shall be 90-degree angles with coved corners; interior partition walls shall utilize `T' panels with coved corners. All panels shall be manufactured in accordance NSF approved standards.

4. Panels shall be completely filled with rigid 100% foamed-in-place non-CFC urethane between interior and exterior metal `skins' which have been die-formed and gauged for uniformity in size. Rigid polyurethane blowing agents shall comply with current US EPA SNAP program listings. Slab urethane or polystyrene are not acceptable. In addition, wood shall not be acceptable in any panel including doors, walls, floor, and ceiling.

5. Insulation shall have a 95% closed cell structure with an average in-place density of 2.2 lbs. per cubic foot, and compression strength at yield point of 19 lbs. per square inch. The R-Values of the floor, ceiling and wall panels meet the requirements under the Energy Independence and Security Act of 2009 (EISA).

6. Floor panels: Floor panels shall be die stamped with 3/8-inch radius NSF coved corners. All plane intersections shall be drawn, not cut and welded. Panels shall be fabricated similar to other panels and designed to readily withstand uniformly distributed loads, point loads for stationary shelving, rolling loads from hand truck and mobile food racks. Where noted, prefabricated floors shall withstand rolling loads from either manual pallet jacks or electric pallet jacks.

B. Door Construction: Walk-in coolers and freezers shall have entry and exit door hardware that complies with all of the requirements and maneuvering clearances at the exterior side per 2010 ADA Standards and local codes. Doors shall be flush (in-fitting) type, self-closing, 36-inches by minimum 80-inches high, 20-guage stainless steel interior and exterior.

1. Doors shall be mounted with three adjustable cam-lift hinges (Kason 1245) and hydraulic adjustable automatic hold-open (rack and pinion) door closers. Door hardware shall be chrome plated Kason model 27C. Mounting height of latching hardware shall be 34 to 48 inches above finish floor. All hardware shall meet the requirements of 2010 ADA Standards.

2. Door latches shall lock and have a safety release to prevent entrapment (one quarter turn of the release handle unlocks the door from the inside).

3. All freezer door will be provided with a Department of Energy approved heater strip, heated sweep gaskets, and a heated pressure relief port.

4. All door sections to have raised casings. Light fixtures to be wired through digital controllers, refer to para. 2.7.E.5 for controller requirements. Provide additional switches as required for light activation from multiple locations.

5. The doorjambs, frames, and thresholds shall be made of durable Fiberglass Reinforced Plastic (FRP) or polyvinyl chloride (PVC).

C. Assembly: Panels shall be assembled by Posi-Locs or equal which shall be foamed-in-place and activated by a hex wrench. Floor panels shall utilize post tension construction within the floor panels. Access ports to locking devices shall be covered by snap caps and shall be located in interior of walk-in.

D. Finishes: Refer to the finishes shown and the Foodservice Equipment Schedule paragraph 3.5.

1. Surfaces (walls, ceiling and closure panels):

a. Exposed exterior 20-gauge Type 304 stainless steel, #4 finish, Rimex Windsor pattern.

b. Unexposed exterior surfaces to be 20-gauge smooth embossed galvanized steel.

c. Interior finishes: minimum 20-gauge type 304 stainless steel on walls and white stucco aluminum on ceiling.

d. Interior floor: verify on finish schedule and item specification, paragraph 3.5.

E. Accessories:

1. Provide interior and exterior doors 14-gauge (stainless steel) kickplates to 36-inches high on interior and exterior doors.

2. Provide (s/s) closure panels to interior ceiling and all adjacent walls, finished with 90-degree angles at the box and the ceiling/wall; no raw edges will be accepted.

3. Provide vinyl strip curtains.

4. Include LED light fixtures to provide 20 ft. candles of light throughout the compartment.

5. Refrigerated compartments fabricated and standard, shall be fitted with flush mounted digital temperature controllers. Thermometers on such controllers shall be adjustable and calibrated after installation. All thermometers shall have an accuracy of 2 degrees. Controller shall be Modularm 75LC, or equal, and include frame mounted door magnets for door ajar alarm, interior panic alarm button and motion detector activated automatic panic alarm. All controls are to be programmable and have the capability of being connected to remote monitory systems or building management systems.

6. Per document drawings, provide 14-inches by 24-inches view port - unheated for cooler door, heated for freezer door.

7. Freezer Door Fan Switches (at ambient facing freezer door only)

8. When Anthony doors are specified: include Optimax Pro LED Lighting.

F. Insulated Floor Depressions: The FSEC shall provide styrofoam insulation for cooler and freezer floors. Insulation shall be a minimum of 3 layers DOW high load extruded polystyrene, 2-inch thick. Overall R-value to meet DOE requirements for freezer floors with vertical compressive strength of 60 psi and maximum water absorption of 0.1% by volume.

G. Approvals: Fire hazard classification according to ASTME-84 (UL723) shall be a flame spread rating of 25 or less with a certifying UL label attached to every panel showing the meeting of the fire code. Smoke development rating to be 450 or less; NSF-listed with an approved toxicity rating.

H. Furnish and installation to be provided by the manufacturer. Failure to do so will void warranty.

I. Food service equipment provider shall contract all aspects of installation for walk-in boxes directly with specified factory so as to not void warranty.

2.4 REMOTE REFRIGERATION SYSTEMS

A. Furnish and install mechanical refrigeration work as indicated and specified, complete and ready for use. Principal items of work include:

1. Mechanical refrigeration systems, including compressor units, condensers, refrigerant piping, evaporator coils, control valves, compressor racks, weather covers, KE2 rack controller, and required miscellaneous items. Refrigeration equipment shall consist of two major assemblies. One is the condensing unit assembly with all necessary components, factory installed and wired including single point electrical control panel, circuit breakers and contactors, OSHA approved fan guards, aluminum flexible conduit for internal wiring, suction filter, sight glass, drier, adjustable dual pressure control, flexible pressure hoses, Rotolock compressor adaptors and necessary tubing. The other is the refrigeration coil assembly/heat exchanger with expansion valve, electronic thermostat temperature control with electronic defrost time clock and on/off power switch, completely factory mounted and factory pressure tested with dry nitrogen.

   a. Utilize refrigerant with an ozone depleting potential of 0

   b. R-448A Low to Medium Temperatures

2. Furnishing of motor starters and walk-in refrigerator/freezer thermostats for installation under Electrical Section.

3. Sleeves, inserts, hangers, supports and other incidental items necessary to complete the work.

4. Cutting and patching of non-structural and other incidental items necessary to complete the work on this section.

5. Testing, charging, adjusting, operational testing and cleaning of equipment. Conduct all tests as required by local inspecting agencies concerned with this project.

6. Refrigeration equipment shall be designed and installed to maintain the following general temperature unless otherwise specified.

a.	Walk-In Refrigerators	1.7°C / 35°F
b.	Walk-In Freezers	-23.2°C / -10°F
c.	Reach-In Refrigerators	1.7°C / 35°F
d.	Reach-In Freezers	-23.2°C / -10°F
e.	Undercounter Refrigerators	1.7°C / 35°F
f.	Undercounter Freezers	-23.2°C / -10°F
g.	Cold Pan	4°C / 39°F

B. Compressors and Condensing Unit: Factory assembled, scroll compressors with air cooled condensers operating at such speed within recommended range of section and discharge pressures for economical operation and with required BTU rating per hour, sizes and capacities in accordance with specifications. Provide units of same manufacturer and type throughout, new standard cataloged, to operate with refrigerant R-407A. 100 degrees ambient air, capacities selected on 16 hour running time basis for medium temperature fixtures and 18 hour running

time basis for low temperature fixtures. For locations where the ambient exceeds 100 degrees Fahrenheit, the system is to be engineered for the maximum recorded ambient temperature. Additionally, all parallel systems shall include a minimum of one digital scroll compressor and be designed with 75% redundancy minimum.

C. Condensing units shall be scroll air cooled condensing unit with rigid structural bases, 20-gauge weather covers, OSHA-approved fan guards and shrouds and waterproof electrical systems. Include internal inherent motor protection, suction line, shut off valves, liquid line shut off valves, oil pressure safety switches when required, adjustable dual pressure control, crank case heaters and oil separators on systems with longer than 100 lin. ft. run from condensing unit to the evaporator coil. Any outdoor installation within 20 miles of the salt air environment shall be provided with coated condenser coils.

D. Medium temperature evaporators shall be equipped with Electronically Commutated Motors (ECM). Coils shall be low profile UL/NSF approved units with inline fans and cross fins staggered. Provide copper tubing, aluminum cased, permanently lubricated motors with thermal overload protection. Unit shall be provided with evaporator controller system capable of providing evaporator fan control, remote monitoring and diagnostics. Control system shall be interconnected to the local area network and be capable of sending alarm alerts via mobile telephone or e-mail. Waterproof electrical system pre-wired to a single connection. Coils are designed to operate above 34 degrees Fahrenheit.

E. Low Temperature evaporators shall be equipped with Electronically Commutated Motors (ECM). Coils shall be low profile UL/NSF approved units with inline fans and cross fins staggered. Provide cooper tubing, aluminum cased, permanently lubricated motors with thermal overload protection. Unit shall be equipped with electric demand defrost controller system. Controller system shall provide on-demand defrost, remote monitoring and diagnostics and be interconnected to the local area network with the capability of sending alarm alerts via mobile telephone or e-mail. Waterproof electrical system pre-wired to a single connection. Coils are designed to operate in a range from 30 degrees above Fahrenheit to -20 degrees Fahrenheit.

F. Refrigerant lines shall be type “L” ACR copper tubing with wrought copper fittings assembled by silver soldering joints.

G. Coil drains shall be 1” IPS copper. Route and pitch ½” per foot to drain. Provide electrical heaters on freezer drains.

H. Refrigeration lines insulation shall have a minimum ¾” Armstrong Armaflex AP Pipe insulation sealed with adhesive foam insulation. For glycol systems the minimum insulation shall be ¾”. Tape fittings to be sufficient thickness to prevent condensation. Lines ran externally shall include a hard white PVC cover.

I. Furnish and installation to be provided by the manufacturer. Failure to do so will void warranty.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Unless expressly stipulated, and in a timely manner, no additional allowances will be made for Contractors or Manufacturers for errors, omissions or ambiguities not reported at time of bidding.

Carefully review and compare the Contract Documents and at once report to Owner and/or Designer any errors, ambiguities, inconsistencies or omissions. Unless expressly stipulated, and in a timely manner, Kitchen Equipment Contractor shall be liable to Owner or Designer for any damage resulting from such errors, inconsistencies or omissions in the Contract Documents. Work shall not be done without approved Drawings, Specifications and/or Modifications and without receiving prior written receiving authorizations from Owner or Designer. Drawings and equipment specifications are intended to complement each other. Therefore, neither should be considered complete without the others.

B. Examine areas and conditions, with Installer present, for compliance with requirements or installation tolerances, service-utility connections, and other conditions affecting installation and performance of food service equipment. Do not proceed with installation until unsatisfactory conditions have been corrected.

C. Examine roughing-in for piping, mechanical, and electrical systems to verify actual locations of connections before installation.

D. Verify all conditions at the building, particularly door openings and passageways for large equipment. Coordinate with General Contractor access to insure delivery of equipment to the required areas. Coordination shall include, but not be limited to, early delivery, hoisting, window removal and/or delay of wall construction. All special equipment, handling charges, window removal, etc. shall be paid for by the Food Service Equipment Contractor.

E. Any and all food service equipment and equipment systems noted as “by owner/operator”, “by purveyor”, or “existing” in the food service construction documents are presented for reference only. These representations must be verified in writing by the food service equipment contractor, owner, operator, and/or general contractor prior to the release of “for construction” documentation. It will be the general contractor’s responsibility to further verify and coordinate all necessary information pertaining to this equipment or systems making up, or relating to, this equipment including, but not limited to, local health department regulations, local sanitation code requirements, mechanical, structural, plumbing and electrical requirements prior to commencement of construction. Consultant or Architect take no responsibility for design, intent, function, performance, utility requirements, or code compliance of non-specified equipment.

3.2 INSTALLATION, GENERAL

A. Install food service equipment level and plumb, according to manufacturer's written instructions, original design, and referenced standards.

B. Complete equipment field assembly, where required, using methods indicated.

1. Provide closed butt and contact joints that do not require a filler.

2. Grind field welds on stainless-steel equipment smooth, and polish to match adjacent finish. Comply with welding requirements in "Fabrication, General" Article.

C. Install equipment with access and maintenance clearances according to manufacturer's written instructions and requirements of authorities having jurisdiction.

D. Provide cutouts in equipment, neatly formed, where required to run service lines through equipment to make final connections. Cut holes and provide sleeves for pipes on equipment, for drains, electrical, plumbing, etc., as required for proper installation. Verify sizes with Owner on the following items before ordering or fabrication: steam pans, sheet pans, trays, glass and cup racks.

E. Except for mobile and adjustable-leg equipment, securely anchor and attach items and accessories to walls, floors, or bases with stainless-steel fasteners, unless otherwise indicated.

F. Install hoods to comply with NFPA 96 requirements and to remain free from vibration when operating.

G. Install seismic restraints according to referenced SMACNA standard.

H. Install trim strips and similar items requiring fasteners in a bed of sealant. Fasten with stainless-steel fasteners at 48 inches (1200 mm) O.C. maximum.

I. Install sealant in joints between equipment and abutting surfaces with continuous joint backing, unless otherwise indicated. Provide airtight, watertight, vermin-proof, sanitary joints.

J. Prohibit cold storage rooms from being used by any other trade for storage or work areas. Repair or cause replacement to any damaged areas on the interior of the cold storage rooms, if the damage was caused due to the cold storage rooms being used for storage or work areas.

3.3 PROTECTING

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure food service equipment is without damage or deterioration at the time of Substantial Completion.

3.4 START-UP, TESTING AND COMMISSIONING

A. Startup Services: Engage factory-authorized service representatives to perform startup services for all equipment.

1. Coordinate food service equipment startup with service-utility testing, balancing, and adjustments. Do not operate steam lines before they have been cleaned and sanitized. Provide demonstrations for both operations and maintenance personnel.

2. Remove protective coverings and clean and sanitize equipment, both inside and out, and re-lamp equipment with integral lighting. Where applicable, comply with manufacturer's written cleaning instructions.

3. Test each equipment item for proper operation. Repair or replace equipment that is defective in operation, including units that operate below required capacity or that operate with excessive noise or vibration.

a. Start up and testing for ice making equipment to be performed by the Original Equipment Manufacturer’s authorized representative after substantial completion by the FSEC prior to final testing. All issues of installation hook-up and operational

conditions are to be addressed. Any conditions not meeting operational needs will be identified and reviewed with the FSEC and/or GC.

b. Type I grease hoods and fire protection systems are to be reviewed by the Original Equipment Manufacturer's authorized representative after substantial completion and prior to final testing. This review shall also take place prior to the start-up and demonstration of any cooking equipment under the hood. All issues of installation hook-up and operational conditions will be addressed. Any conditions not meeting operational needs will be identified and reviewed with the FSEC and/or GC. A field inspection report will be provided as part of the Owner's equipment manual and submitted to the GC and local fire marshal when required by code.

4. Provide maintenance and proper operations training to both the client maintenance and operations staff.

5. Provide maintenance manuals, service parts manuals and product schedule in accordance with paragraphs 1.4.K and 1.4.K.1

B. Demonstration and Commissioning*:* Representatives of authorized service agencies, manufacturer or original equipment supplier shall provide these services with FSEC in attendance*.*

1. Demonstrate in the presence of the owner, owner's designated representative and owner's maintenance and operations personnel the proper initial start-up, operation clean-up, preventative maintenance safety procedures of each item of equipment.

2. FSEC to provide a signed log or record of all demonstrations, training and start-ups conducted to the owner with equipment operations manuals.

3.5 FOOD SERVICE EQUIPMENT SCHEDULE

SIS# W010

ITEM # 1 WALK-IN FREEZER

Quantity: One (1)
Manufacturer: Imperial Brown
Model: CUSTOM

1. One (1) Model CUSTOM Refer to Section 114000.

SPECIFICATIONS:
Indoor combo (with floors)
Vinyl foam NSF gasket (1/16" joint thickness), Cam-lock layout #4

SPECIAL INSTRUCTIONS:
Standard crating

WALL PANELS:
Construction: 4" high density urethane
Exterior Finish: 20 ga. smooth galv. / 20 ga. stainless steel 304 #4
Interior Finish: .040 stucco aluminum / 20 ga. stainless steel 304 #4
Ceiling connections: Camlock
Floor connections: Camlock

CEILING PANELS:
Construction: 4" high density urethane
Exterior Finish: Metal
Interior Finish: .040 stucco white aluminum
Ceiling Caps: Factory mounted
Live Load: 10 psf

FLOOR PANELS:
Model: Hand-Truck Floor panels model #HTFN (NSF)
Construction: 3 1/2" high density urethane
w/ .100 diamond tread aluminum @ interior over 1/2 inch Thermo-Lite
w/ Metal @ exterior

DOORS:
[A]: 36" x 80" flush model G3 self-closing freezer door
*** NO WOOD BACKING ***
*** ELECTRICAL COMPONENTS PRE-WIRED ***
*** LEAF WILL NOT BE RAISED UNLESS SPECIFIED OTHERWISE ***
Brand: Imperial Brown
Frame: 4" high density urethane, 3-sided
w/ 20 ga. stainless steel 304 #4 @ ext.
w/ .040 stucco aluminum @ int.
w/ 24 ga. stainless steel 430 (magnetic) liners
w/ 4-sided heat cable in frame [FL-4-112W]
(25'-9" x 5 ohms/ft (129 total) @ 4.4 W/ft + Pepi - 120V, 1A)
Leaf: 4" thick, 3-side lap, standard height
w/ 20 ga. stainless steel 304 #4 both sides
w/ Magnetic gasket
(3) Kason #1245 reversible cam-rise hinge
(1) Kason #27C cylinder locking deadbolt handle
(1) Kason #27C 1/4 turn knob inside release
(1) Kason #944 deadbolt w/ re-keyable core upgrade
(1) Kason 'PUSH' pad
(1) Dorma #8616 FHP 689 door closer
(1) Modularm 75LC multi-monitor temperature alarm w/IP-1 illum. push button and flush door ajar sensor
(2) Terminal J-Box @ int.
(1) Evaporator cut-off switch
(1) 14" x 24" heated view window (84W, 120V, 0.9A)
(1) 12 ga. stainless steel threshold
36" high AFF 14 ga. smooth stainless steel 304 #4 kickplates (leaf, ext. & int.)

[B]: (1) 30" x 81" CDS entrance all glass cooler door (smooth silver frame)
w/ (1) Full length handle
[C]: (1) 30" x 81" CDS entrance all glass cooler door (smooth silver frame)
w/ (1) Full length handle
[D]: (3) 24" x 75" CDS Advantage FS Series cooler glass door
w/ 2-pane low E gas filled glass, light switch & controller(s) (smooth silver frame)
w/ LED lights
w/ (3) Full length handle
w/ (1) Energy controller for up to (15) doors
w/ (1) Dimming motion sensor

ITEM # 2 EVAPORATOR COIL <Included>

Quantity: One (1)
Manufacturer: RDT
Model: BEL0080

1. One (1) Model BEL0080 Evaporator coil provided as an integral part of the remote refrigeration system.

ITEM # 3 WALK-IN REFRIGERATOR <Included>

Quantity: One (1)
Manufacturer: Imperial Brown
Model: Part of Item #1

1. One (1) Model CUSTOM Refer to Section 114000.

ITEM # 4 EVAPORATOR COIL <Included>

Quantity: Two (2)
Manufacturer: RDT
Model: C43

1. Two (2) Model C43 Evaporator coil provided as an integral part of the remote refrigeration system.

ITEM # 5 REMOTE REFRIGERATION RACK AND SYSTEM

Quantity: One (1)
Manufacturer: RDT
Model: ZS1-02Z-CT3-AST

1. One (1) Model ZS1-02Z-CT3-AST Refer to Section 114000, paragraph 2.8 and FS drawings.

END OF SECTION

SECTION 13 48 53
SEISMIC ANCHORAGE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The purpose of this section is to provide instructions relating to the design and construction of anchorage requirements for mechanical and electrical items, equipment and other components. It is required that these items be anchored to the facility in a manner whereby the overall reliability of the facility is not compromised.
   1. Provide bracing and anchorage as required to meet Oregon Structural Specialty Code (OSSC) requirements.

B. Unless otherwise determined by the Architect, it is not intended that any item of purchased equipment be modified to meet the requirements of this section.

1.02 RELATED SECTIONS

A. Section 09 51 00 - Acoustical Ceilings: Coordination of seismic bracing of ceilings and separate components, such as equipment that maybe mounted above or within finish ceilings.

1.03 REFERENCES

A. As indicated in individual technical sections.

1.04 SYSTEM DESCRIPTION

A. General Connection Requirements:
   1. All supports and connections in construction shall be provided by the Contractor in accordance with the code for the criteria per contractor-supplied Structural Drawings, coordinated with the particular items included in the contract. The Contractor shall retain a registered professional engineer licensed in the State of Oregon to perform and seal this design work.

1.05 DESIGN REQUIREMENTS

A. Delegated Design: Design seismic anchorage, including comprehensive engineering analysis by a registered professional engineer licensed in the State of Oregon, using performance requirements and design criteria indicated.

B. Code: 2019 Oregon Structural Specialty Code shall be used for the design of seismic restraints of items indicated, with the additional requirements dictated by the referenced standards and the specific requirements and exceptions specified in this section.

C. Acquisition of design data and installation of gravity and seismic anchorages (restraints) shall be the responsibility of the Contractor unless otherwise noted in this section. Design data and shop drawings shall be provided for review and approval in accordance with the General Guidelines for Connecting to Structure below.

1.06 SUBMITTALS

A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide Structural characteristics of all proposed components.

C. Shop Drawings: Indicate actual components and field configuration or limitations for each seismic restraint. Provide structural calculations.

D. Delegated Design and Certification of Connection Design:
   1. All design data and shop drawings shall be sealed by a professional engineer licensed in the State of Oregon and submitted for review to the Architect and structural engineer of record before submittal to the Authority Having Jurisdiction (AHJ). Obtain approval for the AHJ before the equipment anchorage is fabricated or installed. Allow 4 weeks from time of Architect's receipt of submittal of design data and shop drawings for review. The following information must be included in the design data and shop drawings.
      a. Exact dimension and intended locations of each unit.

b. Verification and location of weight relative to existing and new building structures (e.g., plan and height location of the center of gravity).
c. Scale drawings showing base details with original intended connection system.
d. Anchors to be installed per manufacturer's recommendations or as indicated. All anchors subject to field testing where loading appears to approach or exceed capacity of the anchor.

2. Submit submittals as "Deferred Submittals" in accordance with Section 01 30 00 - Administrative Requirements. Transmit a copy of each submittal indicating agency approval to the Architect for record.

1.07 QUALITY ASSURANCE

A. Perform design under direct supervision of a registered professional engineer experienced in design of this Work and licensed in Oregon.

PART 2 PRODUCTS

2.01 CONNECTION REQUIREMENT BY LOCATION AND STRUCTURAL MEMBER

A. Suspended Ceilings: Support and brace in accordance with code and specified requirements.

B. Light Fixtures: In suspended ceilings, provide auxiliary supports to the structure in accordance with code requirements.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 22 00 00

PLUMBING BASIC REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Work included in 22 00 00, Plumbing Basic Requirements applies to Division 22, Plumbing work to provide materials, labor, tools, permits, incidentals, and other services to provide and make ready for Owner's use of plumbing systems for proposed project.

B. Contract Documents include, but are not limited to, Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Drawings, Addenda, Owner/Architect Agreement, and Owner/Contractor Agreement. Confirm requirements before commencement of work.

C. Definitions:

1. Provide: To furnish and install, complete and ready for intended use.
2. Furnish: Supply and deliver to project site, ready for unpacking, assembly and installation.
3. Install: Includes unloading, unpacking, assembling, erecting, installation, applying, finishing, protecting, cleaning and similar operations at project site as required to complete items of work furnished.
4. Approved or Approved Equivalent: To possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity. For equipment/products defined by the Contractor as "equivalent", substitution requests must be submitted to Engineer for consideration, in accordance with Division 01, General Requirements, and approved by the Engineer prior to submitting bids for substituted items.
5. Authority Having Jurisdiction (AHJ): Indicates reviewing authorities, including local fire marshal, Owner's insurance underwriter, Owner's Authorized Representative, and other reviewing entity whose approval is required to obtain systems acceptance.

1.02 RELATED SECTIONS

A. Contents of Section applies to Division 22, Plumbing Contract Documents.

B. Related Work:

1. Additional conditions apply to this Division including, but not limited to:
   a) Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements.
   b) Drawings
   c) Addenda
   d) Owner/Architect Agreement
   e) Owner/Contractor Agreement
   f) Codes, Standards, Public Ordinances and Permits

1.03 REFERENCES AND STANDARDS

A. References and Standards per Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, individual Division 22, Plumbing Sections and those listed in this Section.

B. Codes to include latest adopted editions, including current amendments, supplements and local jurisdiction requirements in effect as of the date of the Contract Documents, of/from:

1. State of Oregon:
    a) OAR - Oregon Administrative Rules
    b) OESC - Oregon Electrical Specialty Code
    c) OFC - Oregon Fire Code
    d) OMSC - Oregon Mechanical Specialty Code
    e) OPSC - Oregon Plumbing Specialty Code
    f) OSSC - Oregon Structural Specialty Code
    g) OZERCC - Oregon Zero Energy Ready Commercial Code
    h) Oregon Elevator Specialty Code

C. Reference standards and guidelines include but are not limited to the latest adopted editions from:

1. ABA - Architectural Barriers Act
2. ADA - Americans with Disabilities Act
3. AHRI - Air-Conditioning Heating & Refrigeration Institute
4. ANSI - American National Standards Institute
5. ASCE - American Society of Civil Engineers
6. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers
7. ASHRAE Guideline 0, the Commissioning Process
8. ASME - American Society of Mechanical Engineers
9. ASPE - American Society of Plumbing Engineers
10. ASSE - American Society of Sanitary Engineering
11. ASTM - ASTM International
12. AWWA - American Water Works Association
13. CFR - Code of Federal Regulations
14. CGA - Compressed Gas Association
15. CISPI - Cast Iron Soil Pipe Institute
16. ETL - Electrical Testing Laboratories
17. EPA - Environmental Protection Agency
18. FM - FM Global
19. IAPMO - International Association of Plumbing and Mechanical Officials
20. GAMA - Gas Appliance Manufacturers Association
21. HI - Hydraulic Institute Standards
22. ISO - International Organization for Standardization
23. MSS - Manufacturers Standardization Society
24. NEC - National Electric Code
25. NEMA - National Electrical Manufacturers Association
26. NFGC - National Fuel Gas Code
27. NFPA - National Fire Protection Association
28. NRCA - National Roofing Contractors Association
29. NSF - National Sanitation Foundation

30. OSHA - Occupational Safety and Health Administration
31. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association, Inc.
32. TEMA - Tubular Exchanger Manufacturers Association
33. TIMA - Thermal Insulation Manufacturers Association
34. UL - Underwriters Laboratories Inc.

D. See Division 22, Plumbing individual Sections for additional references.

1.04 SUBMITTALS

A. See Division 01, General Requirements for Submittal Procedures as well as specific individual Division 22, Plumbing Sections.

B. Provide drawings in format and software release equal to the design documents. Drawings to be the same sheet size and scale as the Contract Documents.

C. In addition:

1. "No Exception Taken" constitutes that review is for general conformance with the design concept expressed in the Contract Documents for the limited purpose of checking for conformance with information given. Any action is subject to the requirements of the Contract Documents. Contractor is responsible for the dimensions and quantity and will confirm and correlate at the job site, fabrication processes and techniques of construction, coordination of the work with that of all other trades, and the satisfactory performance of the work.
2. Provide product submittals and shop drawings in electronic format only. Electronic format must be submitted via Posted to E-Builder Beaverton School District Site. For electronic format, provide one file per division containing one bookmarked PDF file with each bookmark corresponding to each Specification Section. Arrange bookmarks in ascending order of Specification Section number. Individual submittals sent piecemeal in a per Specification Section method will be returned without review or comment. All transmissions/submissions to be submitted to Architect. Deviations will be returned without review.
3. Product Data: Provide Manufacturer's descriptive literature for products specified in Division 22, Plumbing Sections.
4. Identify/mark each submittal in detail. Note what differences, if any, exist between the submitted item and the specified item. Failure to identify the differences will be considered cause for disapproval. If differences are not identified and/or not discovered during the submittal review process, Contractor remains responsible for providing equipment and materials that meet the Specifications and Drawings.
    a) Label submittal to match numbering/references as shown in Contract Documents and schedules. Highlight and label applicable information to individual equipment or cross out/remove extraneous data not applicable to submitted model. Clearly note options and accessories to be provided, including field installed items. Highlight connections by/to other trades.
    b) Include technical data, installation instructions and dimensioned drawings for products, fixtures, equipment and devices installed, furnished or provided. Reference Division 22, Plumbing Sections for specific items required in product data submittal outside of these requirements.
    c) See Division 22, Plumbing Sections for additional submittal requirements outside of these requirements.
5. Maximum of two reviews of complete submittal package. Arrange for additional reviews and/or early review of long-lead items; Bear costs of additional reviews

at Engineer's hourly rates. Incomplete submittal packages/submittals will be returned to contractor without review.

6. Resubmission Requirements: Make corrections or changes in submittals as required, and in consideration of Engineer’s comments. Identify Engineer’s comments and provide an individual response to each of the Engineer’s comments. Cloud changes in the submittals and further identify changes which are in response to Engineer’s comments.
7. Structural/Seismic: Provide weights, dimensions, mounting requirements and like information required for mounting, seismic bracing, and support. Indicate manufacturer's installation and support requirements to meet ASCE 7-10 requirements for non-structural components. Provide engineered seismic drawings and equipment seismic certification. Equipment Importance Factor as specified in Division 01 and in Structural documents.
8. Trade Coordination: Include physical characteristics, electrical characteristics, device layout plans, wiring diagrams, and connections as required per Division 22, Plumbing Coordination Documents. For equipment with electrical connections, furnish copy of approved submittal for inclusion in Division 26, Electrical submittals.
9. Make provisions for openings in building for admittance of equipment prior to start of construction or ordering of equipment.
10. Substitutions and Variation from Basis of Design:
    a) The Basis of Design designated product establishes the qualities and characteristics for the evaluation of any comparable products by other listed acceptable manufacturers if included in this Specification or included in an approved Substitution Request as judged by the Design Professional.
    b) If substitutions and/or equivalent equipment/products are being proposed, it is the responsibility of parties concerned, involved in, and furnishing the substitute and/or equivalent equipment to verify and compare the characteristics and requirements of that furnished to that specified and/or shown. If greater capacity and/or more materials and/or more labor is required for the rough-in, circuitry or connections than for the item specified and provided for, then provide compensation for additional charges required for the proper rough-in, circuitry and connections for the equipment being furnished. No additional charges above the Base Bid, including resulting charges for work performed under other Divisions, will be allowed for such revisions. Coordinate with the requirements of "Submittals". For any product marked "or approved equivalent", a substitution request must be submitted to Engineer for approval prior to purchase, delivery or installation.
11. Shop Drawings: Provide coordinated Shop Drawings which include physical characteristics of all systems, equipment and piping layout plans, and control wiring diagrams. Reference individual Division 22, Plumbing Sections for additional requirements for Shop Drawings outside of these requirements.
    a) Provide Shop Drawings indicating sanitary and storm cleanout locations and type to Architect for approval prior to installation.
    b) Provide Shop Drawings indicating access panel locations, size and elevation for approval prior to installation.
12. Samples: Provide samples when requested by individual Sections.
13. Resubmission Requirements:
    a) Make any corrections or change in submittals when required. Provide submittals as specified. The engineer will not be required to edit and/or

interpret the Contractor's submittals. Indicate changes for the resubmittal in a cover letter with reference to page(s) changed and reference response to comment. Cloud changes in the submittals.

(1) Resubmit for review until review indicates no exception taken or "make corrections as noted".

(2) When submitting drawings for Engineers re-review, clearly indicate changes on drawings and "cloud" any revisions. Submit a list describing each change.

14. Operation and Maintenance Manuals, Owner's Instructions:

a) Submit, at one time, electronic files (PDF format) of manufacturer's operation and maintenance instruction manuals and parts lists for equipment or items requiring servicing. Include valve charts. Submit data when work is substantially complete and in same order format as submittals. Include name and location of source parts and service for each piece of equipment.

(1) Include copy of approved submittal data along with submittal review letters received from Engineer. Data to clearly indicate installed equipment model numbers. Delete or cross out data pertaining to other equipment not specific to this project.

(2) Include copy of manufacturer's standard Operations and Maintenance for equipment. At front of each tab, provide routine maintenance documentation for scheduled equipment. Include manufacturer's recommended maintenance schedule and highlight maintenance required to maintain warranty. Furnish list of routine maintenance parts, including part numbers, sizes, quantities, relevant to each piece of equipment: belts, motors, lubricants, and filters.

(3) Include copy of complete parts list for equipment. Include available exploded views of assemblies and sub assemblies.

(4) Include copy of startup and test reports specific to each piece of equipment.

(5) Include copy of final water systems balancing log along with pump operating data.

(6) Include commissioning reports.

(7) Include copy of pressure, flow, leakage and purity test data and water systems test data, as applicable. Include copy of third-party and state and local jurisdiction inspection reports.

(8) Include copy of valve charts/schedules.

(9) Include Warranty per Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

(10) Include product certificates of warranties and guarantees.

(11) Engineer will return incomplete documentation without review. Engineer will provide one set of review comments in Submittal Review format. Contractor must arrange for additional reviews; Contractor to bear costs for additional reviews at Engineer's hourly rates.

b) Thoroughly instruct Owner in proper operation of equipment and systems. Where noted in individual Sections, training will include classroom instruction with applicable training aids and systems

demonstrations. Field instruction per Section 22 00 00, Plumbing Basic Requirements article titled "Demonstration".

c) Copies of certificates of code authority inspections, acceptance, code required acceptance tests, letter of conformance and other special guarantees, certificates of warranties, specified elsewhere or indicated on Drawings.

15. Record Drawings:

a) Maintain at site at least one set of drawings for recording “As-constructed” conditions. Indicate on Drawings changes to original documents by referencing revision document, and include buried elements, location of cleanouts, and location of concealed mechanical items. Include items changed by field orders, supplemental instructions, and constructed conditions.

b) Record Drawings are to include equipment and fixture/connection schedules that accurately reflect "as constructed or installed" for project.

c) At completion of project, input changes to original project on Revit Model and make one set of black-line drawings created from Revit Model in version/release equal to contract drawings. Submit Revit disk and drawings upon substantial completion.

d) At completion of project, show changes and deviations from the Drawings in red on one set of black-line drawings. Include written Addendums, RFIs, and change order items. Make changes to Drawings in a neat, clean, and legible manner.

e) Provide Invert elevations and dimensioned locations for water services, building waste, and storm drainage piping below grade extending to 5-feet outside building line.

f) See Division 22, Plumbing individual Sections for additional items to include in record drawings.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Work and materials installed to conform with all local, State and Federal codes, and other applicable laws and regulations. Where code requirements are at variance with Contract Documents, meet code requirements as a minimum requirement and include costs necessary to meet these in Contract. Machinery and equipment are to comply with OSHA requirements, as currently revised and interpreted for equipment manufacturer requirements. Install equipment provided per manufacturer recommendations.

B. Whenever this Specification calls for material, workmanship, arrangement or construction of higher quality and/or capacity than that required by governing codes, higher quality and/or capacity take precedence.

C. Drawings are intended to be diagrammatic and reflect the Basis of Design manufacturers equipment. They are not intended to show every item in its exact dimensions, or details of equipment or proposed systems layout. Verify actual dimensions of systems (i.e., piping) and equipment proposed to assure that systems and equipment will fit in available space. Contractor is responsible for design and construction costs incurred for equipment other than Basis of Design, including, but not limited to, architectural, structural, electrical, HVAC, fire sprinkler, and plumbing systems.

D. Manufacturer's Instructions: Follow manufacturer's written instructions. If in conflict with Contract Documents, obtain clarification. Notify Engineer/Architect, in writing, before starting work.

E. Items shown on Drawings are not necessarily included in Specifications or vice versa. Confirm requirements in all Contract Documents.

F. Provide products that are UL listed.

G. Piping Insulation products to contain less than 0.1 percent by weight PBDE in all insulating materials.

H. All potable water system components, devices, material, or equipment containing a weighted average of greater than 0.25 percent lead are prohibited, and shall be certified in accordance with current editions of the Safe Drinking Water Act (SDWA), NSF 61 & NSF 372. Endpoint devices used to dispense water for drinking shall meet the requirements of NSF 61.

I. ASME Compliance: ASME listed water heaters and boilers with an input of 200,000 BTUH and higher, hot water storage tanks which exceed 120 gallons, and hot water expansion tanks which are connected to ASME rated equipment or required by code or local jurisdiction.

J. Provide safety controls required by National Boiler Code (ASME CSD 1) for boilers and water heaters with an input of 400,000 BTUH and higher.

1.06 WARRANTY

A. Provide written warranty covering the work for a period of one year from date of Substantial Completion in accordance with Division 00, Contracting and Procurement Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

B. Sections under this Division can require additional and/or extended warranties that apply beyond basic warranty in Division 01, General Requirements and the General Conditions. Confirm requirements in all Contract Documents.

1.07 COORDINATION DOCUMENTS

A. Prior to construction, coordinate installation and location of HVAC equipment, ductwork, grilles, diffusers, piping, plumbing equipment/fixtures, fire sprinklers, plumbing, cable trays, lights, and electrical services with architectural and structural requirements, and other trades (including ceiling suspension, and tile systems), and provide maintenance access requirements. Coordinate with submitted architectural systems (i.e. roofing, ceiling, finishes) and structural systems as submitted, including footings and foundation. Identify zone of influence from footings and ensure systems are not routed within the zone of influence.

B. Advise Architect in the event a conflict occurs in location or connection of equipment. Bear costs resulting from failure to properly coordinate installation or failure to advise Architect of conflict.

C. Verify in field exact size, location, invert, and clearances regarding existing material, equipment and apparatus, and advise Architect of discrepancies between that indicated on Drawings and that existing in field prior to installation related thereto.

D. Submit final Coordination Drawings with changes as Record Drawings at completion of project.

1.08 WORK INCLUDED

A. Furnish and install sleeves, inserts and anchorage required for the installation, which are embedded in work of other trades. Sleeve, wrap and seal piping in concrete.

B. Electrical: For plumbing trim/devices/equipment, provide, from the line voltage connection by Division 26, the low voltage electrical connections and wiring as required for complete and operable system. Includes, but is not limited to: Low voltage electrical raceway, wiring and accessories, such as step-down transformers as necessary for function of sensors and automatic valve and faucet controls. Supply step-down transformers and size wiring as recommended by manufacturer of plumbing trim/faucets requiring electrical low voltage connection.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Articles, fixtures, and equipment of a kind to be standard product of one manufacturer, including but not limited to fixtures, pumps, drains and equipment.

2.02 STANDARDS OF MATERIALS AND WORKMANSHIP

A. Base contract upon furnishing materials as specified. Materials, equipment, and fixtures used for construction are to be new, latest products as listed in manufacturer's printed catalog data and are to be UL or ETL approved or have adequate approval or be acceptable by State, County, and City authorities.

B. Names and manufacturer's names denote character and quality of equipment desired and are not to be construed as limiting competition.

C. Hazardous Materials:

1. Comply with local, State of Oregon, and Federal regulations relating to hazardous materials.
2. Comply with Division 00, Procurement and Contracting Requirements and Division 01, General Requirements for this project relating to hazardous materials.
3. Do not use any materials containing a hazardous substance. If hazardous materials are encountered, do not disturb; immediately notify Owner and Architect. Hazardous materials will be removed by Owner under separate contract.

PART 3 - EXECUTION

3.01 ACCESSIBILITY AND INSTALLATION

A. Confirm Accessibility and Installation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

B. Install equipment and products complete as directed by manufacturer's installation instructions. Obtain installation instructions from manufacturer prior to rough-in of equipment and examine instructions thoroughly. When requirements of installation instructions conflict with Contract Documents, request clarification from Architect prior to proceeding with installation. This includes proper installation methods, sequencing, and coordination with other trades and disciplines.

C. Earthwork:

1. Confirm Earthwork requirements in Contract Documents. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:
   a) Perform excavation, dewatering, shoring, bedding, and backfill required for installation of work in this Division in accordance with the provisions of related earthwork Sections/divisions. Contact utilities and locate existing utilities prior to excavation. Repair any work damaged during excavation or backfilling.
   b) Excavation: Do not excavate under footings, foundation bases, or retaining walls.
   c) Provide protection of underground systems. Review the project Geotechnical Report for references to corrosive or deleterious soils which will reduce the performance or service life of underground systems materials.

D. Firestopping:

1. Confirm Firestopping requirements in Division 07, Thermal and Moisture Protection. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:
    a) Coordinate location and protection level of fire and/or smoke rated walls, ceilings, and floors. When these assemblies are penetrated, seal around piping, ductwork and equipment with approved firestopping material. Install firestopping material complete as directed by manufacturer's installation instructions. Meet requirements of ASTM E814, Standard Test Method for Fire Tests of Through-Penetration Fire Stops.

E. Pipe Installation:

1. Provide installation of piping systems coordinated to account for expansion and contraction of piping materials and building as well as anticipated settlement or shrinkage of building. Install work to prevent damage to piping, equipment, and building and its contents. Provide piping offsets, loops, expansion joints, sleeves, anchors or other means to control pipe movement and minimize forces on piping. Verify anticipated settlement and/or shrinkage of building with Project Structural Engineer. Verify construction phasing, type of building construction products and rating for coordinating installation of piping systems.
2. Include provisions for servicing and removal of equipment without dismantling piping.

F. Plenums:

1. Provide plenum rated materials that meet the requirements to be installed in plenums. Immediately notify Architect/Engineer of discrepancy.

3.02 REVIEW AND OBSERVATION

A. Confirm Review and Observation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

B. Notify Architect, in writing, at following stages of construction so that they may, at their option, visit site for review and construction observation:

1. Underground piping installation prior to backfilling.
2. Prior to covering walls.
3. Prior to ceiling cover/installation.
4. When main systems, or portions of, are being tested and ready for inspection by AHJ.

C. Bear responsibility and cost to make piping accessible, to expose concealed lines, or to demonstrate acceptability of the system. If Contractor fails to notify Architect at times prescribed above, costs incurred by removal of such work are the responsibility of the Contractor.

D. Final Punch:

1. Prior to requesting a final punch visit from the Engineer, request from Engineer the Plumbing Precloseout Checklist, complete the checklist confirming completion of systems' installation, and return to Engineer. Request a final punch visit from the Engineer, upon Engineer's acceptance that the plumbing systems are ready for final punch.
2. Costs incurred by additional trips required due to incomplete systems will be the responsibility of the Contractor.

3.03 CONTINUITY OF SERVICE

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:

1. During remodeling or addition to existing structures, while existing structure is occupied, current services to remain intact until new construction, facilities or equipment is installed.
2. Prior to changing over to new service, verify that every item is thoroughly prepared. Install new piping, and wiring to point of connection.
3. Coordinate transfer time to new service with Owner. If required, perform transfer during off peak hours. Once changeover is started, pursue to its completion to keep interference to a minimum.
   a) If overtime is necessary, there will be no allowance made by Owner for extra expense for such overtime or shift work.
4. Organize work to minimize duration of power interruption.

3.04 CUTTING AND PATCHING

A. Confirm Cutting and Patching requirements in Division 01, General Requirements. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:

1. Proposed floor cutting/core drilling/sleeve locations to be approved by Project Structural Engineer. Submit proposed locations to Architect/Project Structural Engineer. Where slabs are of post tension construction, perform x-ray scan of proposed penetration locations and submit scan results including proposed penetration locations to Project Structural Engineer/Architect for approval. Where slabs are of waffle type construction, show column cap extent and cell locations relative to proposed penetration(s).
2. Cutting, patching and repairing for work specified in this Division including plastering, masonry work, concrete work, carpentry work, and painting included under this Section will be performed by skilled craftsmen of each respective trade in conformance with appropriate Division of Work.
3. Additional openings required in building construction to be made by drilling or cutting. Use of jack hammer is specifically prohibited. Patch openings in and through concrete and masonry with grout.
4. Restore new or existing work that is cut and/or damaged to original condition. Patch and repair specifically where existing items have been removed. This includes repairing and painting walls, ceilings, etc. where existing piping and devices are removed as part of this project. Where alterations disturb lawns, paving, and walks, surfaces to be repaired, refinished and left in condition matching existing prior to commencement of work.
5. Additional work required by lack of proper coordination will be provided at no additional cost to the Owner.

3.05 EQUIPMENT SELECTION AND SERVICEABILITY

A. Replace or reposition equipment which is too large or located incorrectly to permit servicing, at no additional cost to Owner.

3.06 DELIVERY, STORAGE AND HANDLING

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:

1. Handle materials delivered to project site with care to avoid damage. Store materials on site inside building or protected from weather, dirt and construction dust. Insulation and lining that becomes wet from improper storage and handling to be replaced before installation. Products and/or materials that become damaged due to water, dirt and/or dust as a result of improper storage to be replaced before installation.

2. Protect equipment and pipe to avoid damage. Close pipe openings with caps or plugs. Keep motors and bearings in watertight and dustproof covers during entire course of installation.

3. Protect bright finished shafts, bearing housings and similar items until in service.

3.07 DEMONSTRATION

A. Confirm Demonstration requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

B. Upon completion of work and adjustment of equipment and test systems, demonstrate to Owner's Authorized Representative, Architect and Engineer that equipment furnished and installed or connected under provisions of these Specifications functions in manner required. Provide field instruction to Owner's Maintenance Staff as specified in Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

C. Manufacturer's Field Services: Furnish services of a qualified person at time approved by Owner, to instruct maintenance personnel, correct defects or deficiencies, and demonstrate to satisfaction of Owner that entire system is operating in satisfactory manner and complies with requirements of other trades that may be required to complete work. Complete instruction and demonstration prior to final job site observations.

3.08 CLEANING

A. Confirm cleaning requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

B. Upon completion of installation, thoroughly clean exposed portions of equipment, removing temporary labels and traces of foreign substances. Throughout work, remove construction debris and surplus materials accumulated during work.

3.09 INSTALLATION

A. Confirm installation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

B. Install equipment and fixtures in accordance with manufacturer's installation instructions, plumb and level and firmly anchored to vibration isolators. Maintain manufacturer's recommended clearances.

C. Start up equipment, in accordance with manufacturer's start-up instructions, and in presence of manufacturer's representative. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.

1. Do not place equipment in sustained operation prior to initial balancing of plumbing systems.

2. Provide pump impellers to obtain Basis of Design design capacities.

D. Provide miscellaneous supports/metals required for installation of equipment and piping.

3.10 PAINTING

A. Confirm requirements in Division 01, General Requirements and Division 09, Finishes. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:

1. Ferrous Metal: After completion of plumbing work, thoroughly clean and paint exposed supports constructed of ferrous metal surfaces, i.e., hangers, hanger rods, equipment stands, with one coat of black asphalt for exterior or black enamel for interior, suitable for hot surfaces.

2. In a mechanical room, on roof or other exposed areas, machinery and equipment not painted with enamel to receive two coats of primer and one coat of rustproof enamel, colors as selected by Architect.
3. See individual equipment Specifications for other painting.
4. Structural Steel: Repair damage to structural steel finishes or finishes of other materials damaged by cutting, welding or patching to match original.
5. Piping: Clean, primer coat and paint exposed piping on roof or at other exterior locations with two coats paint suitable for metallic surfaces and exterior exposures. Color selected by Architect.
6. Covers: Covers such as manholes, cleanouts and the like will be furnished with finishes which resist corrosion and rust.

3.11 DEMOLITION

A. Confirm Demolition requirements in Division 01, General Requirements and Division 02, Existing Conditions. In absence of specific requirements, comply with individual Sections in Division 22, Plumbing and the following:

1. Scope:
   a) It is the intent of these documents to provide necessary information and adjustments to plumbing system required to meet code, and accommodate installation of new work.
   b) Coordinate with Owner so that work can be scheduled not to interrupt operations, normal activities, building access or access to different areas.
   c) Existing Conditions: Determine exact location of existing utilities and equipment before commencing work, compensate Owner for damages caused by failure to exactly locate and preserve underground utilities. Replace damaged items with new material to match existing. Promptly notify Owner if utilities are found which are not shown on Drawings.
2. Equipment: Unless otherwise directed, equipment, fixtures, or fittings being removed as part of demolition process are Owner's property. Remove other items not scheduled to be reused or relocated from job site as directed by Owner.
3. Unless specifically indicated on Drawings, remove exposed, unused piping to behind finished surfaces (floor, walls, ceilings, etc.). Cap piping and patch surfaces to match surrounding finish.
4. Unless specifically indicated on Drawings, remove unused equipment, fixtures, fittings, rough-ins, and connectors. Removal is to be to a point behind finished surfaces (floors, walls, and ceilings).

3.12 ACCEPTANCE

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Sections in Division 22, Plumbing and the following:

1. System cannot be considered for acceptance until work is completed and demonstrated to Architect that installation is in strict compliance with Specifications, Drawings and manufacturer's installation instructions, particularly in reference to following:
   a) Testing and Balancing Reports
   b) Cleaning
   c) Operation and Maintenance Manuals
   d) Training of Operating Personnel

e) Record Drawings

f) Warranty and Guaranty Certificates

g) Start-up/Test Document and Commissioning Reports

3.13 FIELD QUALITY CONTROL

A. Confirm Field Quality Control requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

B. Tests:

1. Conduct tests of equipment and systems to demonstrate compliance with requirements specified. Reference individual Specification Sections for required tests. Document tests and include in operation and maintenance manuals.

2. During site evaluations by Architect or Engineer, provide appropriate personnel with tools to remove and replace trims, covers, and devices so that proper evaluation of installation can be performed.

3.14 LETTER OF CONFORMANCE

A. Provide Letter of Conformance, copies of manufacturers' warranties and extended warranties with a statement that plumbing items were installed in accordance with manufacturer's recommendations, UL listings and FM Global approvals. Include Letter of Conformance, copies of manufacturers' warranties and extended warranties in Operation and Maintenance Manuals.

3.15 ELECTRICAL INTERLOCKS

A. Where equipment motors are to be electrically interlocked with other equipment for simultaneous operation, utilize plumbing equipment wiring diagrams to coordinate with electrical systems so that proper wiring of equipment involved is affected.

END OF SECTION

SECTION 22 10 00

PLUMBING PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

1. Sanitary, Grease Drainage DWV Piping, Below and Above Grade
2. Condensate Piping

1.02 RELATED SECTIONS

A. Contents of Division 22, Plumbing and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

B. In addition, meet the following:

1. NSF 61, Annex G.
2. Steel pipe to conform to ASTM and ANSI Standards as specified in this Section.
3. Cast Iron Piping to conform to standards of ASTM A-74, CISPI 301 and FM 1680.
4. Manufacturer's Standards Society (MSS) for valving and support reference standard.
5. American National Standards Institute (ANSI) for Piping Standards.
6. NFPA Standard 51B - “Fire Prevention in Use of Cutting and Welding Processes”.
7. Crosslinked polyethylene (PEX) pipe conforming to ASTM F876, F877 and CSA B1375, or DIN 16892 and 16893.

1.04 SUBMITTALS

A. Submittals as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. See component manufacturers listed in individual articles below.

B. ADS

C. American-USA

D. Charlotte

E. Clamp-All

F. Enfield

G. Husky
H. Ideal
I. Mission
J. Mueller
K. Orion
L. Sioux Chief
M. Spears
N. Tyler
O. Or approved equivalent.

2.02 GENERAL

A. Provide pipe, tube and fittings of the same type, fitting requirements, grade, class and the size and weight indicated or required for each service, as indicated in other Division 22, Plumbing Specifications. Where type, grade, or class is not indicated, provide proper selection as determined by installer for installation requirements, and comply with governing regulations and industry standards.

B. Manufactured materials delivered, new to the project site and stored in their original containers.

C. Product Marking: Furnish each item with legible markings indicating name brand and manufacturer, manufacturing process, heat number and markings as required per ASTM and UL/FM Standards.

2.03 SANITARY, GREASE DRAINAGE DWV PIPING, BELOW AND ABOVE GRADE

A. Cast Iron Pipe: ASTM A 74 service weight hub and spigot.
   1. Fittings: Cast iron.
   2. Joints: Hub-and-spigot ASTM C564 neoprene gaskets and conform to ASTM C1563.

B. Cast Iron Pipe: ASTM A888/CISPI 301 hubless.
   1. Fittings: Cast iron.
   2. Coupling Assembly:
      a) Standard Duty: ASTM C1277 or CISPI 310.

2.04 CONDENSATE PIPING

A. Copper Tube: ASTM B 88 (ASTM B898M), Type K (A).
   1. Fittings: ASME B16.29, wrought copper.
   2. Joints: ASTM B32, alloy Sn50 solder.

B. Use chemical resistant piping for drainage of condensate from combustion fuel sources (such as condensing boilers and water heaters), as noted in this Section for area of application.

C. CPVC (Chlorinated Poly Vinyl Chloride) Pipe and Fittings:
   1. Pipe and Fittings: Schedule 40, NSF-14, ASTM 439, IAPMO IS20-96, socket fittings, solvent weld.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Underground Piping Systems:
   1. Examination: Verify that excavations are to required grade, dry, and not over-excavated.

2. Perform necessary excavation and backfill required for installation of plumbing work. Repair piping or other work at no expense to Owner.
3. Water: Keep excavations free of standing water. Re-excavate and fill back excavations damaged or softened by water or frost to original level with sand, crushed rock or other approved material at no expense to Owner.
4. Tests: During progress of work for compacted fill, Owner reserves right to request compaction tests made under direction of testing laboratory.
5. Trench Excavation: Excavate trenches to necessary depth and width, removing rocks, unstable soil (muck, peat), roots and stumps. Excavation material is classified as "base fill" and "native." Base fill excavation material consisting of placed crushed rock may be used as backfill above "Pipe Zone." Remove and dispose off site native excavation material. Adequate width of trench for proper installation of piping or conduit.
6. Support Foundations:
   a) Foundations: Excavate trenches located in unstable ground areas below elevation required for installation of piping to depth which is determined by Architect as appropriate for conditions encountered. Place and compact approved foundation material in excavation up to "Bedding Zone." Dewatering, placement, compaction and disposal of excavated materials to conform to requirements contained in other Specification Sections or Drawings.
   b) Over-Excavations: Where trench excavation exceeds required depths, provide, place and compact suitable bedding material to proper grade or elevation at no additional cost to Owner.
   c) Foundation Material: Where native material has been removed, place and compact necessary foundation material to form base for replacement of required thickness of bedding material.

	Class A		**Class B**	
Material Passing	**Min.**	**Max.**	**Min.**	**Max.**
3/4-inch Square Opening	**27**	**47**	**0**	**1**

   d) Bedding Material: Full bed piping on sand, pea gravel, or 3/4-inch minus crushed rock. Place minimum 4-inch deep layer of sand, pea gravel, or crushed rock on leveled trench bottom for this purpose. Remove bedding to necessary depth for piping bells and couplings to maintain contact of pipe on bedding for its entire length. Provide additional bedding in excessively wet, unstable, or solid rock trench bottom conditions as required to provide firm foundation.
7. Backfilling:
   a) Following installation and successful completion of required tests, backfill piping in lifts.
      (1) In "Pipe Zone" place backfill material and compact in lifts not to exceed 6-inches in depth to height of 12-inches above top of pipe. Place backfill material to obtain contact with entire periphery of pipe, without disturbing or displacing pipe.
      (2) Place and compact backfill above "Pipe Zone" in layers not to exceed 12-inches in depth.
   b) Backfill Material:

(1) Backfill Material in "Pipe Zone": 3/4-inch minus crushed rock, sand or pea gravel.

(2) Crushed rock, fill sand or other backfill material approved elsewhere in Specifications may be used above "Pipe Zone."

8. Compaction of Trench Backfill:

a) Where compaction of trench backfill material is required, use one of following methods or combination thereof:

(1) Mechanical tamper,

(2) Vibratory compactor, or

(3) Other approved methods appropriate to conditions encountered.

b) Architect to have right to change methods and limits to better accommodate field conditions. Compaction sufficient to attain 95 percent of maximum density at optimum moisture content unless noted otherwise on Drawings or elsewhere in Specifications. Water "puddling" or "washing" is prohibited.

B. General Installation:

1. Work performed by experienced journeyman plumbers. No exceptions.

2. Provide access panels for concealed trap primers and the like.

3. Install pipes and pipe fittings in accordance with recognized industry practices and manufacturer's recommendations.

4. Align piping accurately at connections, within 3/32-inch misalignment tolerance. Comply with ANSI B31 Code for Pressure Piping.

5. Locate piping runs, as indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details, and notations or, if not otherwise indicated, run piping in shortest route which does not obstruct space or block access for servicing building and its equipment. Hold piping close to walls, overhead construction, and other structural and permanent-enclosure elements of building. Limit clearance to 1/2-inch where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1-inch clearance outside insulation. Whenever possible in finished and occupied spaces, conceal piping from view by locating it in column enclosures, hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as indicated.

a) Concealed Piping Above Suspended Ceiling: Plan and coordinate to avoid interferences; install to maintain suspended ceiling heights shown on Architectural Drawings. Allow sufficient space above removable ceiling panels for panel removal. Locate piping so that valves are visible and accessible within 24-inches horizontally and vertically from point of access to the ceiling space. Provide plenum rated materials for ceiling spaces which are being used as plenums.

b) Insulation Space Allowance: In piping work, allow space for pipe insulation and jackets. If interferences occur, move the piping to accommodate insulation thickness specified.

c) Pipe Lengths: Do not use short lengths or nipples at locations where a full length of pipe will fit.

d) Alignment Prior to Supporting and Anchoring: Place piping in proper alignment and position prior to connection to anchors, expansion loops, and equipment. Furnish jacking devices, temporary steel structural members, and assembled structures as necessary. Remove temporary

equipment and structures supplied by contractor at completion; such items to remain Contractor property.

e) Valve and Equipment Connections: Piping not to place undue stress on flanged valves and equipment connections. Install mating flange faces true and parallel to each other and not requiring springing of piping for assembly. Pipe hangers and supports to carry the full weight of the pipe and fluid.

f) Piping Leaks: Correct immediately; use new materials; leak-sealing compounds or peening not permitted.

g) Pressure Ratings of Fittings, Valves, and Devices in Piping Systems: Pressure rating to be equal to, or greater than, the maximum working pressure of the system.

h) Equipment Vents and Drains: Provide for coils and vessels which contain water. Provide isolation valves and outlet valves at piping high and low points to permit venting and draining of the vessel without venting and draining connected piping. Provide hose connections and caps on drain lines.

i) Escutcheon Plates: Where exposed insulated and uninsulated piping passes through walls, floors or ceilings; provide spring clip type. Provide plates on both sides of wall or floor.

C. Testing:

1. General:

a) Provide temporary equipment for testing, including pumps, compressors, tanks, and gauges, as required. Test piping systems before insulation (if any) is installed and remove or disengage control devices before testing. Where necessary, test sections of each piping system independently, but do not use piping valves to isolate sections where test pressures exceed local valve operating pressure rating. Fill each section with water, compressed air, or nitrogen and pressurize for the indicated pressure and time.

b) Notify Architect and local Plumbing Inspector 2 days before tests.

c) Drainage, Waste and Vent Piping: Test in accordance with governing plumbing code or as follows: Test drainage and venting systems, with necessary openings plugged, to permit system to be filled with water and subjected to water pressure of minimum of 5 PSI head. System to hold water without water level drop greater than 1/2 pipe diameter of largest nominal pipe size within 24-hour period. Test system in sections if minimum head cannot be maintained in each section. 5 PSI head to be minimum pressure at highest joint.

d) Water Piping: Eliminate air from system. Fill and test at 125 PSIG or minimum 1-1/2 times static pressure at connection to serving utility main for period of two hours with no loss in pressure.

e) Send test results to Architect for review and approval and include in Operation and Maintenance Manual.

2. Testing of Pressurized Systems:

a) Test each pressurized piping system at 150 percent of operating pressure indicated, but not less than 125 PSIG test pressure.

b) Observe each test section for leakage at end of test period. Test fails if leakage is observed or if pressure drop exceeds 2 percent of test pressure.

D. Corrosive Soil Conditions:

1. Wrap steel, iron, copper or other metal piping materials/fittings with Protecto Wrap 200, 30 mils or greater. Maintain a 1/2-inch overlap and install per manufacturer's recommendations.
2. Provide epoxy coated cast iron pipe and fittings for drainage systems.
3. Obtain and review project soils report for verification of requirements concerning corrosive soils.

E. Protection:

1. Keep pipe openings closed by means of plugs or caps to prevent entrance of foreign matter. Protect piping, ductwork, fixtures, equipment and apparatus against dirty water, chemical or mechanical damage both before and after installation. Restore to its original condition or replace fixtures, equipment or apparatus damaged prior to final acceptance of work.

F. Cut piping squarely, free of rough edges and reamed to full bore. Insert piping fully into fittings.

G. Provide joints of type indicated in each piping system.

H. Thread pipe in accordance with ANSI/ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Remove excess cutting oil from piping prior to assembly. Apply pipe joint compound, or pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than 3 threads exposed.

I. Sleeves:

1. Pipe Sleeves:
   a) Layout work in advance of pouring concrete, furnish, and set sleeves necessary to complete work.
   b) Floor Sleeves: Provide sleeves on pipes passing through concrete or masonry construction. Extend sleeve 1-inch above finished floor. Caulk pipes passing through floor with non-shrinking grout or approved caulking compound (Except DWV Piping penetrating a concrete slab set on finish grade), provide "Link-Seal" sleeve sealing system for concrete/slab penetrations which are below grade. Caulk/seal piping passing through fire rated building assembly with UL rated assemblies. Provide fire-rated assemblies per local AHJ requirements
   c) Wall Sleeves: Provide sleeves on pipes passing through concrete or masonry construction. Provide sleeve flush with finished face of wall. Caulk pipes passing through walls with non-shrinking caulking compound. Provide modular link sealing system for concrete penetrations which are below grade. Caulk/seal piping passing through fire-rated assemblies per local AHJ requirements.
   d) Beam Sleeves: Coordinate with trades for locations of pipe sleeves in reinforced concrete and steel beams. Indicate penetrations on structural shop drawings. See Drawings and Specifications for specific sleeve location limitations. Plumbing Drawings are diagrammatic. Offset piping as required to meet these limitations. Pipe sleeve locations must be indicated on reinforced concrete and steel beam shop drawings. Field cutting of beams not allowed without written approval of structural engineer. No extra costs allowed for failure to coordinate beam penetrations prior to reinforced concrete and steel beam shop drawing submittal.
2. Installation of metallic or plastic piping penetrations through non fire-rated walls and partitions and through smoke-rated walls and partitions:
   a) Install fabricated pipe sleeve.

b) After installation of sleeve and piping, tightly pack entire annular void between piping or piping insulation and sleeve identification.

c) Seal each end airtight with a resilient nonhardening seal per code.

3.02 SANITARY, GREASE DRAINAGE DWV PIPING, BELOW AND ABOVE GRADE

A. Excavation and Backfill:

1. See 3.01 above.

B. Grease Drainage, Waste and Vent Piping: Test in accordance with governing plumbing code or as follows: Test drainage and venting systems, with necessary openings plugged, to permit system to be filled with water and subjected to water pressure of minimum of 5 PSI head. System to hold water without water level drop greater than 1/2 pipe diameter of largest nominal pipe size within 24-hour period. Test system in sections if minimum head cannot be maintained in each section. 5 PSI head to be minimum pressure at highest joint.

C. Firestopping Penetrations in Fire-Rated Wall/Floor Assemblies:

1. Provide proper sizing when providing sleeves or core-drilled holes to accommodate penetration. Firestop voids between sleeve or core-drilled hole and pipe passing through to meet requirements of ASTM E814.

D. Solder copper tube and fitting joints with lead free nickel/silver bearing solder meeting ASTM Std. B-32, in accordance with IAPMO Is 3-93, ASTM B-828 and Copper Development Association recommended procedures. Clean joints by other than chemical means prior to assembly. "Shock" cooling is prohibited. Fluxes to be water soluble for copper and brass potable water applications, and meeting CDA standard test method 1.0 and ASTM B813-91. Apply solder until a full fillet is present around the joint. Do not apply solder and flux in such excessive quantities as to run down interior of pipe. Lead solder or corrosion flux not to be present at the jobsite.

E. Cast-Iron Joints: Comply with coupling manufacturer's Cast Iron Soil Pipe Institute Standards and installation instructions.

F. Grease Drainage:

1. Grade piping at a uniform pitch of 2 percent unless otherwise noted on Drawings.

2. Indirect Waste or Drain Piping: Extend piping to discharge as shown on Drawings. Maintain minimum air gap. Provide traps on direct waste or drain piping exceeding 60-inches.

3. Fixture Carriers: Concealed fixture carriers for wall hung plumbing fixtures are specified in Section 22 40 00, Plumbing Fixtures.

4. Drains:

a) Install drains to suit finished floor. Install drains and components per manufacturer's instructions. Slope flooring to floor drain or sink a minimum of 1/2-inch below finished floor elevation.

b) Install P-traps for hub drains, floor drains and floor sinks. P-traps to be of the same materials as soil and waste piping. Provide trap primer assembly for each drain or floor sink.

5. Insulate horizontal branch lines from floor sinks, receptors and drains receiving cold discharge from equipment and appliances.

3.03 CONDENSATE PIPING

A. Firestopping Penetrations in Fire-Rated Wall/Floor Assemblies:

1. Provide proper sizing when providing sleeves or core-drilled holes to accommodate penetration. Firestop voids between sleeve or core-drilled hole and pipe passing through to meet requirements of ASTM E814.

END OF SECTION

SECTION 22 40 00

PLUMBING FIXTURES

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

1. General Plumbing Fixtures:
2. Floor Sinks

1.02 RELATED SECTIONS

A. Contents of Division 22, Plumbing and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

B. In addition, meet the following:

1. Comply with lead free (less than or equal to 0.25 percent) products in drinking water systems.
2. NSF 61, Annex G, Drinking Water System Components, Compliant.
3. ISO 9001, Quality Management Standard Certified.
4. IAPMO Low Lead Certification.
5. Provide fixtures, faucets and accessories to meet barrier free requirements of the governing code with respect to plumbing fixtures provided for the physically handicapped.
6. Items approved for use by State of Oregon.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. "Or approved equivalent" as defined in 22 00 00, Plumbing Basic Requirements. Substitution process requirements apply to approved equivalent products.

B. General Plumbing Fixtures: See Schedule on Drawings for type.

C. Floor Sinks:

1. Commercial Enameling
2. Sioux Chief
3. Smith
4. Wade

5. Watts
6. Zurn

2.02 GENERAL PLUMBING FIXTURES

A. Review substitution request requirements in Division 01, General Requirements and 22 00 00, Plumbing General Requirements.

B. Reference Architectural Details for mounting height and location of fixtures.

C. Provide factory fabricated fixtures of type, style and material indicated on the plumbing fixture connection schedule shown on the Drawings. For each type fixture, provide fixture manufacturer's standard trim, carrier, seats, and valves as indicated by their published product information; either as designed and constructed, or as recommended by manufacturer, or required for complete installation. Where more than one type is indicated, selection is installer's option; but, fixtures of same type must be furnished by a single manufacturer. Where type is not otherwise indicated, provide fixtures complying with governing regulations.

2.03 FLOOR SINKS

A. See Schedule on Drawings for types.

B. Plastic components are not allowed.

PART 3 - EXECUTION

3.01 GENERAL PLUMBING FIXTURE INSTALLATION INFORMATION

A. Verification of Conditions:

1. Examine rough-in work of water supply and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping and other unsatisfactory conditions for installation of plumbing fixtures.
2. Examine walls, floors and cabinets for suitable conditions where fixtures are to be installed.
3. Install plumbing fixtures level and plumb, in accordance with fixture manufacturer's written instructions, rough-in drawings and pertinent codes and regulations, design and referenced standards.
4. Fasten plumbing fixtures securely to supports or building structure. Secure supplies behind or within wall construction to provide rigid installation.
5. Install escutcheons at each wall, floor and ceiling penetration in exposed finished locations and within cabinets and millwork.
6. Seal fixtures to walls and floors using silicone sealant Dow Corning No. 780 or approved equivalent. Match sealant color to fixture color.
7. Inspect each unit for damage prior to installation. Replace damaged fixtures.
8. Clean fixtures using manufacturer's recommended cleaning methods and materials.
9. During construction, cover installed fixtures, drains and sinks with cardboard and wrap with sheet plastic.
10. Provide trap primers for floor drains, floor sinks and hub drains.

B. Owner Furnished Equipment:

1. Rough-in and make final connections to Owner furnished equipment. Provide necessary items to complete installation.
2. Comply with requirements of this Section and Drawings for installation procedures.

C. Adjusting and Cleaning: Clean plumbing fixtures, trim, and strainers of dirt and debris upon completion of installation.

D. Field Quality Control: Upon completion of installation of plumbing fixtures, test fixtures to demonstrate capability and compliance with Specifications. Correct or replace malfunctioning units at site, then retest to demonstrate compliance.

E. Protection: Protect fixtures and equipment from damage. Cover finished fixtures with cardboard and sheet plastic. Fixtures are not to be used during construction. Replace damaged items with new.

3.02 FLOOR SINK INSTALLATION

A. Install components in accordance with manufacturer's instructions and approved product data submittals.

B. Set plumb, level and rigid. Set fixture rim/grate flush with surrounding finish surface unless specifically noted otherwise.

END OF SECTION

SECTION 26 00 00

ELECTRICAL BASIC REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Work included in 26 00 00, Electrical Basic Requirements applies to Division 26, Electrical work to provide materials, labor, tools, permits, incidentals, and other services to provide and make ready for Owner's use of electrical systems for proposed project.

B. Contract Documents include, but are not limited to, Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Drawings, Addenda, Owner/Architect Agreement, and Owner/Contractor Agreement. Confirm requirements before commencement of work.

C. Definitions:

1. Provide: To furnish and install, complete and ready for intended use.
2. Furnish: Supply and deliver to project site, ready for unpacking, assembly and installation.
3. Install: Includes unloading, unpacking, assembling, erecting, installation, applying, finishing, protecting, cleaning and similar operations at project site as required to complete items of work furnished.
4. Approved or Approved Equivalent: To possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity. For equipment/products defined by the Contractor as "equivalent", substitution requests must be submitted to Engineer for consideration, in accordance with Division 01, General Requirements, and approved by the Engineer prior to submitting bids for substituted items.
5. Authority Having Jurisdiction (AHJ): Indicates reviewing authorities, including local fire marshal, Owner's insurance underwriter, Owner's Authorized Representative, and other reviewing entity whose approval is required to obtain systems acceptance.

1.02 RELATED SECTIONS

A. Contents of Section applies to Division 26, Electrical Contract Documents.

B. Related Work:

1. Additional conditions apply to this Division including, but not limited to:
   a) Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements.
   b) Drawings
   c) Addenda
   d) Owner/Architect Agreement
   e) Owner/Contractor Agreement
   f) Codes, Standards, Public Ordinances and Permits

1.03 REFERENCES AND STANDARDS

A. References and Standards per Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, individual Division 26, Electrical Sections and those listed in this Section.

B. Codes to include latest adopted editions, including current amendments, supplements and local jurisdiction requirements in effect as of the date of the Contract Documents, of/from:

1. State of Oregon:
    a) OAR - Oregon Administrative Rules
    b) OESC - Oregon Electrical Specialty Code
    c) OFC - Oregon Fire Code
    d) OMSC - Oregon Mechanical Specialty Code
    e) OPSC - Oregon Plumbing Specialty Code
    f) OSSC - Oregon Structural Specialty Code
    g) OZERCC - Oregon Zero Energy Ready Commercial Code
    h) Oregon Elevator Specialty Code

C. Reference standards and guidelines include but are not limited to the latest adopted editions from:

1. ABA - Architectural Barriers Act
2. ADA - Americans with Disabilities Act
3. ANSI - American National Standards Institute
4. APWA - American Public Works Association
5. ASCE - American Society of Civil Engineers
6. ASHRAE Guideline 0, the Commissioning Process
7. ASTM - ASTM International
8. CFR - Code of Federal Regulations
9. EPA - Environmental Protection Agency
10. ETL - Electrical Testing Laboratories
11. FCC - Federal Communications Commission
12. FM - FM Global
13. IBC - International Building Code
14. IEC - International Electrotechnical Commission
15. IEEE - Institute of Electrical and Electronics Engineers
16. IES - Illuminating Engineering Society
17. ISO - International Organization for Standardization
18. MSS - Manufacturers Standardization Society
19. NEC - National Electric Code
20. NECA - National Electrical Contractors Association
21. NEMA - National Electrical Manufacturers Association
22. NETA - National Electrical Testing Association
23. NFPA - National Fire Protection Association
24. OSHA - Occupational Safety and Health Administration
25. UL - Underwriters Laboratories Inc.

D. See Division 26, Electrical individual Sections for additional references.

1.04 SUBMITTALS

A. See Division 01, General Requirements for Submittal Procedures as well as individual Division 26, Electrical Sections.

B. Provide drawings in format and software release equal to the design documents. Drawings to be the same sheet size and scale as the Contract Documents.

C. In addition:

1. "No Exception Taken" constitutes that review is for general conformance with the design concept expressed in the Contract Documents for the limited purpose of checking for conformance with information given. Any action is subject to the requirements of the Contract Documents. Contractor is responsible for the dimensions and quantity and will confirm and correlate at the job site, fabrication processes and techniques of construction, coordination of the work with that of all other trades, and the satisfactory performance of the work.

2. Provide product submittals and shop drawings in electronic format only. Electronic format must be submitted via Posted to E-Builder Beaverton School District Site. For electronic format, provide one file per division containing one bookmarked PDF file with each bookmark corresponding to each Specification Section. Arrange bookmarks in ascending order of Specification Section number. Individual submittals sent piecemeal in a per Specification Section method will be returned without review or comment. All transmissions/submissions to be submitted to Architect. Deviations will be returned without review.

   a) Provide separate submittals for lighting control cutsheets, and for lighting control shop drawings.

3. Product Data: Provide manufacturer's descriptive literature for products specified in Division 26, Electrical Sections.

4. Identify/mark each submittal in detail. Note what differences, if any, exist between the submitted item and the specified item. Failure to identify the differences will be considered cause for disapproval. If differences are not identified and/or not discovered during the submittal review process, Contractor remains responsible for providing equipment and materials that meet the specifications and drawings.

   a) Label submittal to match numbering/references as shown in Contract Documents. Highlight and label applicable information to individual equipment or cross out/remove extraneous data not applicable to submitted model. Clearly note options and accessories to be provided, including field installed items. Highlight connections by/to other trades.

   b) Include technical data, installation instructions and dimensioned drawings for products, fixtures, equipment and devices installed, furnished or provided. Reference individual Division 26, Electrical specification Sections for specific items required in product data submittal outside of these requirements.

   c) See Division 26, Electrical individual Sections for additional submittal requirements outside of these requirements.

5. Maximum of two reviews of complete submittal package. Arrange for additional reviews and/or early review of long-lead items; Bear costs of these additional reviews at Engineer's hourly rates. Incomplete submittal packages/submittals will be returned to contractor without review.

6. Resubmission Requirements: Make corrections or changes in submittals as required, and in consideration of Engineer’s comments. Identify Engineer’s comments and provide an individual response to each of the Engineer’s comments. Cloud changes in the submittals and further identify changes which are in response to Engineer’s comments.

7. Structural/Seismic: Provide weights, dimensions, mounting requirements and like information required for mounting, seismic bracing, and support. Indicate manufacturer's installation and support requirements to meet ASCE 7-10

requirements for non-structural components. Provide engineered seismic drawings and equipment seismic certification. Equipment Importance Factor as specified in Division 01 and in Structural documents.

8. Trade Coordination: Include physical characteristics, electrical characteristics, device layout plans, wiring diagrams, and connections as required per Division 26, Electrical Coordination Documents. For equipment with electrical connections, furnish copy of approved submittal for inclusion in Division 26, Electrical submittals. Electric motors are supplied and installed by Division 23 unless otherwise specified. During shop drawing stage of the project, verify correct disconnect sizes, conductor sizes, etc., and bring any discrepancies to the attention of the Mechanical trade. Be responsible for any modifications to electrical equipment or installations as a result of equipment incompatibility discovered after shop drawing review.
9. Make provisions for openings in building for admittance of equipment prior to start of construction or ordering of equipment.
10. Substitutions and Variation from Basis of Design:
    a) The Basis of Design designated product establishes the qualities and characteristics for the evaluation of any comparable products by other listed acceptable manufacturers if included in this Specification or included in an approved Substitution Request as judged by the Design Professional.
    b) If substitutions and/or equivalent equipment/products are being proposed, it is the responsibility of parties concerned, involved in, and furnishing the substitute and/or equivalent equipment to verify and compare the characteristics and requirements of that furnished to that specified and/or shown. If greater capacity and/or more materials and/or more labor is required for the rough-in, circuitry or connections than for the item specified and provided for, then provide compensation for additional charges required for the proper rough-in, circuitry and connections for the equipment being furnished. No additional charges above the Base Bid, including resulting charges for work performed under other Divisions, will be allowed for such revisions. Coordinate with the requirements of "Submittals". For any product marked "or approved equivalent", a substitution request must be submitted to Engineer for approval prior to purchase, delivery or installation.
11. Shop Drawings: Provide coordinated shop drawings which include physical characteristics of all systems, device layout plans, and control wiring diagrams. Reference individual Division 26, Electrical specification Sections for additional requirements for shop drawings outside of these requirements.
    a) Provide Shop Drawings indicating access panel locations, size and elevation for approval prior to installation.
12. Samples: Provide samples when requested by individual Sections.
13. Resubmission Requirements:
    a) Make any corrections or change in submittals when required. Provide submittals as specified. The engineer will not be required to edit and/or interpret the Contractor's submittals. Indicate changes for the resubmittal in a cover letter with reference to page(s) changed and reference response to comment. Cloud changes in the submittals.
    b) Resubmit for review until review indicates no exception taken or "make corrections as noted".
14. Operation and Maintenance Manuals, Owner's Instructions:

a) Submit, at one time, electronic files (PDF format) of manufacturer's operation and maintenance instruction manuals and parts lists for equipment or items requiring servicing. Submit data when work is substantially complete and in same order format as submittals. Include name and location of source parts and service for each piece of equipment.

(1) Include copy of approved submittal data along with submittal review letters received from Engineer. Data to clearly indicate installed equipment model numbers. Delete or cross out data pertaining to other equipment not specific to this project.

(2) Include copy of manufacturer's standard Operations and Maintenance for equipment. At front of each tab, provide routine maintenance documentation for scheduled equipment. Include manufacturer's recommended maintenance schedule and highlight maintenance required to maintain warranty. Furnish list of routine maintenance parts, including part numbers, sizes, quantities, relevant to each piece of equipment.

(3) Include Warranty per Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

(4) Include product certificates of warranties and guarantees.

(5) Include copy of complete parts list for equipment. Include available exploded views of assemblies and sub assemblies.

(6) Include commissioning reports.

(7) Include copy of startup and test reports specific to each piece of equipment.

(8) Engineer will return incomplete documentation without review. Engineer will provide one set of review comments in Submittal Review format. Contractor must arrange for additional reviews; Contractor to bear costs for additional reviews at Engineer's hourly rates.

b) Thoroughly instruct Owner in proper operation of equipment and systems. Where noted in individual Sections, training will include classroom instruction with applicable training aids and systems demonstrations. Field instruction per Section 26 00 00, Electrical Basic Requirements, Demonstration.

c) Copies of certificates of code authority inspections, acceptance, code required acceptance tests, letter of conformance and other special guarantees, certificates of warranties, specified elsewhere or indicated on Drawings.

15. Record Drawings:

a) Maintain at site at least one set of drawings for recording “As-constructed” conditions. Indicate on drawings changes to original documents by referencing revision document, and include buried elements, location of conduit, and location of concealed electrical items. Include items changed by field orders, supplemental instructions, and constructed conditions.

b) Record Drawings are to include equipment and fixture/connection schedules that accurately reflect "as constructed or installed" for project.

c) At completion of project, input changes to original project on Revit Model and make one set of black-line drawings created from Revit Model in version/release equal to contract drawings. Submit Revit disk and drawings upon substantial completion.

d) See Division 26, Electrical individual Sections for additional items to include in record drawings.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Work and materials installed to conform with all local, State and Federal codes, and other applicable laws and regulations. Where code requirements are at variance with Contract Documents, meet code requirements as a minimum requirement and include costs necessary to meet these in Contract. Machinery and equipment are to comply with OSHA requirements, as currently revised and interpreted for equipment manufacturer requirements. Install equipment provided per manufacturer recommendations.

B. Whenever this Specification calls for material, workmanship, arrangement or construction of higher quality and/or capacity than that required by governing codes, higher quality and/or capacity take precedence.

C. Drawings are intended to be diagrammatic and reflect the Basis of Design manufacturer's equipment. They are not intended to show every item in its exact dimensions, or details of equipment or proposed systems layout. Verify actual dimensions of systems (i.e. distribution equipment, duct banks, light fixtures, etc.) and equipment proposed to assure that systems and equipment will fit in available space. Contractor is responsible for design and construction costs incurred for equipment other than Basis of Design, including, but not limited to, architectural, structural, electrical, HVAC, fire sprinkler, and plumbing systems.

D. Manufacturer's Instructions: Follow manufacturer's written instructions. If in conflict with Contract Documents, obtain clarification. Notify Engineer/Architect, in writing, before starting work.

E. Items shown on Drawings are not necessarily included in Specifications or vice versa. Confirm requirements in all Contract Documents.

F. Provide products that are UL listed.

1.06 WARRANTY

A. Provide written warranty covering the work for a period of one year from date of Substantial Completion in accordance with Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

B. Sections under this Division can require additional and/or extended warranties that apply beyond basic warranty under Division 01, General Requirements and the General Conditions. Confirm requirements in all Contract Documents.

1.07 COORDINATION DOCUMENTS

A. Prior to construction, coordinate installation and location of HVAC equipment, ductwork, grilles, diffusers, piping, plumbing equipment/fixtures, fire sprinklers, plumbing, lights, cable tray and electrical services with architectural and structural requirements, and other trades (including ceiling suspension and tile systems), and provide maintenance access requirements. Coordinate with submitted architectural systems (i.e. roofing, ceiling, finishes) and structural systems as submitted, including footings and foundation. Identify zone of influence from footings and ensure systems are not routed within the zone of influence.

B. Advise Architect in event a conflict occurs in location or connection of equipment. Bear costs resulting from failure to properly coordinate installation or failure to advise Architect of conflict.

C. Verify in field exact size, location, and clearances regarding existing material, equipment and apparatus, and advise Architect of discrepancies between that indicated on Drawings and that existing in field prior to installation related thereto.

D. Submit final Coordination Drawings with changes as Record Drawings at completion of project.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Articles, fixtures, and equipment of a kind to be standard product of one manufacturer.

2.02 STANDARDS OF MATERIALS AND WORKMANSHIP

A. Base contract upon furnishing materials as specified. Materials, equipment, and fixtures used for construction are to be new, latest products as listed in manufacturer's printed catalog data and are to be UL or ETL approved or have adequate approval or be acceptable by state, county, and city authorities. Equipment/fixture supplier is responsible for obtaining State, County, and City acceptance on equipment/fixtures that are not UL or ETL approved or are not listed for installation.

B. Names and manufacturer's names denote character and quality of equipment desired and are not to be construed as limiting competition.

PART 3 - EXECUTION

3.01 ACCESSIBILITY AND INSTALLATION

A. Confirm Accessibility and Installation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

B. Install equipment requiring access (i.e., junction boxes, light fixtures, power supplies, motors, etc.) so that they may be serviced, reset, replaced or recalibrated by service people with normal service tools and equipment. Do not install equipment in passageways, doorways, scuttles or crawlspaces which would impede or block the intended usage.

C. Install equipment and products complete as directed by manufacturer's installation instructions. Obtain installation instructions from manufacturer prior to rough-in of equipment and examine instructions thoroughly. When requirements of installation instructions conflict with Contract Documents, request clarification from Architect prior to proceeding with installation. This includes proper installation methods, sequencing, and coordination with other trades and disciplines.

D. Firestopping:

1. Confirm requirements in Division 07, Thermal and Moisture Protection. In the absence of specific requirements, comply with individual Division 26, Electrical Sections and the following:

   a) Coordinate location and protection level of fire and/or smoke rated walls, ceilings, and floors. When these assemblies are penetrated, seal around piping and equipment with approved firestopping material. Install firestopping material complete as directed by manufacturer's installation instructions. Meet requirements of ASTM E814, Standard Test Method for Fire Tests of Through-Penetration Fire Stops.

E. Plenums:

1. In plenums, provide plenum rated materials that meet the requirements to be installed in plenums. Immediately notify Architect/Engineer of discrepancy.

F. Start up equipment, in accordance with manufacturer's start-up instructions, and in presence of manufacturer's representative. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.

G. Provide miscellaneous supports/metals required for installation of equipment and conduit.

3.02 REVIEW AND OBSERVATION

A. Confirm Review and Observation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

B. Notify Architect, in writing, at following stages of construction so that they may, at their option, visit site for review and construction observation:

1. Underground conduit installation prior to backfilling.
2. Prior to covering walls.
3. Prior to ceiling cover/installation.
4. When main systems, or portions of, are being tested and ready for inspection by AHJ.

C. Final Punch:

1. Prior to requesting a final punch visit from the Engineer, request from Engineer the Electrical Precloseout Checklist, complete the checklist confirming completion of systems' installation, and return to Engineer. Request a final punch visit from the Engineer, upon Engineer's acceptance that the electrical systems are ready for final punch.
2. Costs incurred by additional trips required due to incomplete systems will be the responsibility of the Contractor.

3.03 CONTINUITY OF SERVICE

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In the absence of specific requirements in Division 01, General Requirements, comply with individual Division 26, Electrical Sections and the following:

1. During remodeling or addition to existing structure, while existing structure is occupied, present services to remain intact until new construction, facilities or equipment is installed.
2. Prior to changing over to new service, verify that every item is thoroughly prepared. Install new wiring, and wiring to point of connection.
3. Coordinate transfer time to new service with Owner. If required, perform transfer during off-peak hours. Once changeover is started, pursue to its completion to keep interference to a minimum.
    a) If overtime is necessary, there will be no allowance made by Owner for extra expense for such overtime or shift work.
4. No interruption of services to any part of existing facilities will be permitted without express permission in each instance from Owner. Requests for outages must state specific dates, hours and maximum durations, with outages kept to these specific dates, hours and maximum durations. Obtain written permission from Owner for any interruption of power, lighting or signal circuits and systems.
    a) Organize work to minimize duration of power interruption.
    b) Coordinate utility service outages with utility company.

3.04 CUTTING AND PATCHING

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In the absence of specific requirements in Division

01, General Requirements, comply with individual Division 26, Electrical Sections and the following:

1. Proposed floor cutting/core drilling/sleeve locations to be approved by Project Structural Engineer. Submit proposed locations to Architect/Project Structural Engineer. Where slabs are of post tension construction, perform x-ray scan of proposed penetration locations and submit scan results including proposed penetration locations to Project Structural Engineer/Architect for approval. Where slabs are of waffle type construction, show column cap extent and cell locations relative to proposed penetration(s).
2. Cutting, patching and repairing for work specified in this Division including plastering, masonry work, concrete work, carpentry work, and painting included under this Section will be performed by skilled craftsmen of each respective trade in conformance with appropriate Division of Work.
3. Additional openings required in building construction to be made by drilling or cutting. Use of jack hammer is specifically prohibited. Patch openings in and through concrete and masonry with grout.
4. Restore new or existing work that is cut and/or damaged to original condition. Patch and repair specifically where existing items have been removed. This includes repairing and painting walls, ceilings, etc. where existing conduit and devices are removed as part of this project. Where alterations disturb lawns, paving, and/or walks, surfaces to be repaired, refinished and left in condition matching existing prior to commencement of work.
5. Additional work required by lack of proper coordination will be provided at no additional cost to the Owner.

3.05 EQUIPMENT SELECTION AND SERVICEABILITY

A. Replace or reposition equipment which is too large or located incorrectly to permit servicing, at no additional cost to Owner.

3.06 DELIVERY, STORAGE AND HANDLING

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In the absence of specific requirements, comply with individual Division 26, Electrical Sections and the following:

1. Handle materials delivered to project site with care to avoid damage. Store materials on site inside building or protected from weather, dirt and construction dust. Products and/or materials that become damaged due to water, dirt, and/or dust as a result of improper storage and handling to be replaced before installation.
2. Protect equipment to avoid damage. Close conduit openings with caps or plugs. Keep motors and bearings in watertight and dustproof covers during entire course of installation.
3. Protect bus duct and similar items until in service.

3.07 DEMONSTRATION

A. Confirm Demonstration requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, and individual Division 26, Electrical Sections.

B. Upon completion of work and adjustment of equipment, test systems and demonstrate to Owner's Authorized Representative, Architect, and Engineer that equipment furnished and installed or connected under provisions of these Specifications functions in manner required. Provide field instruction to Owner's Maintenance Staff as specified in Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

C. Manufacturer's Field Services: Furnish services of a qualified person at time approved by Owner, to instruct maintenance personnel, correct defects or deficiencies, and demonstrate to satisfaction of Owner that entire system is operating in satisfactory manner and complies with requirements of other trades that may be required to complete work. Complete instruction and demonstration prior to final job site observations.

3.08 CLEANING

A. Confirm Cleaning requirements in Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

B. Upon completion of installation, thoroughly clean electrical equipment, removing dirt, debris, dust, temporary labels and traces of foreign substances. Throughout work, remove construction debris and surplus materials accumulated during work.

3.09 INSTALLATION

A. Confirm Installation requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

B. Install equipment and fixtures in accordance with manufacturer's installation instructions, plumb and level and firmly anchored to vibration isolators. Maintain manufacturer's recommended clearances.

C. Start up equipment, in accordance with manufacturer's start-up instructions, and in presence of manufacturer's representative. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.

D. Provide miscellaneous supports/metals required for installation of equipment.

3.10 PAINTING

A. Confirm requirements in Division 01, General Requirements and Division 09, Finishes. In the absence of specific requirements, comply with individual Division 26, Electrical Sections and the following:

1. Ferrous Metal: After completion of work, thoroughly clean and paint exposed supports constructed of ferrous metal surfaces (i.e., hangers, hanger rods, equipment stands, etc.) with one coat of black asphalt varnish for exterior or black enamel for interior, suitable for hot surfaces.
2. In Electrical Room, on roof or other exposed areas, equipment not painted with enamel to receive two coats of primer and one coat of rustproof enamel, colors as selected by Architect.
3. See individual equipment Specifications for other painting.
4. Structural Steel: Repair damage to structural steel finishes or finishes of other materials damaged by cutting, welding or patching to match original.
5. Conduit: Clean, primer coat and paint interior/exterior conduit exposed in public areas with two coats paint suitable for metallic surfaces. Color selected by Architect.
6. Covers: Covers such as manholes, vaults and the like will be furnished with finishes which resist corrosion and rust.

3.11 DEMOLITION

A. Confirm requirements in Division 01, General Requirements and Division 02, Existing Conditions. In the absence of specific requirements, comply with individual Division 26, Electrical Sections and the following:

1. It is the intent of these documents to provide necessary information and adjustments to electrical system required to meet code, and accommodate installation of new work.
2. Coordinate with Owner so that work can be scheduled not to interrupt operations, normal activities, building access or access to different areas. Owner will

cooperate to best of their ability to assist in coordinated schedule, but will remain final authority as to time of work permitted.

3. Examination:
   a) Determine exact location of existing utilities and equipment before commencing work, compensate Owner for damages caused by failure to locate and preserve utilities. Replace damaged items with new material to match existing.
   b) Verify that abandoned wiring and equipment serve only abandoned facilities.
   c) Demolition drawings are based on casual field observation and existing record documents.
      (1) Verify accuracy of information shown prior to bidding and provide such labor and material as is necessary to accomplish work.
      (2) Verify location and number of electrical outlets, luminaires, panels, etc. in field.
   d) Report discrepancies to Architect before disturbing existing installation.
      (1) Promptly notify Owner if utilities are found which are not shown on Drawings.
4. Execution:
   a) Remove existing luminaires, switches, receptacles, and other electrical equipment and devices and associated wiring from walls, ceilings, floors, and other surfaces scheduled for remodeling, relocation, or demolition unless shown as retained or relocated on Drawings.
   b) Provide temporary wiring and connections to maintain electrical continuity of existing systems during construction. Remove or relocate electrical boxes, conduit, wiring, equipment, and luminaires, as encountered in removed or remodeled areas in existing construction affected by this work.
   c) Remove and restore wiring which serves usable existing outlets clear of construction or demolition.
   d) 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, provide new conduit and wire to bypass inaccessible junction boxes and abandoned outlets.
   e) If existing conduits pass through partitions or ceiling which are being removed or remodeled, provide new conduit and wire to reroute clear of construction or demolition and maintain service to existing load.
   f) Extend circuiting and devices in existing walls to be furred out.
   g) Remove abandoned wiring to source of supply.
   h) Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
   i) Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
   j) Disconnect and remove abandoned panelboards and distribution equipment.
   k) Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

l) Existing lighting which is to remain, leave luminaires in proper working order.

m) Repair adjacent construction and finishes damaged during demolition work.

n) Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

3.12 ACCEPTANCE

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In the absence of specific requirements, comply with individual Division 26, Electrical Sections and the following:

1. System cannot be considered for acceptance until work is completed and demonstrated to Architect that installation is in strict compliance with Specifications, Drawings and manufacturer's installation instructions, particularly in reference to following:

a) Cleaning

b) Operation and Maintenance Manuals

c) Training of Operating Personnel

d) Record Drawings

e) Warranty and Guaranty Certificates

f) Start-up/Test Document and Commissioning Reports

3.13 FIELD QUALITY CONTROL

A. Confirm Field Quality Control requirements in Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

B. Tests:

1. Conduct tests of equipment and systems to demonstrate compliance with requirements specified. Reference individual Specification Sections for required tests. Document tests and include in operation and maintenance manuals.

2. During site evaluations by Architect or Engineer, provide appropriate personnel with tools to remove and replace trims, covers, and devices so that proper evaluation of installation can be performed.

3.14 LETTER OF CONFORMANCE

A. Provide Letter of Conformance, copies of manufacturers' warranties and extended warranties with a statement that Electrical items were installed in accordance with manufacturer's recommendations, UL listings and FM Global approvals. Include Letter of Conformance, copies of manufacturers' warranties and extended warranties in Operation and Maintenance Manuals.

END OF SECTION

SECTION 26 05 09

EQUIPMENT WIRING

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

1. Equipment connections, whether furnished by Owner or other Divisions of the Contract.

1.02 RELATED SECTIONS

A. Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

B. In addition:

1. Verify mechanical and utilization equipment electrical characteristics with Drawings and equipment submittals prior to ordering equipment. Submit confirmation of this verification as a part of, or addendum to, the electrical product submittals.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements apply to this Section.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials and Equipment for Equipment Wiring: As specified in individual Sections.

2.02 GENERAL

A. Unless otherwise noted, the following voltage and phase characteristics apply to motors:

1. 3/4 HP and Under: 120 volt, 1 phase.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to submittal of product data for electrical distribution equipment, obtain and examine product data and shop drawings for equipment furnished by the Owner and by other trades on the project. Update the schedule of equipment electrical connections accordingly, noting proper ratings for overcurrent devices, fuses, safety disconnect switches, conduit and wiring, and the like. As a minimum, this requirement applies to equipment furnished by Owner and equipment furnished under the following divisions of work under this contract:

1. Division 8, Openings
2. Division 11, Equipment
3. Division 22, Plumbing

3.02 INSTALLATION

A. Do not install unrelated electrical equipment or wiring on mechanical equipment without prior approval of Engineer.

B. Provide moisture tight equipment wiring and switches in ducts or plenums used for environmental air.

C. Connect motor and appliance/utilization equipment complete from panel to motor/equipment as required by code.

D. Install motor starters and controllers for equipment furnished by others.

E. Appliance/Utilization Equipment:

1. Provide appropriate cable and cord cap for final connection unless equipment is provided with same. Provide receptacle configured to receive cord cap.
2. Verify special purpose outlet NEMA configuration and ampere rating with equipment supplier prior to ordering wiring devices and coverplates.

F. Freezer and Cooler Box Connections:

1. Obtain supplier's shop drawings prior to rough-in and provide complete connections per supplier's shop drawings.
2. Provide connections to electric defrost elements, door heaters, vent heaters, door switches, lights, condensate drain heaters, blower fans, and the like.
3. Provide control wiring as required by control systems, and install per manufacturer's instructions.

3.03 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Division 01, General Requirements.

3.04 SYSTEMS STARTUP

A. Provide field representative to prepare and start equipment.

1. Test and correct for proper rotation of polyphase motors.

B. Adjust for proper operation within manufacturer's published tolerances.

C. Demonstrate proper operation of equipment to Owner's Authorized Representative.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

1. Lugs and Pads
2. Wires and Cables
3. Connectors

1.02 RELATED SECTIONS

A. Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

B. In addition, provide:

1. Cable insulation test reports in project closeout documentation.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Lugs and Pads:

1. Anderson
2. Ilsco
3. Panduit
4. Thomas & Betts
5. 3M
6. Or approved equivalent.

B. Wires and Cables:

1. General:
   a) General Cable
   b) Okonite
   c) Southwire
   d) Encore Wire
   e) Or approved equivalent.

C. Connectors:

1. Anderson Power Products
2. Burndy
3. Ilsco
4. 3M
5. Thomas & Betts
6. Or approved equivalent.

2.02 LUGS AND PADS

A. Ampacity: Cross-sectional area of pad for multiple conductor terminations to match ampere rating of panelboard bus or equipment line terminals.

B. Copper Pads: Drilled and tapped for multiple conductor terminals.

C. Lugs: Compression type for use with stranded branch circuit or control conductors; mechanical lugs for use with solid branch and feeder circuit conductors.

2.03 WIRES AND CABLES

A. Building Wires:

1. Copper: Soft-drawn with conductivity of not less than 98 percent IACS at 20 degrees C (68 degrees F). 600 volt rated throughout. Conductors 12 AWG and 10 AWG, solid. Conductors 8 AWG and larger, stranded. 12 AWG minimum conductor size. Minimum insulation rating of 90 degrees C. Insulation Type: THHN/THWN-2.

B. Phase color to be consistent at feeder terminations; A-B-C, top to bottom, left to right, front to back.

C. Color Code Conductors as Follows:

PHASE	208 VOLT WYE
A	Black
B	Red
C	Blue
Neutral	White
Ground	Green
Isolated Ground	Green w/yellow trace

D. MC Cable: Not allowed.

E. AC Cable (Armored Cable): Not allowed.

F. NMB Cable: Not allowed.

2.04 CONNECTORS

A. Split bolt connectors not allowed.

B. Conductor Branch Circuits: Wire nuts with integral spring connectors for conductors 12 AWG through 8 AWG. Push-in type connectors where conductors are not required to be twisted together are not acceptable.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Install per manufacturer instructions and OESC.

B. Field Quality Control:

1. Test conductor insulation on feeders of 100 amp and greater for conformity with 1000 volt megohmmeter. Use Insulated Cable Engineers Association testing

procedures. Minimum insulation resistance acceptable is 1 megohm for systems 600 volts and below. Notify Architect if insulation resistance is less than 1 megohm.

2. Test Report: Prepare a typed tabular report indicating the testing instrument, the feeder tested, amperage rating of the feeder, insulation type, voltage, the approximate length of the feeder, conduit type, and the measured resistance of the megohmmeter test. Submit test reports with project closeout documents.
3. Inspect and test in accordance with NETA Standard ATS, except Section 4.
4. Perform inspections and tests listed in NETA Standard ATS, Section 7.3.2.

3.02 LUGS AND PADS

A. Thoroughly clean surfaces to remove all dirt, oil, great or paint.

B. Use torque wrench to tighten per manufacturer's directions.

3.03 WIRES AND CABLES

A. General:

1. Do not install or handle thermoplastic insulated wire and cable in temperatures below -10 degrees C (14 degrees F). Do not handle thermoset insulated wire and cable in temperatures below -40 degrees C (-40 degrees F). All wire and cable must be acclimated to temperatures above freezing for no less than 24 hours prior to installation.
2. Install conductors in raceways having adequate, code size cross-sectional area for wires indicated.
3. Install conductors with care to avoid damage to insulation.
4. Do not apply greater tension on conductors than recommended by manufacturer during installation.
5. Use of pulling compounds is permitted. Clean residue from exposed conductors and raceway entrances after conductor installation. Do not use pulling compounds for installation of conductors connected to GFCI circuit breakers or GFCI receptacles.
6. Conductor Size and Quantity:
   a) Install no conductors smaller than 12 AWG unless otherwise shown.
   b) Provide required conductors for a fully operable system.
   c) Power Circuits: No. 12 AWG minimum, except as follows:
      (1) No. 10 AWG for 15A, 120V circuits longer than 100 ft.
      (2) No. 8 AWG for 15A, 120V circuits longer than 150 ft.
      (3) No. 10 AWG for 20A, 120V circuits longer than 70 ft.
      (4) No. 8 AWG for 20A, 120V circuits longer than 100 ft.
   d) When exact run lengths are determined for all branch circuits, and prior to installation of the conductors, ensure that the maximum voltage drop, based on 80 percent of the circuit protective device, does not exceed 3 percent. Increase wire size from #12AWG, if necessary, to ensure that the 3 percent voltage drop is not exceeded.
7. Provide dedicated neutrals (one neutral conductor for each phase conductor) in all 120V circuits.

B. Conductors in Cabinets:

1. Cable and tree wires in panels and cabinets for power and control. Use plastic ties in panels and cabinets.
2. Tie and bundle feeder conductors in wireways of panelboards.

3. Hold conductors away from sharp metal edges.

C. Homeruns:

1. Do not change intent of branch circuit homeruns without approval. Homeruns for 20A branch circuits may be combined to a maximum of six current carrying conductors including neutral conductors in homeruns. Apply derating factors as required per NEC. Increase conductor size as needed.

2. MC cable homeruns are not allowed unless indicated on drawings.

D. Exposed cable is not allowed.

E. All cable must be run parallel or perpendicular to building lines and hidden from view when possible. Where installed in tray each power cable is to be identified with Lamacoid nametag engraved with identification of equipment being fed. Tag to be fastened to cable using tie-wraps. Provide nametag at each floor level.

F. Do not install PVC jacketed cables in return air plenums, unless they are specially rated plenum cables.

3.04 CONNECTORS

A. Install to assure a solid and safe connection.

B. Select hand twist connectors for wire size and install tightly on conductors.

C. Install compression connectors using methods and tools recommended by the manufacturer.

D. Do not install stranded conductors under screw terminals unless compression lugs are installed.

E. Do not connect wiring without UL listed connectors that are listed for the purposes.

END OF SECTION

SECTION 26 05 33

RACEWAYS

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

1. Electrical Metallic Tubing (EMT)
2. Liquidtight Flexible Metal Conduit (LFMC)
3. Conduit Fittings

B. Provide a complete system of conduit and fittings, with associated couplings, connectors, and fittings, as shown on drawings and described in these specifications.

1.02 RELATED SECTIONS

A. Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

B. In addition, reference the following:

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.07 DEFINITIONS

A. Raceway system is defined as consisting of conduit, tubing, duct, and fittings including but not limited to connectors, couplings, offsets, elbows, bushings, expansion/deflection fittings, and other components and accessories. Complete electrical raceway installation before starting the installation of conductors and cables.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Electrical Metallic Tubing (EMT):

1. Allied Tube & Conduit
2. Beck Manufacturing WL
3. Picoma
4. Wheatland Tube Company
5. Or approved equivalent.

B. Liquidtight Flexible Metal Conduit (LFMC):

1. AFC Cable Systems Inc.
2. Electri-Flex Company

3. International Metal Hose
4. Or approved equivalent.

C. Conduit Fittings:

1. Bushings:
   a) Insulated Type for Threaded Raceway Without Factory Installed Plastic Throat Conductor Protection:
      (1) Thomas & Betts 1222 Series
      (2) O-Z Gedney B Series
      (3) Or approved Equivalent.
2. Raceway Connectors and Couplings:
   a) Thomas & Betts Series
   b) O-Z Gedney Series
   c) Or approved Equivalent.
3. Expansion/Deflection Fittings:
   a) EMT: O-Z Gedney Type TX
   b) RMC: O-Z Gedney Type AX, DX and AXDX, Crouse & Hinds XD
   c) PVC: O-Z Gedney Type DX with PVC adapters, Carlon E945 Series, Kraloy OPEJ Series
   d) Or approved equivalent.

2.02 ELECTRICAL METALLIC TUBING (EMT)

A. Description: UL 797, ANSI C80.3; steel galvanized tubing.

B. Fittings: NEMA FB 1; steel, compression type.

2.03 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Description: UL 360, inner core made from spiral wound strip of heavy gauge, hot dipped galvanized low carbon steel. 3/4-inch through 1-1/4-inch trade sizes to have a square lock core and contain an integral bonding strip of copper. 1-1/2-inch and larger to have fully interlocked core. Jacket material to be moisture, oil and sunlight resistant flexible PVC.

B. Fittings: NEMA FB 2.20.

2.04 CONDUIT FITTINGS

A. Bushings:

1. Insulated type for threaded raceway connectors without factory-installed plastic throat conductor protection.
2. Insulated grounding type for threaded raceway connectors.

B. Raceway Connectors and Couplings:

1. Steel connectors, couplings, and conduit bodies, hot-dip galvanized.
2. Connector locknuts to be steel, with threads meeting ASTM tolerances. Locknuts to be hot-dip galvanized.
3. Connector throats (EMT, flexible conduit, metal clad cable and cordset connectors) to have factory installed plastic inserts permanently installed. For normal cable or conductor exiting angles from raceway, the cable jacket or conductor insulation to bear only on plastic throat insert.
4. Steel gland, Tomic or Breagle connectors and couplings are recognized for this Contract as having acceptable raceway to fitting electrical conductance.
5. Set screw connectors and couplings, without integral compression glands, are recognized for this Contract as not having acceptable raceway to fitting electrical

conductance. A ground conductor sized per this Specification must be included and bonded within raceway assembly utilizing this type connector or coupling.

C. Provide expansion/deflection fittings for EMT.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Finished Surfaces: Schedule raceway installation to avoid conflict with installed wall and ceiling surfaces. If unavoidable, coordinate work and repairs with Architect.

B. Conduit Size:

1. Minimum Size: 3/4-inch for power and control, unless otherwise noted. 3/4-inch for communication/data, unless otherwise noted. 3/4-inch for signal systems, unless otherwise noted.

C. Provide two pull strings/tapes in empty conduits. Types:

1. Branch Circuits and Low Voltage: Greenlee Poly Line 431 or approved.
2. If fish tape is used for pulling line or low voltage wiring, fiberglass type to be used. Metal fish tapes will not be allowed.
3. Secure pull string/tape at each end.
4. Provide caps on ends of empty conduit to be used in future.
5. Label both ends of empty conduits with location of opposite end.

D. Verify that field measurements are as shown on drawings.

E. Plan locations of conduit runs in advance of the installation and coordinate with ductwork, plumbing, ceiling and wall construction in the same areas.

F. Locate penetrations and holes in advance where they are proposed in the structural sections such as footings, beams, and walls. Penetrations are acceptable only when the following occurs:

1. Where shown on the structural drawings.
2. As approved by the Structural Engineer prior to construction, and after submittal of drawing showing location, size, and position of each penetration.

G. Verify routing and termination locations of conduit prior to rough-in.

H. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

I. Install raceways securely, in neat and workmanlike manner, as specified in NECA 1, Standard Practices for Good Workmanship in Electrical Construction.

J. Install steel conduit as specified in NECA 101, Standard for Installing Steel Conduits.

K. Install nonmetallic conduit in accordance with manufacturer's instructions.

L. Inserts, anchors and sleeves.

1. Coordinate location of inserts and anchor bolts for electrical systems prior to concrete pour.
2. Coordinate location of sleeves with consideration for other building systems prior to concrete pour.

M. Conduit Supports:

1. Arrange supports to prevent misalignment during wiring installation.
2. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
3. Group related conduits; support using conduit rack. Construct rack using steel channel. Provide space on each for conduits.

4. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
5. Do not attach conduit to ceiling support wires.

N. Flexible steel conduit length not-to-exceed 6-feet, 3-feet in concealed walls. Provide sufficient slack to reduce the effect of vibration.

O. Install conduit seals at boundaries where ambient temperatures differ by 10 degrees F or more as shown on the drawings. Install seals on warm side of partition.

P. Seal raceways stubbing up into electrical equipment. Plug raceways with conductors with duct-seal. Cap spare raceways and plug PVC raceway products with plastic plugs as made by Underground Products, or equal, shaped to fit snugly into the stubup.

Q. Seal raceways penetrating an exterior building wall to prevent moisture and vermin from entering into the electrical equipment.

R. Use suitable caps on spare and empty conduits to protect installed conduit against entrance of dirt and moisture.

S. Arrange conduit to maintain headroom and present neat appearance.

T. Do not install conduits on surface of building exterior, along vapor barrier, across roof, on top of parapet walls, or across floors, unless otherwise noted on drawings.

U. Exposed conduits are permitted only in following areas:

1. Mechanical rooms, electrical rooms or spaces where walls, ceilings and floors will not be covered with finished material.
2. Existing walls that are concrete or block construction.
3. Where specifically noted on Drawings.
4. Route exposed conduit parallel and perpendicular to walls, tight to finished surfaces and neatly offset into boxes.

V. Do not install conduits or other electrical equipment in obvious passages, doorways, scuttles or crawl spaces which would impede or block area passage's intended usage.

W. Install continuous conduit and raceways for electrical power wiring.

X. Route conduit installed above accessible ceilings parallel and perpendicular to walls.

Y. Maintain adequate clearance between conduit and piping.

Z. Keep conduits a minimum of 12-inches away from steam or hot water radiant heating lines (at or above 104 degrees F) or 3-inches away from waste or water lines.

AA. Cut conduit square using saw or pipecutter; deburr cut ends.

AB. Bring conduit to shoulder of fittings; fasten securely.

AC. Use conduit hubs to fasten conduit to cast boxes in damp and wet locations.

AD. Install no more than the equivalent of three 90 degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams.

AE. Use hydraulic one shot bender to fabricate elbows for bends in metal conduit larger than 2-inch size.

AF. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

AG. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 07, Thermal and Moisture Protection.

AH. Route conduit through roof openings for piping and ductwork wherever possible. Where separate roofing penetration is required, coordinate location and installation method with roofing installation and installer.

3.02 ELECTRICAL METALLIC TUBING (EMT) INSTALLATION

A. Dry Locations:

1. Concealed: EMT.
2. Exposed: EMT.

B. Dry, Protected: EMT.

3.03 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC) INSTALLATION

A. Use PVC coated liquidtight flexible metallic conduit for motors and equipment connections subject to movement or vibration and subjected to any of following conditions: Exterior location, moist or humid atmosphere, corrosive environments, water spray, oil, or grease.

B. Install 12-inch minimum slack loop on liquidtight flexible metallic conduit.

3.04 CONDUIT FITTINGS INSTALLATION

A. Conduit Joints: Assemble conduits continuous and secure to boxes, panels, luminaires and equipment with fittings to maintain continuity. Provide watertight joints where embedded in concrete, below grade or in damp locations. Seal metal conduit with metal thread primer. Rigid conduit connections to be threaded, clean and tight (metal to metal).

B. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

C. Use set screw type fittings only in dry locations. When set screw fittings are utilized provide insulated continuous equipment ground conductor in conduit, from overcurrent protection device to outlet.

D. Use compression fittings in dry locations, damp and rain-exposed locations. Maximum size permitted in damp locations and locations exposed to rain is 2-inches in diameter.

E. Use threaded type fittings in wet locations, and damp or rain-exposed locations where conduit size is greater than 2-inches.

F. Use PVC coated, threaded type fittings in corrosive environments.

G. Use insulated type bushings with ground provision at switchboards, panelboards, safety disconnect switches, junction boxes that have feeders 60 amperes and greater.

H. Condulets and Conduit Bodies:

1. Do not use condulets and conduit bodies.

I. Sleeves and Chases - Floor, Ceiling and Wall Penetrations: Provide necessary rigid conduit sleeves, openings and chases where conduits or cables are required to pass through floors, ceilings or walls.

J. Expansion Joints:

1. Provide conduits crossing expansion joints where cast in concrete with expansion-deflection fittings, installed per manufacturer's recommendations.
2. Secure conduits 3-inches and larger to building structure on opposite sides of a building expansion joint with an expansion-deflection fitting across joint installed per manufacturer's recommendations.
3. Provide conduits less than 3-inches where not cast in concrete with junction boxes securely fastened on both sides of expansion joint, connected together with 15-inches of slack (minimum of 15-inches longer than straight line length) flexible conduit and copper green ground bonding jumper. In lieu of this flexible conduit, an expansion-deflection fitting, as indicated for conduits 3-inch and larger may be installed.
4. Verify expansion/deflection requirements with Structural Engineer prior to installation.

K. Seismic Joints:

1. No conduits cast in concrete allowed to cross seismic joint.

2. Provide conduits with junction boxes securely fastened on both sides of seismic joint, connected together with 15-inches of slack (minimum of 15-inches longer than straight line length) flexible conduit and copper green ground bonding jumper. Prior to installation, verify with Architect that 15-inches is adequate for designed movement, and if not, increase this length as required.
3. Provide conduits less than 3-inches where not cast in concrete with junction boxes securely fastened on both sides of expansion joint, connected together with 15-inches of slack (minimum of 15-inches longer than straight line length) flexible conduit and copper green ground bonding jumper. In lieu of this flexible conduit, an expansion-deflection fitting, as indicated for conduits 3-inch and larger may be installed.

L. Provide rigid conduit coupling flush with surface of slab or wall for conduit stubbed in concrete slab or wall to serve electrical equipment or an outlet under table or to supply shop tool, etc. Provide plug where conduit is to be used in future.

END OF SECTION

SECTION 26 05 34

BOXES

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

1. Pull and Junction Boxes

B. Provide electrical boxes and fittings for a complete installation. Include but not limited to outlet boxes, junction boxes, pull boxes, bushings, locknuts and other necessary components.

1.02 RELATED SECTIONS

A. Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

B. In addition, reference the following:

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Pull and Junction Boxes:

1. Eaton/Crouse-Hinds
2. Hoffman
3. Or approved equivalent.

2.02 PULL AND JUNCTION BOXES

A. Construction: Provide ANSI 49 gray enamel painted sheet steel junction and pull boxes, with screw-on covers; of type shape and size, to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.

B. Location:

1. Provide junction boxes above accessible ceilings for drops into walls for receptacle outlets from overhead.
2. Provide junction boxes and pull boxes to facilitate installation of conductors and limiting accumulated angular sum of bends between boxes, cabinets and appliances to 270 degrees.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Coordinate locations of floor boxes and wall mounted wiring device boxes with architectural and structural floor plans prior to rough-in.

B. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1, Standard Practice of Good Workmanship in Electrical Construction.

C. Secure boxes rigidly to substrate upon which they are being mounted.

D. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NEC. Locate boxes and conduit bodies so as to ensure accessibility of electrical wiring.

E. Set wall mounted boxes at elevations to accommodate mounting heights shown on Architectural Elevations.

F. Electrical boxes are shown on drawings in approximate locations unless dimensioned.

1. Adjust box locations up to 10-feet if required to accommodate intended purpose.

G. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 07, Thermal and Moisture Protection.

H. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

I. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

J. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12-inches of box.

K. Adjust boxes to be parallel with building lines. Boxes not plumb to building lines are not acceptable.

L. Install knockout closures in unused box openings.

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

N. Clean exposed surfaces and restore finish.

3.02 PULL AND JUNCTION BOXES INSTALLATION

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

B. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6-inches from ceiling access panel or from removable recessed luminaire.

C. Do not fasten boxes to ceiling support wires.

D. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

END OF SECTION