# **PROJECT MANUAL**

for

**BEAVERTON SCHOOL DISTRICT TERRA LINDA ELEMENTARY SCHOOL REPIPE & RESTROOM REMODEL** 1998 NW 143<sup>RD</sup> AVENUE PORTLAND, OREGON 97229 JOB NO. 19036.00.L

Date: January 6, 2020 Bid Set



# ARCHITECTS

BBL Architects 200 North State Street Lake Oswego, Oregon 97034 (503) 635-4425

## MECHANICAL-ELECTRICAL ENGINEERS

System Design Consultants 333 SE 2<sup>nd</sup> Avenue, Suite 100 Portland, Oregon 97214 (503) 248-0227

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NOTE: Division and Section numbers listed in the Table of Contents and items of work included in each Section conform in general to CSI's MasterFormat, 2010 Upgrade Edition. Section numbers listed are merely for identification and may not be consecutive. Users of this Project Manual shall check the specification with the Table of Contents to be sure each Section is included and shall check each Section to be sure each consecutively numbered pages within each Section is included. The last page of each Section has the statement "END OF SECTION".

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NOTE: Users of this Project Manual shall check the Construction Documents with the List of Drawings to be sure each sheet is included.

# LIST OF DRAWINGS

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### PART 1 - GENERAL

### 1.1 CONDITIONS AND REQUIREMENTS

A. The Bidding Requirements, provided under Division 0, and the Sections contained in Division 1 – GENERAL REQUIREMENTS of these Specifications apply to the Work specified in this Section.

### 1.2 SECTION INCLUDES

- A. Sections contained in Division 0 and Division 1 of the Specifications apply to the Work specified in this Section and in each Section of the Specifications. The Contractor shall instruct each of his Subcontractors to become fully familiar and comply with all requirements of these documents.
- B. The project and the Work of the Contract can be described in summary as follows:

Remove existing domestic water piping and replace with new domestic water piping. Remove and replace finishes as required. Remodel two restrooms-all new finishes and equipment.

- C. The Contractor shall coordinate work with other Contracts including:
  - 1. Abatement of hazardous materials will be performed by an environmental contractor hired by the Owner.

### D. General:

- 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 the District.
- 2. Contractor shall schedule demolition and remodel to accommodate Owner's continued use of existing mechanical, plumbing and electrical 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 all services required. Protect and maintain existing utilities, active electrical conductors, sewers, pipes, and other active lines on school property or in street excavations.
- 5. 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, local regulations and governing codes. Utilities, pipes, sewers, electrical conductors and the like to be abandoned shall be capped in accordance with instruction of governing authority or as directed.
- E. Protections:
  - 1. Protect sidewalks, asphalt paving, concrete, shrubs 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 surface 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 least equal to that which existed prior to such demolition.
  - 4. Damage to property adjacent to District's property shall be restored to the satisfaction of respective property owners.

### 1.3 ASBESTOS FREE CERTIFICATION

- A. Absolutely no materials containing asbestos are to be provided or installed as part of this Project. The Contractor shall ensure that no subcontractor or any of Contractor's own forces installs any materials containing asbestos. At final closeout of the Project, the Contractor shall provide to the School District certification that no materials containing asbestos have been installed in the Project and that the Project is asbestos free as required by the State of Oregon.
  - Upload certification to Submittal Module on e-Builder to verify it meets the needs of the District.

### 1.4 COORDINATION

1.

- A. The Contractor is responsible for overall coordination of the Project.
- B. The Drawings and Specifications are arranged for convenience only and do not necessarily determine which trades perform the various portions of the Work.
- C. Coordinate sequence of the Work to accommodate Owner occupancy. If mechanical, electrical or plumbing work is to interrupt power or water usage, the District must be notified 24 hours in advance.
- D. Do all necessary Work to receive or join the Work of all trades.
- E. Verify location of existing utilities and protect from damage.
- F. Mechanical and Electrical Drawings: The mechanical and electrical drawings are diagrammatic. Additional offsets and bends may be required and are to be installed as may be required. The Architect may make minor adjustments in fixture, outlets, grille, louver or ventilator locations prior to rough-in work with no additional cost to the project.
- G. Calculate dimensions and measures for layout of work. Record deviations from Drawing information on existing conditions, and review with the Architect at time of discovery. Record actual conditions on project record drawings.
- H. Installer Inspection:
  - 1. Require installer of each major unit of work to inspect substrate and conditions for installation, and to report unsatisfactory conditions in writing. Correct unsatisfactory conditions before proceeding with installation.
  - 2. Inspect each product immediately before installation. Do not install damaged or defective products, materials or equipment.
  - 3. Start of installation shall be understood as acceptance of substrate conditions by the installer.
- I. Clearances: Review the Design Drawings for possible conflicts prior to rough-in. Contractor is responsible for verification that equipment will fit in the space provided. Resolve conflicts with the Architect prior to rough-in work.
- J. Separate Contracts: The Contractor shall be responsible for the coordination and to coordinate activities with other contractors on site performing Owner provided work under separate contracts occurring during the construction period.
  - 1. The District will be performing a re-roofing of the entire building concurrent with this project.

### 1.5 CUTTING AND PATCHING

A. Provide cutting, fitting and patching of the Work as required.

- B. Make its several parts fit properly together.
- C. Uncover Work to provide for installation of ill-timed Work.
- D. Remove and replace defective Work.
- E. Remove and replace Work not conforming to requirements of Contract Documents.
- F. Remove samples of installed Work as specified or where directed for testing.
- G. Install specified Work in existing construction.
- H. Uncover Work to provide for Architect's observation of Work covered prior to inspection or approval.
- I. Provide routine penetrations of non-structural surfaces for installation of piping, ducts, electrical conduit, and other mechanical and electrical items.
- 1.6 SUBMITTALS-All BSD contracts require use of e-Builder submittal modules.
  - A. Contractor shall use e-Builder to conduct the following work processes:
    - 1. Submission of shop drawings and other submittals and receiving the processed submittals.
    - 2. Submission of Requests for Information (RFI) and receiving RFI responses from the Owner and A/E.
    - 3. Submission of Invoices and approval or rejection of same.
    - 4. Distribution of Meeting Minutes.
    - 5. Submission of As-Built Record Drawing.
    - 6. Submission of Test Results and Operation and Maintenance (O&M) manuals (electronic format).
    - 7. Submission of Change Orders (COs) and Contract Amendment and approval or rejection of same.
    - 8. Transmission of formal letters and notices between the District and the Contractor.
    - 9. In the event of occasional operational problems with e-Builder, transmission of the above documents may be done for a temporary period of time by hand carrying, email, normal mail or express mail. Prior approval must be obtained from the District before utilizing this backup communication system and a resumption of e-Builder use is to initiate as soon as the operational problems are corrected.
  - B. Submit schedule of all shop drawings, product data and samples specified in each individual section of the project manual. Coordinate construction schedule and installation dates of each product and assembly and allow ample time for Architect's review. Allow time for possible disapproval and resubmission.
  - C. Deliver submittals (that need to be reviewed in person) to BBL Architects, 200 North State Street, Lake Oswego, Oregon 97034.
  - D. Transmit each item under Architect-accepted form. Identify Project, Contractor, Subcontractor, and major supplier; identify pertinent Drawing sheet and detail number, and Specification Section number, as appropriate. Identify deviations from Contract Documents. Provide space for Contractor and Architect review stamps.

- E. Apply Contractor's stamp, signed or initialed certifying that review, 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.
- F. Coordinate submittal of related items with construction schedule for timely submittal to the Architect.
- G. After Architect's review of submittal, revise and resubmit as required, identifying changes made since previous submittal.
- H. Do not fabricate products or begin work that requires submittals until return of submittal with Architect acceptance.
- I. Timing of Submittals:

1.

- Submittals Within 10 days of Notice of Award of Contract:
  - a. A designation of the Work to be performed by the Contractor by his own forces.
  - b. List of Subcontractors and major materials suppliers for principal portions of the Work.
- 2. Submittals Prior to Notice to Proceed:
  - a. Executed Agreement.
  - b. Performance and Labor & Material Payment bonds per Oregon Law (ORS 279.029, 279.542, 701.430) with certified copy of Power of Attorney from Attorney-in-Fact executing bonds.
  - c. Certified copies of Contractor's Liability Insurance Policies (AIA Doc.G705)
- 3. Submittals Within 15 days After Notice to Proceed and Prior to first Payment Application, upload the following to the Submittal Module on e-Builder:
  - a. Schedule of values.
  - b. Schedule of submittals. Upload to Submittal Register on e-Builder.
  - c. Copies of acquired building permit licenses etc. to complete the work of this contract.
  - d. Construction schedule.
- 4. Submittals Prior to each Month's Payment:
  - Application and Certificate for Payment (AIA Document G702 and G703).
    - 1) Submit with back-up using Invoice Approval Process in e-Builder.
  - b. Notarized affidavit of payments to all subcontractors and major material suppliers.
  - c. Updated construction schedule.
  - d. Public Works Contractor Wage Certification per Oregon Law. Upload BOLI Payroll submittals to e-Builder.
- 5. Submittals Prior to Substantial Completion: Notification to Architect that work of the Project is substantially complete, including a listing of items of work to be completed or corrected, together with certificate of occupancy or occupancy permit issued by the Local Building Department for the entire Project.
  - a. Attach Commissioning Reports for critical life safety systems to Substantial Completion notification on e-Builder.
- J. Schedule of Values:

a.

- 1. Submit typed schedule on AIA Form G703. Contractor's standard form or media-driven printout will be considered on request.
- 2. Provide breakdown per each specification section listed in the project manual.
  - a. Include line item for project closeout.
- 3. Upload draft of Schedule of Values to the Submittal Module on e-Builder.
- K. See Section 01 33 00 SUBMITTAL PROCEDURES.

### 1.7 COMMUNICATIONS

A. Communication and the flow of transmitted documents shall flow from the Trade Contractor to the General Contractor and then in parallel to the A/E and the District. Communication and document transmission from the A/E and the District to the Trade Contractor is to occur in the same manner, except that the flow will be the reverse of that noted above.

# PART 2 – PRODUCTS

- 2.1 MATERIAL
  - A. The 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 materials and equipment.

PART 3 – EXECUTION (Not Used)

# WORK RESTRICTIONS

## PART 1 - GENERAL

### 1.1 WORK RESTRICTIONS

- A. Work Sequence:
  - 1. Complex schedules, phased construction and/or compressed schedules are common.
  - 2. Coordinate work sequence and phased construction requirements with BSD Representative.

### 1.2 CONTRACTOR USE OF PREMISES – GENERAL

- A. General: Owner will occupy portions of the building during the construction period. Do not interfere with the Owner's operations. Coordinate use of premises under the direction of the Owner.
- B. Use of Site:
  - 1. Assume full responsibility for the protection and safekeeping of Products under this Contract, stored on the Site.
  - 2. Confine operations at the site to the areas permitted. Portions of the site beyond areas on which work is indicated are not to be disturbed.
  - 3. Move any stored Products, under Contractor's control, which interfere with operations of Owner or separate contractors.
  - 4. Keep existing driveways and entrances serving the premises clear and available at all times. Do not use for parking or storage of materials.
  - 5. Maintain continuity of utility services to existing building.
  - 6. Lock automotive type vehicles and other mechanized or motorized construction equipment, when parked and unattended. Do not leave vehicles or equipment unattended with the motor running. Keys are not to be left in the vehicle.
  - 7. Do not encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated.
  - 8. Limit access to prohibited locations and arrange schedules with BSD personnel.
  - 9. Define contractor areas for work, access, staging, storage, etc.
  - 10. Provide staging & logistics plan. Delineate on site plan. Submit Staging & Logistics Plan with submission of Bid and again with submission of Construction Schedule.

### 1.3 CONTRACTOR USE OF PREMISE – EXISTING BUILDINGS

- A. Use of Site:
  - 1. Maintain the existing building in a safe and weathertight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.
  - 2. Keep public areas such as hallways, stairs, and toilet rooms free from accumulation of waste material, rubbish, or construction debris.
  - 3. Smoking or open fires will not be permitted within the building enclosure or on the premises.
  - 4. Contractor personnel prohibited from undesignated areas.
  - 5. Use of tobacco, including vaping, chewing tobacco and marijuana is prohibited.
  - 6. Toilet facilities are the Contractor's responsibility to provide.
  - 7. Temporary water as required for work during shutoff is the Contractor's responsibility.
  - 8. Limit/contain smoke, dust, dirt, noise including radios to immediate work area.
  - 9. Broom-clean work area daily.
  - 10. Restore existing surfaces where damaged or modified by construction operations to their original condition.
  - 11. Room may be designated for use as a field office if coordinated through the BSD representative. Room must be vacated by stipulated completion date, regardless of authorized adjustments to construction schedule.

# WORK RESTRICTIONS

### 1.4 OCCUPANCY REQUIREMENTS – EXISTING BUILDINGS

- A. Partial Owner Occupancy:
  - 1. The Owner reserves the right to place and install equipment in completed areas of the building and to occupy completed areas prior to substantial completion, provided that occupancy does not interfere with completion of the Work.
  - 2. Placing of equipment and partial occupancy shall not constitute acceptance of the Work or any part of the Work.
- B. Scheduling Requirements:
  - 1. Contractor shall organize and coordinate work in a manner that does not interfere with the normal operations of areas of the facility being occupied and used by the Owner.
  - 2. Contractor shall maintain safe and convenient public access to the toilet rooms at all times that the facility is normally open to the public.
  - 3. Contractor shall continuously maintain public entry to the portions of the building being used by the Owner. The Contractor shall also continuously maintain safe, direct and legal exiting routes from all areas of the building to the outside.
  - 4. Owner's Project Manager contact information:
    - a. Megan Finch, Project Manager:
      - 1) Office Phone: 503-356-4318
      - 2) Cell Phone: (971) 276-0097
      - 3) Email: <u>megan\_finch@beaverton.k12.or.us</u>
- C. Provide for continued occupancy, access, and egress. Existing utilities shall be maintained to the building. Provide minimum 24 hour notice for any disruption.
- D. Provide safety protection for occupants.
- E. Owner items will be stored in a separate storage space not accessible to Contractor.

### 1.5 WORK SEQUENCE

- A. Coordinate the construction schedule and operations with the Owner's Designated Representative.
- B. The Contractor is responsible for employing an approved abatement contractor for the removal of hazardous materials at the school as necessary.
- C. It is anticipated that Contractor may begin Work on the Site on June 15, 2020.

# **UNIT PRICES**

## PART 1 - GENERAL

### 1.1 GENERAL

- A. Description: Contractor shall provide, with his Bid, unit prices for doing work as described in the Schedule of Unit Prices at the end of this Section. If the Owner elects to have the work performed, change order(s) will be issued describing extent of work, and Contractor will be compensated on the basis of the unit price submitted by the Contractor on the Bid Form.
- B. Unit prices shall include all costs to the Owner including cost of work, overhead and profit. All material wastage shall be factored into the unit cost.
- C. Referenced Sections: Specification Sections contain pertinent requirements for materials and installation to achieve the Work described by each unit price.
- D. Coordination: Coordinate related Work and modify surrounding Work as required to complete the Project under each unit price.
- E. Bidders are required to provide all unit prices that may be indicated on the Bid Form.
- F. Schedule:
  - 1. A "Schedule of Unit Prices" is included at the end of this section.
  - 2. Specification Sections that may be referenced in each Unit Price contain pertinent requirements for materials and installation to achieve the Work described by each Unit Price.
  - 3. Include as part of each unit price, miscellaneous devices, appurtenances and similar items incidental to or required for a complete system whether or not mentioned as part of the unit price.

### PART 2 - PRODUCTS (Not Used)

### **PART 3 - EXECUTION**

- 3.1 SCHEDULE OF UNIT PRICES
  - A. Unit Price No. 1: Provide additional 2x4 layin ceiling tiles to match existing as needed. Provide the unit pricing based on a per tile basis.
  - B. Unit Price No. 2: Provide additional 12x12 glue up ceiling tiles to match existing as needed. Provide the unit pricing based on a per tile basis.
  - C. Unit Price No. 3: Provide hard fittings on fiberglass pipe insulation. Refer to Specification Section 02 83 11 ASBESTOS ABATEMENT.

# SUBSTITUTION PROCEDURES

### PART 1 – GENERAL

### 1.1 SUBSTITUTIONS

- A. During the Bid period submit CSI substitution form attached at the end of this document to Contracts@beaverton.k12.or.us.
- B. Include in Request:
  - 1. Complete data substantiating compliance of proposed substitution with Contract Documents.
  - 2. For Products:
    - a. Product identification, including manufacturer's name and address.
    - b. Manufacturers literature.
    - c. Product description.
    - d. Performance and test data
    - e. Reference standards.
    - f. Samples, where appropriate.
    - g. Name and address of similar projects on which product was used and date of installation.
    - h. If item deviates from District standards.
      - 1) District Standards can be viewed at the District's website at <u>www.beaverton.k12.or.us/depts/facilities</u>. At Home Page, click on Facilities Development" for list of documents.
    - i. Maintenance requirements
    - j. Unit Cost
  - 3. For Construction Methods:
    - a. Detailed description of proposed method and Drawings illustrating methods.
    - b. Itemized comparison of proposed substitutions with product or method specified.
    - c. Data relating to changes in construction schedule.
    - d. Accurate cost data on proposed substitution in comparison with product or method specified.
    - e. If method deviates from District standards.
      - District Standards can be viewed at the District's website at <u>www.beaverton.k12.or.us/depts/facilities</u>. At Home Page, click on "Facilities Development" for list of documents.
- C. Substitution after Award of Contract
  - 1. Substitution of products will not normally be approved after Contract is executed. However, substitutions may be considered for one or more of the following conditions.
    - a. Unavailability beyond control of Contractor, such as strikes, lockouts, discontinuance by the manufacturer or his authorized supplier.
    - b. Requirements for compliance with final interpretation of code requirements or insurance regulations.
    - c. BSD or Design Team requested substitution.
    - d. If it can be shown that specified product or system is not well suited for proposed application or that another is superior and/or less costly and has attached detailed documentation including cost savings/increase.
    - e. Subsequent information or data discloses inability of specified product to perform properly in the design for which it was intended.
    - f. Manufacturer or fabricator refusal to certify or guarantee performance of specified product as required.
    - g. Subsequent information that a long delivery rate will not be compatible with Contract construction period.

# SUBSTITUTION PROCEDURES

h. Proof for any of the above set forth conditions shall be submitted to the Consultant in writing with all pertinent data in the form of a Change Order Request for Consultant's and less costly substitution shall be credited to BSD's account.

# SUBSTITUTION REQUEST

TO:

PROJECT:

SPECIFIED ITEM:

Section Page Paragraph Description

# **PROPOSED SUBSTITUTION:**

Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of request including identification of applicable data portions.

Attached data also includes description of changes to Contract Documents and proposed substitution requires for proper installation.

## Undersigned certifies following items, unless modified by attachments, are correct:

- 1. Proposed substitution does not affect dimensions shown on drawings.
- 2. Undersigned pays for changes to building design, including engineering design, detailing, and construction costs caused by proposed substitution.
- 3. Proposed substitution has no adverse effect on other trades, construction schedule, or specified warranty requirements.
- 4. Maintenance and service parts available locally or readily obtainable for proposed substitution.

# Undersigned further certifies function, appearance, and quality of proposed substitution are equivalent or superior to specified item.

# Undersigned agrees, if this page is reproduced, terms and conditions for substitutions found in Bidding Documents apply to this proposed substitution.

Submitted by:

Name (Printed or typed)

Signature

Firm Name

Address

City, State, Zip

Date Tel:

Fax:

General Contractor (if after award of Contract)

For use by A/E

Approved	
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□ Not Approved □ Received too late

Approved as noted

Ву

Date

Remarks

The Construction Specifications Institute Northwest Region



Advancement of Construction Technology September 1997

# CONTRACT MODIFICATION PROCEDURES

## PART 1 – GENERAL

### 1.1 CONTRACT MODIFICATION PROCEDURES

- A. Proposal Requests:
  - 1. BSD-Initiated Proposal Requests:
    - a. Design Team will issue a detailed description of proposed changes in the work that may require adjustment to the Contract Sum or Contract Time via e-Builder.
    - b. Request shall be presented on AIA Document G709 or similar form approved by BSD Representative.
    - c. Proposal requests issued by Design Team are for information only, and shall not be considered instructions to stop work or to execute the proposed change.
    - d. Within 10 working days after receipt or proposal request, Contractor shall submit a quotation of cost adjustments to the Contract Sum and Contract Time necessary to execute the change via e-Builder.
    - e. Contractor shall include an itemized breakdown of cost including quantities of materials, labor costs with breakdown by trade, costs of rental equipments, transportation, storage, etc.
    - f. Contractor shall include an updated Construction Schedule via e-Builder that indicates the effect of the change including, but not limited to, changes in activity duration, start and finish dates, and activity relationships. Contractor shall utilize available total float before requesting an extension of Contract Time.
  - 2. Contractor-initiated Proposal Requests:
    - a. Contractor shall provide a complete description of the proposed change, indicating the effect of the proposed change on the Contract Sum and on the Contract Time.
    - b. Contractor shall include an itemized breakdown of cost including quantities of materials, labor costs with breakdown by trade, costs of rental equipment, transportation, storage, etc.
    - c. Contractor shall include an updated Construction Schedule that indicates the effect of the change including, but not limited to, changes in activity duration, start and finish dates, and activity relationships.
    - d. Contractor shall utilize available total float before requesting an extension of Contract Time.
  - 3. Proposal Request Log: Contractor shall maintain a current log of all proposal requests and submit same at each project meeting and with each application for payment via e-Builder. Each proposal request shall have a unique number for tracking purpose. The log shall, at minimum, show the proposal request number, date initiated, brief description, reference (i.e. RFI or supplemental instruction), estimated cost, estimated time, status, and reason for the proposal request (i.e. Unforeseen Condition / Regulatory Requirement / BSD Request / E&O).
- B. Change Orders:
  - 1. District and Consultant shall review the Proposal Requests submitted by the Contractor for revisions in the contract cost and the contract time, and may request the Contractor modify its proposal.
  - 2. Upon acceptance of the Proposal Requests by the BSD Representative, Contractor, and Design Team, the Design Team will prepare the Change Order via e-Builder on the District's form attached for signatures by all parties.

# CONTRACT MODIFICATION PROCEDURES

- C. Construction Change Directives:
  - 1. Construction Change Directive shall contain a complete description of the change in the work, and shall designate the method to be followed to determine changes in the Contract Sum or Contract Time.
  - 2. Documentation: Contractor shall maintain detailed records on a time and material basis of work required.
  - 3. Upon completion of the change in the work, the Contractor shall submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract for preparation of a Change Order by the Consultant.
  - 4. Payments to the Contractor shall not be made on a basis of a Construction Change Directive until it is made into a Change Order approved by BSD Representative, Contractor, and Consultant- portions of a Construction Change Directive shall not be eligible to be made into a Change Order for partial Payment.
- D. Minor Changes in The Work:
  - 1. The Design Team may issue supplemental instructions authorizing minor changes in the work that do not involve adjustment to the contract sum nor the contract Time. Minor changes in the work shall use AIA Document G710, "Architect's Supplemental Instructions" or a similar form as approved by the BSD Representative and be submitted via e-Builder.

# PAYMENT PROCEDURES

### PART 1 - GENERAL

### 1.1 DESCRIPTION

A. Forms and procedures for progress payments.

# 1.2 APPLICATION FORMS

- A. For applications for payment, AIA Document G702, supported by AIA Document G703, Continuation Sheet.
- B. Prepare the schedule of values in such a manner that each major item of Work and each subcontracted item of Work is shown as a line item broken down in terms of material and labor costs on AIA Document G703, Application and Certificate for Payment Continuation Sheet in similar format.
- C. The schedule of values shall be submitted for review by the Owner and Design Team prior to the first application for payment via e-Builder; and may be used when, and only when, accepted in writing by the Owner and Design Team. Use e-Builder Submittal Module.
- D. Payment request is to include the Contractor's Federal Tax Identification number and return address.
- E. Each Application for Payment shall be based upon the Schedule of Values submitted by the Contractor to the BSD Representative and the Design Team within 10 days of the award of Contract. The Schedule of Values shall allocate the entire Contract Sum among the various portions of the Work and be prepared in such form and supported by such data to substantiate its accuracy as the BSD Representative and the Consultant may require: Format AIA G702 with G703 Schedule of Values.

# 1. Include line item for project closeout.

### 1.3 PAYMENTS

- A. Owner will make progress payments on account of the Contract once monthly for the scheduled duration of the project based on the value of Work accomplished or materials in the job site, as stated in the schedule of values on the Application and Certificate for Payment. Complete and forward on or about the 20<sup>th</sup> day of each month.
- B. Submit via e-Builder forms requesting payment to the Design Team.
- C. Payments will be made on protected materials on hand at the job site properly stored, protected, and insured. Materials held offsite in a bonded and insured warehouse will be considered for payment if the application for payment contains an insurance certificate and bill of sale for materials stored offsite. Estimated quantities shall be subject to the Design Team's review and judgment.

### 1.4 EARLY PURCHASE AND PAYMENT OF MATERIALS AND EQUIPMENT

- A. Order materials and equipment requiring a long lead or waiting time early so as not to delay progress of the Work.
- B. The Contractor will be reimbursed for early order materials or items upon receipt and verification of quality and quantity against submittals and shipping documents by Owner's Representative. Receipt shall be to the job site or stored at Owner's other premises in an orderly and safe manner, secured from normal weather damage. Security remains the responsibility of the Contractor.
- C. When such items are procured by BSD, the items will be assigned to the General Contractor for receiving and installation.

# PAYMENT PROCEDURES

D. As part of the procurement of the items, the specifications will require the start of the product warranty/guarantee extended to coincide with the Project Substantial Completion date and be fully assignable to the General Contractor or its designee.

# PROJECT MANAGEMENT AND COORDINATION

### PART 1- GENERAL

### 1.1 COORDINATION

- A. The contractor shall coordinate scheduling, submittals, sequencing of the installation of interdependent elements, utility coordination, and space requirements for installation and maintenance of finished work and storage or staging areas for all trades. The mechanical, electrical, and electrical drawings are diagrammatic and may require special coordination between trades. The Contractor shall provide multidisciplinary coordination of drawings as necessary to insure proper space and layout of various portions of the work.
  - B. Notes on various drawings are not meant to determine trade or work jurisdictions. As an example, there may be "architectural" items shown or indicated on mechanical, plumbing, and electrical drawings. Further, there may also be "mechanical", "plumbing" or "electrical" items shown on architectural drawings. The Contractor is responsible to include all items in the bid cost regardless of which drawing they are indicated on.
  - C. The Contractor shall coordinate all work with the Owner's representative to minimize conflict and insure the least inconvenience to the general public and adjoining properties. Claims for additional time or money resulting from a lack of coordination will not be considered.
    - 1. Directions shall originate only from the Owner's designated representative and/or the Architect. Communications with other BSD stakeholders are to be considered supplementary and not binding. Instructions, information, and/or direction from other BSD stakeholders are <u>not</u> official direction, and must be confirmed with the Owner's designated representative and/or the Architect.

### 1.2 SUPERVISION

A. The Contractor shall provide a competent superintendent who is present on-site during all phases of construction and while work is in progress.

### 1.3 PRE-CONSTRUCTION CONFERENCE

- A. Purpose:
  - 1. To discuss items of interest in such detail that the Contractor shall have a clear understanding of the Owner's requirements, Contract Documents, and conditions affecting the Work. Items to be discussed include, but are not limited to:
    - a. Roles of Architect, Owner, Contractor, and Inspectors.
    - b. Procedures for handling change orders, requests for payment, and other administrative details.
    - c. Procedures for handling shop drawing, substitutions, inspections, etc.
    - d. Scheduling of the work.
    - e. Contractor's comments on any inaccuracies or ambiguities found in the Contract Documents.
    - f. To discuss any and all questions by the Contractor to make sure that the Contractor is aware of all conditions affecting the work prior to the awarding of the Contract.
  - 2. For the General Contractor to discuss with the Owner, Architect, subcontractors, and other interested parties the design, methods, organization, schedule of the work, contract requirements, mutual understandings relative to the Contract Documents, and procedures of the Administration of the Contract. Items to be discussed include, but are not limited to:
    - a. Construction Schedule.
    - b. Project Coordination: Designation of responsible personnel.
    - c. Procedures and processing of submittals, pay requests, change orders.

## PROJECT MANAGEMENT AND COORDINATION

- d. Record Document maintenance.
- e. Hazardous materials.
- f. Review of existing building conditions.
- B. Date of Conference: Before actual construction begins, when scheduled by the Design Team.
- C. Attendance: The Owner, Design Team, Contractor, and his superintendent shall attend as well as subcontractors and suppliers designated by the Owner, Design Team, or Contractor.
- D. Place: To be designated by the Owner.

## 1.4 PROJECT COORDINATION SUBMITTALS

- A. Schedule of Values: Submit within 15 days from Award of Contract. Provide in format approved by the Owner's Representative.
  - 1. Format: Identify each line item with number and title of the corresponding SPECIFICATION SECTIONS. Indexing by general division is not acceptable.
  - 2. Keep Schedule of Values current with progress of work, and provide as integral part of Application for Payment. Revise schedule to list Change Orders for each Application for Payment.
  - 3. Breakdown per phasing (if included in project). Submit via e-Builder.
- B. Construction Schedule:
  - 1. Submit Construction Schedule in line with published schedule contained in these bid documents within 20 days of Award of Contract and provide update at every week subcontractor coordination meeting. Schedule shall consist of a horizontal bar chart with separate designation for each major trade or operation, identifying first workday of each week. Clearly designate Critical Path of construction.
  - 2. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Show projected percentage of completion for each item of work as of the first of each month. Submit via e-Builder.

# 1.5 SUBMITTAL PROCEDURES

- A. Submit information as required by each Section of the Specification. Coordinate with construction schedule and allow sufficient time for Design Team review. Allow time for potential disapproval and re-submittal.
  - 1. The Contractor should expect a minimum review/processing time of seven (7) days for the Architect review and a minimum of fourteen (14) days for Architect's consultant and Owner's review.

### 1.6 SHOP DRAWINGS

A. Submit drawings via e-Builder.

# 1.7 SAMPLES

- A. Submit full range of manufacturer's standard colors or custom colors where specified, textures and patterns for Architect's final selection. Submit via e-Builder unless sample cannot be adequately reviewed without seeing the physical sample.
- B. Submit samples to illustrate functional characteristics of the product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.
- C. Include identification on each sample, giving full information.

# PROJECT MANAGEMENT AND COORDINATION

D. The Contractor shall clearly mark and identify applicable products, models, options and other data on manufacturer's standard data or catalog cuts. The Contractor shall provide supplemental data or information unique to this project. Where specified in other sections of the specification, assembly, installation, start-up, adjusting and finishing. The Contractor shall submit supporting reference data, affidavits and certifications that products meet or exceed the specified requirements.

# 1.8 PRODUCT DATA

- A. Mark each copy to identify applicable products, models, options, and other data; supplement manufacturer's standard data to provide information unique to the work.
- B. Submit via e-Builder.

### 1.9 WARRANTIES

A. Prior to final payment, furnish electronic copy of warranties required for each item of materials where stipulated in the Contract Documents. Submit as part of the O&M deliverables.

### 1.10 LAYOUT OF THE WORK

- A. The Contractor shall survey and verify the conditions of the existing project site. The purpose of the survey is to record existing conditions prior to the construction for comparison with the Contract Documents.
- B. The Contractor shall report any conflicts to the Design Team prior to the start of the Work. The Design Team will provide revisions to the Contract Documents or issue instructions to deal with conflicts.
- C. The Contractor shall be responsible for remedying conflicts that could have been prevented by timely reviews of existing conditions. All remedies which vary from the Contract Documents shall be approved by the Design Team and the Owner's Representative.

# 1.11 JURISDICTIONAL REPORTING REQUIREMENTS

A. Certification of occupancy shall not be issued prior to all inspections normally required in the course of construction by the Authority Having Jurisdiction.

## 1.12 PROGRESS MEETINGS

- A. Purpose: Project meetings will be held each week, from beginning of construction to final acceptance, to discuss items of mutual interest regarding coordination and progress of the work.
  - 1. The Contractor shall fully brief the Design Team and BSD Representative on the progress of the Work.
- B. Day of Week: To be mutually determined by the Design Team, Owner, and the Contractor.
- C. Attendance: The Owner, Design Team, Contractor, and his superintendent shall attend, or their representatives. Other subcontractors, suppliers, or manufacturer's representatives shall attend when requested by the Contractor, Owner, or Design Team.
- D. Place: Project site or as otherwise designated by the Owner.
- E. Chairman: The Contractor shall chair the meeting.

# PROJECT MANAGEMENT AND COORDINATION

- F. Meeting Date Changes: Contact Owner's Representative to request any changes in the meeting date; provide 24 hour notice. The Owner's Representative will set the new date.
- G. Meeting Report: The Contractor will later issue a meeting report to the Contractor and Owner. Submit via e-Builder.
- H. The Contractor shall be responsible for notifying subcontractors and other representatives of scheduled construction meetings where their attendance is requested.

### 1.13 PRE-INSTALLATION CONFERENCES:

- A. Pre-Installation Conferences: Contractor to arrange and conduct pre-installation conferences prior to initialization of work of major trades as required within the Specifications. Attendance shall include Owner's representative, Contractor, major sub-contractor(s), and Design Team. Include technical representatives of product manufacturers and others recognized as expert or otherwise capable of influencing success of the installation. Review significant aspects of requirements for the work. Record discussion and distribute as plan of action. Review procedures, distribute schedule and discuss requirements pertaining to the work. Designate responsible personnel. Conduct walkover inspection of existing site.
- B. Required Pre-Installation Conferences:
  - 1. Section 02 41 13, Selective Structure Demolition: Pre-Demolition Conference.
  - 2. Section 09 30 13, Ceramic Tile: Pre-Installation Conference.

# PROJECT MANAGEMENT DATABASE (E-BUILDER)

## PART 1 – GENERAL

### 1.1 SECTION INCLUDES

- A. Summary.
- B. General Requirements.
- C. System Requirements.
- D. System Access.
- E. System Use.

## 1.2 SUMMARY

- A. Project Management Communications: The Owner, Contractor and Architect shall use the Internet web based project management communications tool, e-Builder® ASP 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.
- C. Contractor shall use this system to conduct the normal communication and work process flows that are used in completing the design and construction of our facilities. Division 1 should reflect that the Contractor use e-Builder to conduct the following work processes:
  - 1. Submission of shop drawings and other submittals and receiving the processed submittals.
  - 2. Submission of Requests for Information (RFI) and receiving RFI responses from the Owner and A/E.
  - 3. Submission of invoices and approval or rejection of same.
  - 4. Distribution of meeting minutes.
  - 5. Submission of as-built record drawings.
  - 6. Submission of test results and Operation and Maintenance (O&M) manuals (electronic format).
  - 7. Submission of Change Orders (COs) and contract amendment and approval or rejection of same.
  - 8. Transmission of formal letters and notices between the District and the Contractor.
  - 9. In the event of occasional operational problems with e-Builder, transmission of the above documents may be done for a temporary period of time by hand carrying, email, normal mail or express mail. Prior approval must be obtained from the District before utilizing this backup communication system and a resumption of e-Builder use is to initiate as soon as the operational problems are corrected.

# 1.3 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.

# PROJECT MANAGEMENT DATABASE (E-BUILDER)

- 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 and backup member of Design Team responsible.
  - 2. Contractor's project manager or lead member and a backup member of Contractor's project staff.
  - 3. Others as deemed appropriate by Owner.

# 1.4 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 <u>www.e-builder.net</u>).
    - d. Users are recommended to have properly licensed versions of the standard Microsoft Office Suite (current version must be purchased) or the equivalent.

### 1.5 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.

# PROJECT MANAGEMENT DATABASE (E-BUILDER)

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.

# 1.6 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. RFI, Requests for Information.
  - 2. Change Order Requests.
  - 3. Supplemental Instructions.
  - 4. Calendar of Events (meetings, events, open houses, public site tours etc.).
  - 5. 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: 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: Documents of various types shall be logically related to one another and discoverable.
- G. Notifications and Distribution: 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: All documents, files or other information posted on the system shall become the property of the Owner.

# PROJECT MANAGEMENT DATABASE (E-BUILDER)

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

# SUBMITTAL PROCEDURES

## PART 1 - GENERAL

# 1.1 WORK INCLUDED

- A. Submit overall construction schedule, 3-week work schedule, shop drawings, product data, samples, schedule of values, record documents, and products list as specified.
  - 1. Submit to Design Team via e-Builder only through Contractor.
  - 2. The Architect/Consultant will forward a marked up set of submittals to the District Representative for review and approval after review by the Design Team.

### 1.2 QUALITY ASSURANCE

A. Within 15 days of the Award of Contract, submit schedules of values, list of principal subcontractors and suppliers, progress schedule, copies of building permits, and similar start-up authorization via e-Builder.

### **PART 2 - PRODUCTS**

### 2.1 CONSTRUCTION SCHEDULE

- A. Content: Within 20 days of the award of contract, submit a comprehensive progress schedule indicating a time bar for each significant category of work to be performed via e-Builder. Show product and installation dates for major products. Show dates for each construction activity, Substantial Completion and punch list preparation, Final Completion, and Occupancy.
- B. Designate in the Construction Schedule, the dates for submission and review of Shop Drawings, product data and samples that are needed for the product. Show critical submittal dates or prepare a separate coordinated listing of critical submittal dates.
  - 1. Any critical path submittals shall be identified as critical in the e-Builder Submittal Module.
- C. Updating: Indicate progress of each activity and show revised completion dates. Provide listing of current and anticipated accelerations and delays. Describe proposed corrective action when required. Revise at intervals matching payment requests and redistribute with each payment request.

### 2.2 MEETING MINUTES

A. Meeting minutes to be prepared by Contractor and distributed to all meeting attendees via e-Builder with 2 days. Action items uploaded to e-Builder by the end of that same day.

## 2.3 SCHEDULE OF VALUES

- A. Submit a Schedule of Values covering various parts of work including quantities aggregating the total sum of the Contract to e-Builder. Show dollar value and percent of total for each unit of work scheduled. This Schedule will be the basis for the Contractor's Application for Payment.
- B. Submit on the latest edition of AIA Document G703, Continuation Sheet, within 15 days of Award of Contract and with each payment request. Revise each time schedule is affected by change order or other revision.
- C. Upon request by the Design Team, support values given with data that will substantiate their correctness.

# SUBMITTAL PROCEDURES

### 2.4 PAYMENT REQUESTS

A. Submit a request each calendar month to e-Builder. Use the latest edition of AIA Document G702, Application and Certificate for Payment, fully completed, notarized, and executed and G703, Schedule of Values.

### 2.5 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

### A. General:

- 1. Review, stamp with Contractor's stamp, and sign each submittal to certify Contractor has reviewed submittal for compliance with Contract Documents prior to submitting to the Design Team. Submittals issued without the Contractor's review may be returned to the Contractor without being reviewed by the Design Team. Submit to e-Builder.
- 2. Provide 3" x 4" clear space on each submittal for the Engineer's stamp.
- 3. Provide additional copies as required by governing authorities.
- B. Shop Drawings-Submit via e-Builder.
  - 1. Submit shop drawings showing connections, details, dimensions, finishes, fasteners, etc.
  - 2. Maintain 1 print as a mark-up copy for the "Record Drawings".
  - 3. In the event that the submittal is a partial submittal, identify related shop drawings to be submitted at a later date.
- C. Product Data-Submit via e-Builder.
  - 1. Submit manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other description data on manufactured products and systems.
  - 2. Mark to indicate the actual product to be provided. Show selections from among options in the manufacturer's printed product data.
  - 3. Maintain 1 copy at the project site for reference purposes.
- D. Office Samples-Submit via e-Builder:
  - 1. Maintain one returned set at the project site for purposes of quality control comparisons.
  - 2. Sample submittals are for Architect's observation of color, texture, pattern, and "kind".
  - 3. Upload copy of transmittal and digital photographs of all submitted samples to e-Builder after physical samples have been submitted to Design Team.
- E. Miscellaneous Submittals: Provide copies of miscellaneous submittals as follows:
  - 1. Warranties: Submit 3 executed copies, plus additional copies as required for maintenance manual.
  - 2. Field Records: Submit 3 copies, including 1 copy that will be returned for inclusion in the submittal of "Record Documents".
  - 3. Maintenance Manuals: Submit 3 bound copies.
  - 4. "Record Drawings": Submit original maintained marked-up prints.
  - 5. Construction Schedule and Schedule of Values: Submit 4 copies to the Design Team.

### 2.6 5-WEEK WORK SCHEDULE

- A. Each week, provide to the Design Team a 5-Week Work Schedule on a form approved by the Design Team. Submit via e-Builder. Each 5-Week Work Schedule is to show the description of all phases of the work to be accomplished during the week submitted and the 2 following weeks. The 5-Week Work Schedule is to be updated every week and presented to the Design Team.
  - 1. Indicate any suspected utility service interruption on the 5-Week Work Schedule.
#### SUBMITTAL PROCEDURES

#### PART 3 - EXECUTION

#### 3.1 CONTRACTOR'S SUBMITTAL

- A. Review submittals prior to submission and provide stamp of approval signed or initialed by the Contractor indicating the Contractor has inspected the submittals and certifying that they are complete, correct, in compliance with the Contract Documents and suitable for the Project.
- B. Verify field measurements and other field construction criteria.
- C. Submit submittals required by each Specification Section to the Design Team. Notify the Design Team in writing at time of submission of deviation in submittals from requirements of the Contract Documents.
- D. The Design Team shall provide a marked up set of submittals to the District Representative for review and approval after review by the Design Team.
- E. Submittals shall be arranged by specification section with the specification sections identified on divider tabs. Product Submittals shall include catalog data sheet clearly marking the following information for the exact equipment being installed: manufacturer, type, style, complete catalog number, dimensions, physical description, and specifications for each item and each option submitted. Submittals shall reference equipment number as designated on Project Drawings, equipment schedules, or specifications for any and all equipment identified by unique designation in project documents. Contractor must submit the proposed startup documentation for the equipment upon submittal for that equipment. Include the manufacturer's recommended installation and startup procedures with associated checklists for each unique piece of equipment under a separate tab titled "Installation/Startup". These procedures and forms shall be for the specific piece of equipment to be provided.
  - 1. Submittals shall be divided out and listed separately in the e-Builder Submittal Register, and each submittal shall be uploaded separately to the Submittal Module in e-Builder.
- F. Submittals to be provided as a complete package. When individual sections or incomplete submittals are provided, include divider or space holder for missing section(s) with sheet indicating equipment number and anticipated delivery date for submittal.

#### 3.2 DESIGN TEAM'S REVIEW

- A. The Design Team will review submittals for design concept and conformance with the Contract Documents and return submittals to the Contractor for distribution with corrections noted thereon.
- B. Stamp: The Architect or Engineer will stamp each submittal to be returned with a uniform, self explanatory action stamp, appropriately marked and executed to indicate the status of the submittal. The stamp indicates and requires the follow action:
  - 1. No Exception Taken: No further action is required.
  - 2. Make Corrections Noted: Make the corrections upon fabrication of the material only.
  - 3. Rejected: The material submitted is not acceptable and another material submission is required.
  - 4. Revise and Resubmit: The material submittal is not acceptable and it is to be elaborated upon or corrected and resubmitted prior to material fabrication.
  - 5. Submit Specified Item: Submittal is rejected and the material specified is to be submitted.

#### SUBMITTAL PROCEDURES

- 6. Checking is only for general conformance with the design concept of the Project and general compliance with the information given in the Contract Documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for dimensions which shall be confirmed and correlated at the job site, fabrication processes and techniques of construction, coordination of Contractor's work with that of all other trades and the satisfactory performance of Contractor's work.
- C. Contractor's responsibility for deviations in submittals from requirements of the Contract Documents is not relieved by the Design Team's review of submittals unless the Contractor has made written request for the deviations and the Design Team gives written acceptance of specific deviations requested.

#### 3.3 CORRECTIONS

A. Immediately incorporate all required corrections in the submittals and resubmit for further review, if required.

#### 3.4 TIME SCHEDULE FOR SUBMITTALS

- A. Construction Schedule: Submit to the Design Team via e-Builder no later than 20 calendar days after Award of Contract.
- B. Shop Drawings: Submit to the Design Team via e-Builder for review. The Design Team will review within 15 calendar days. Schedule submissions to allow ample time for ordering and delivery of materials after review.
- C. Product Data: Submit to the Design Team via e-Builder for review. The Design Team will review within 15 calendar days. Schedule submissions to allow ample time for ordering and delivery of materials after review.
- D. Office Samples: Submit to the Design Team via e-Builder for review. The Design Team will review within 15 calendar days. Schedule submissions to allow ample time for ordering and delivery of materials after review.
- E. Schedule of Values: Submit to the Design Team via e-Builder no later than 15 calendar days after receipt of the Notice to Proceed.

#### 3.5 SUBMITTAL SCHEDULE

A. Submittals required by Specifications and the Drawings shall be made regardless of whether or not they are scheduled herein. Each specification section should be reviewed for exact submittal requirements. All submittals must be reviewed by the Design Team prior to being used and must be submitted in sufficient time to preclude a delay in meeting the approved Construction Schedule.

SECTION	SECTION	REQUIRED			
NUMBER	NAME	SUBMITTAL			
01 11 00	Summary of Work	Asbestos Free Certification Designation of Work Performed by Contractor by Own Forces List of Subcontractors and Major Materials Suppliers Executed Agreement Performance and Labor & Material Payment Bonds Contractor's Liability Insurance Policies Schedule of Values Schedule of Values Schedule of Submittals Schedule of All Shop Drawings, Product Data and Samples Copies of Acquired Building Permit Licenses Construction Schedule Application and Certificate for Payment & Backup Notarized Affidavits of Payments Public Works Contractor Wage Certifications & BOLI Payroll Submittals Notice of Substantial Completion Certificate of Occupancy or Occupancy Permit			
01 25 00	Substitution Procedures	CSI Substitution Form			
01 25 00	Substitution Trocedures				
01 26 00	Contract Modification Procedures	Proposal Requests Proposal Request Log			
01 29 00	Payment Procedures	Applications for Payment Schedule of Values			
01 31 00	Project Management and Coordination	Schedule of Values Construction Schedule Shop Drawings Color Submittal Samples Product Data Warranties City of Beaverton Reporting Requirements			
01 33 00	Submittal Procedures	Construction Schedule Schedule of Values 3 Week Work Schedule			
01 35 73	Delegated Design Procedures	Submittals			
01 45 00	Quality Control	Reports			
01 61 00	Common Product Requirements	Manufacturer's Instructions			
01 77 00	Closeout Procedures	Prerequisites to Substantial Completion Prerequisites to Contract Closeout			

# SUBMITTAL PROCEDURES

SECTION	SECTION	REQUIRED
NUMBER	NAME	SUBMITTAL
01 78 00	Closeout Submittals	As-Built Drawings Permit Drawings Operation and Maintenance Manuals Warranty, Maintenance and Operational Manuals Certifications Asbestos Free Certification Certificate of Occupancy Final Permit Inspection and Approvals Record Documents Record Specifications Record Product Data Miscellaneous Record Submittals
05 50 00	Metal Fabrications	Product Data Shop Drawings
06 41 00	Architectural Wood Casework	Shop Drawings Product Data
07 92 00	Joint Sealants	Product Data MSDS Sheets Closeout Submittals Guarantee Structural Adhesion Warranty Weatherseal Warranty Non-Staining Warranty
09 29 00	Gypsum Board	Product Data Texture Samples Product Preparation Instructions and Recommendations Storage and Handling Requirements Installation Methods
09 51 00	Acoustical Ceilings	Office Samples Design Data Product Preparation Instructions and Recommendations Storage and Handling Requirements Installation Methods
09 91 00	Painting	Product Data Office Samples Product Preparation Instructions and Recommendations Storage and Handling Requirements Installation Methods Finish Schedule Date Schedule Closeout Submittals Extra Stock

# SUBMITTAL PROCEDURES

SECTION NUMBER	SECTION NAME	REQUIRED SUBMITTAL
22 00 00	Basic Plumbing Requirements	Record Drawings Operation and Maintenance Manuals Guarantee Spare Parts
22 05 23	General Duty Valves for Plumbing Valves	Operation and Maintenance Manuals Manufacturer's catalog or technical data
22 05 29	Hanger and Supports for Plumbing Piping and Equipment	Manufacturer's technical literature for hanger Literature or describe duct-supporting method
22 05 48	Vibration and Seismic Controls for Plumbing Piping and Equipment	Manufacturer's technical literature Indicate service for each type of hanger
22 05 53	Identification for Plumbing Piping and Equipment	List of proposed equipment and valve tags Product information on piping markers Valve Chart Operation & Maintenance
22 05 93	Testing of Plumbing	O&M Data Certificate of completion Inspection and test
22 07 19	Plumbing Insulation	Compliance Data Manufacturer's technical data
22 11 00	Facility Water Distribution	O&M Data Certificates
22 11 19	Domestic Water Piping Specialties	Operation and Maintenance Data Manufacturer's catalog or technical data
22 13 00	Facility Sanitary Sewers	O&M Data Certificates
22 16 00	Gas Piping	Flow Control Valves List Manufacturer's technical data O&M data Manufacturer's literature Maintenance instructions
22 33 00	Electric Domestic Water Heaters	Manufacturer's technical data O&M data Manufacturer's literature Maintenance instructions
22 34 00	Fuel Fired Domestic Water Heaters	Manufacturer's technical data O&M data Manufacturer's literature Maintenance instructions

# SUBMITTAL PROCEDURES

SECTION <u>NUMBER</u>	SECTION NAME	REQUIRED SUBMITTAL
22 42 00	Commercial Plumbing Fixtures	Manufacturer's technical data O&M data Manufacturer's literature Maintenance instructions
26 00 00	Electrical General Provisions	Record Drawings Operation and Maintenance Manuals Guarantee Spare Parts
26 05 19	Conductors and Connections	Shop Drawings Product Data
26 05 33	Conduit, Raceways, Boxes and Fittings	Shop Drawings Product Data Operational Instructions and Maintenance
26 27 26	Wiring Devices and Plates	Shop Drawings Product Data Operation & Maintenance Data Warranty
26 50 00	Lighting Fixtures and Lamps	Shop Drawings Product Data Operation & Maintenance Data

## SUBMITTAL PROCEDURES

#### SPECIAL PROCEDURES

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Asbestos: No asbestos containing materials may be used in the construction or remodel of any facilities located within the Beaverton School District.
  - 1. The Beaverton School District retains an Asbestos Abatement Consultant to test presumed asbestos containing material (PACM) and to oversee all asbestos abatement work that takes place within our facilities. This consultant is to be an integral part of the construction process. They are to be notified before any asbestos abatement takes place within the designated facility. If material is found during the construction process that has not been specifically identified as asbestos containing material, but is presumed to contain asbestos, then a bulk sample must be sent for laboratory analysis before the material may be removed or repaired. The Asbestos Abatement Consultant is charged with keeping records which are forwarded to the AHERA Designated Person for the Beaverton School District. This information is crucial to the maintenance of the BSD asbestos database for all facilities.
  - 2. The Contractor must have a full-time construction project manager on site to oversee the construction that takes place within the facility. It will be the responsibility of the construction project manager to notify the Asbestos Abatement Consultant in conjunction with the Abatement Contractor so that the Asbestos Abatement Consultant is on site to oversee the abatement of the asbestos and to document the material removed for the BSD asbestos database. <u>Asbestos abatement is to be completed by the General Contractor and the cost to be incurred by the General Contractor.</u>
  - 3. Procedures to follow if there has been an asbestos release event
    - a. Shut down all heating, ventilation and air conditioning units that supply return or draw air to, or from the area in question.
    - b. Keep the area in question closed off. Post signs to restrict any person from accidentally walking into the contaminated area.
    - c. Notify the BSD Representative and the Asbestos Abatement Consultant for the District. They will make the arrangements for the clean up of the asbestos contamination.
  - 4. Construction Contractor shall be held liable for any actions of its agent, personnel or subcontractors and all costs, expenses, damages, claims and causes of action rising out of an asbestos release that occurs during performance of their work. All costs incurred by the District to clean up the asbestos release shall be the responsibility of the Contractor.
- B. Environmental Pollutants:
  - 1. Contractor shall obtain the District's written consent prior to bringing onto the work site any environmental pollutants or hazardous substances or materials.
  - 2. Properly handle, use, and dispose of all environmental pollutants and hazardous substances or materials brought onto the work site, in accordance with all applicable federal, state, or local statues, rules, or ordinances.
  - 3. Be responsible for any and all spills, releases, discharges, or leaks of (or from) environmental pollutants or hazardous substances or materials which Contractor has brought on the work site.
  - 4. Promptly clean up, without cost to the District, such spills, releases, discharges, to the District's satisfaction and in compliance with all applicable federal, state, or local statutes, rules, or ordinances.
  - 5. Contractor shall be liable for any and all costs, expenses, damages, claims and causes of action, or any of them related to or arising out of a spill, release, discharge or leak of (or from) any environmental pollutant or hazardous substance or material, to the extent such spill release, discharge, or leak was caused or contributed to by the Contactor's negligence or failure to perform in accordance with the contract documents.
  - 6. Contractor must report, when safe to do so, all quantity releases via telephone to the BSD Representative. A written follow-up report is to be submitted to the BSD Representative within

#### SPECIAL PROCEDURES

48 hours of the telephone notification. At a minimum, the report must contain the following information:

- a. Description of times released (identity, quantity, and all other documentation required by law).
- b. Whether amount of items released is reportable to EPA/DEQ, and if so, when it was reported.
- c. Exact time and location of release, including a description of the area involved.
- d. Containment procedures initiated.
- e. Summary of communications about the release that Contractor has had with members of the press or State officials other than District.
- f. Description of clean-up procedures employed, or to be employed at the site, including disposal location of spill residue.
- g. Personnel injuries, if any, resulting from or aggravated by, the release.
- C. Environmental Clean-up:
  - 1. As part of the Final Completion Notice, or as a separate written notice submitted with or before the Notice of Completion, the Contractor shall notify the District that all environmental pollution clean-up which was performed as part of this construction project has been disposed of in accordance with all applicable rules, regulations, laws and statutes of all agencies having jurisdictions over such environmental pollution. The notice shall indemnify and hold harmless the District from any claims resulting from the disposal of the environmental pollution including removal, encapsulation, transportation, handling, and disposal.
  - 2. Construction Contractor will be held responsible for any and all releases of environmental pollution during performance of the Contract that occur as a result of, or are contributed to, by actions of its agent, personnel, or subcontractors.
  - 3. All costs incurred by the District in meeting applicable regulations, in correcting any unhealthy or unsafe working conditions, or costs incurred by the District to complete any of the Contractor's work, will be charged to the Contractor.
- D. Hazardous Materials:
  - 1. In the event that PCB ballasts, lead paint, heavy metals, underground storage tanks, or other hazardous materials are encountered during construction, contact the BSD Representative who will notify BSD Environmental Management. Separate arrangements will be made to remove the hazardous material and clean the facility in a manner that is safe and consistent with Beaverton School District policies and all regulatory authorities.
  - 2. Any time "assumed lead" painted surfaces are disturbed the work must be done by a certified firm with a trained and certified contractor. In addition the areas of the building that will be affected must be posted with appropriate signage warning of the potential hazard and parents and guardians of the children must receive information about the renovation work that is planned an EPA pamphlet about renovation.
- E. In the event that an event occurs contact the National Response Center and obtain a file report number that will be forwarded to the District Representative.

### SAFETY REQUIREMENTS

### PART 1 – GENERAL

#### **1.1** SAFETY REQUIREMENTS

- A. The following requirements, as applicable, apply to Work specified herein.
  - 1. Associated General Contractors of America, Inc., "Manual of Accident Prevention in Construction."
  - 2. Workmen's Compensation Board "Safety Code for Construction Work."
  - 3. Oregon State Employment Act Safety Requirements.
  - 4. Oregon Occupational Safety and Health Act (OROSHA) requirements, as applicable, apply to Work specified herein.

#### **SECURITY PROCEDURES**

#### PART 1 - GENERAL

#### 1.1 SECURITY REQUIREMENTS

- 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 342.143, most recent edition.

# 1.2 CONSTRUCTION/MAINTENANCE BUILDING SECURITY RULES

- A. The Contractor shall enforce strict discipline and good order among the Contractor's employees, Subcontractors, and other persons carrying out the contract on District property. The District may require that the Contractor immediately remove from the project site and District property any employee or other person carrying out the contract that the District considers objectionable.
- B. District Personnel (i.e., Building Administrator, Custodian, or a building monitor etc.) must be present when a contractor is performing work within an existing school facility.
- C. Only District Personnel will deactivate the security system upon arriving and reactivate the system when they leave the facility.
  - 1. If the responsible District Personnel for a particular day changes during the day, the District Personnel shall coordinate this change in responsibility and advise the Contractor's superintendent.
- D. Contractor personnel will not be furnished District security badges and/or access codes to the Building security system. All personnel under the employment of the Contractor and its subcontractors that travel to or spend time at the project site are to wear ID badges while on the work site. ID badges are to contain:
  - 1. Individuals full name.
  - 2. Individuals company affiliation.
- E. The Contractor shall have a responsible party such as a superintendent, foreman, or supervisor on site during any work being performed by either their own forces or that of their subcontractors.

#### SECURITY PROCEDURES

- F. The superintendent shall check in with the responsible District Personnel upon arrival and advise when all work is complete, contract personnel have left, and the area is secure.
- G. The Contractor's superintendent shall be responsible for security in areas where work is being performed as well as ingress and egress to that area.
- H. At the BSD Representative's discretion, the superintendent may be issued a building key to allow access to area's where work is being performed.
- I. The superintendent shall maintain a daily log defining what areas within the building were accessed by Contractor personnel, which personnel from their firm were in the building, and which subcontracting firms were in the building.
- J. Each of the Contractor's employees, Subcontractors' employees, and principals/owners involved at the site may, at the option of the District, be subject to a security check, at any time, through the Beaverton Police Department or other venue.

#### 1.3 BACKGROUND CHECKS

- A. In an effort to ensure the safety of children at Beaverton Schools, ALL Contractors, including, but not limited to, trade contractors, material vendors, professional service providers, architects or engineers, subcontractors or sub-consultants, retained by the District shall complete a criminal background check prior to beginning work. Furthermore, Contractors shall adhere to the following rules while on BSD campuses. The District may remove any Contractors as defined above, from any BSD property, for not complying with these requirements.
- B. Background Checking Procedure:

a.

- 1. Contractor shall complete a follow Contractor Background Checks procedure and fill out Confidential Criminal Background Check Certification Form (copy attached following this Section) on each employee and provide the information to a third-party background checking company (see list of possible companies on Page 3).
  - a. Background checks need to cover the past 7 years and include offenses registered in the federal, county, sex offender and the Department of Corrections lists.
  - b. Fingerprinting is left up to the discretion of the District, however not required in most instances.
  - c. An existing background check may qualify an employee for badging if:
    - i. The background check was conducted within the last year
    - ii. The background check was conducted in accordance with work for another public or private school district within the State of Oregon
    - iii. The background check covered the list of crimes rendering ineligibility as outlined on Page 2 of the Confidential Criminal Background Check Certification Form
    - iv. The employee has not taken up residency outside the State of Oregon since the time the background check was conducted
- 2. Once an employee of the Contractor passes the Criminal Background Check, Contractor will provide to the District a letter on company letterhead with a listing of these names.
  - The District will not collect the background check certifications. However, the
- District reserves the right to request the background check certifications at any time.
   After passing background checks, all Contractors and their employees are to be badged when onsite. Badges are to be prepared by the Contractor (template attached). Badges must include individual's legal name (not a nick-name), company name that they work for, location(s) that the Contractor will be working, and a recent (within the last 4 years) photo of the individual. Background checks are valid for one year.

## **SECURITY PROCEDURES**

C. Contractor shall pay and perform or have performed criminal background checks for every employee on all active campus (i.e., children are present) projects prior to that employee's admittance to the project site. Once an employee passes the criminal background check they will create an ID badge which they must wear while they are on site at all times. Contractor may be fined up to \$500 for every worker working on site without the proper ID badge. The following are the convicted crimes that may not appear on the background check.

#### D. CONVICTIONS RENDERING INELIGIBILITY per ORS 342.143:

- 163.095 Aggravated murder
- 163.115 Murder
- 163.185 Assault in the first degree
- 163.235 Kidnapping in the first degree
- 163.355 Rape in the third degree
- 163.365 Rape in the second degree
- 163.375 Rape in the first degree
- 163.385 Sodomy in the third degree
- 163.395 Sodomy in the second degree
- 163.405 Sodomy in the first degree
- 163.408 Unlawful sexual penetration in the second degree
- 163.411 Unlawful sexual penetration in the first degree
- 163.415 Sexual abuse in the third degree
- 163.425 Sexual abuse in the second degree
- 163.427 Sexual abuse in the first degree
- 163.432 Online sexual corruption of a child in the second degree
- 163.433 Online sexual corruption of a child in the first degree
- 163.435 Contributing to the sexual delinquency of a minor
- 163.445 Sexual misconduct
- 163.465 Public indecency
- 163.515 Bigamy
- 163.525 Incest
- 163.547 Child neglect in the first degree
- 163.575 Endangering the welfare of a minor
- 163.670 Using child in display of sexually explicit conduct
- 163.675 Sale of exhibition of visual reproduction of sexual conduct by child
- 163.680 Paying for viewing sexual conduct involving a child
- 163.684 Encouraging child sex abuse in the first degree
- 163.686 Encouraging child sex abuse in the second degree
- 163.687 Encouraging child sex abuse in the third degree
- 163.688 Possession of materials depicting sexually explicit conduct of a child in the first degree
- 163.689 Possession of materials depicting sexually explicit conduct of a child in the second degree
- 164.325 Arson in the first degree
- 164.415 Robbery in the first degree
- 166.005 Treason
- 166.087 Abuse of corpse in the first degree
- 167.007 Prostitution
- 167.008 Patronizing a prostitute
- 167.012 Promoting prostitution
- 167.017 Compelling prostitution
- 167.057 Luring a minor
- 167.062 Sadomasochistic abuse or sexual conduct in live show
- 167.075 Exhibiting an obscene performance to minor.
- 167.080 Displaying obscene materials to minors
- 167.090 Publicly displaying nudity or sex for advertising purposes
- 475.808 Unlawful manufacture of hydrocodone within 1,000 feet of school

#### **SECURITY PROCEDURES**

- 475.810 Unlawful delivery of hydrocodone
- 475.812 Unlawful delivery of hydrocodone within 1,000 feet of school
- 475.818 Unlawful manufacture of methadone within 1,000 feet of school
- 475.820 Unlawful delivery of methadone
- 475.822 Unlawful delivery of methadone within 1,000 feet of school
- 475.828 Unlawful manufacture of oxycodone within 1,000 feet of school
- 475.830 Unlawful delivery of oxycodone
- 475.832 Unlawful delivery of oxycodone within 1,000 feet of school
- 475.846 Unlawful manufacture of heroin
- 475.848 Unlawful manufacture of heroin within 1,000 feet of school
- 475.850 Unlawful delivery of heroin
- 475.852 Unlawful delivery of heroin within 1,000 feet of school
- 475.854 Unlawful possession of heroin
- 475.856 Unlawful manufacture of marijuana
- 475.858 Unlawful manufacture of marijuana within 1,000 feet of school
- 475.860 Unlawful delivery of marijuana
- 475.862 Unlawful delivery of marijuana within 1,000 feet of school
- 475.864 Unlawful possession of marijuana within 1,000 feet of school
- 475.866 Unlawful manufacture of 3,4 methylenedioxymethamphetamine
- 475.868 Unlawful manufacture of 3,4 methylenedioxymethamphetamine within 1,000 feet of school
- 475.870 Unlawful delivery of 3,4 methylenedioxymethamphetamine
- 475.872 Unlawful delivery of 3,4 methylenedioxymethamphetamine within 1,000 feet of school
- 475.874 Unlawful possession of 3,4 methylenedioxymethamphetamine
- 475.876 Unlawful manufacture of cocaine
- 475.878 Unlawful manufacture of cocaine within 1,000 feet of school
- 475.880 Unlawful delivery of cocaine
- 475.882 Unlawful delivery of cocaine within 1,000 feet of school
- 475.884 Unlawful possession of cocaine
- 475.886 Unlawful manufacture of methamphetamine
- 475.888 Unlawful manufacture of methamphetamine within 1,000 feet of school
- 475.890 Unlawful delivery of methamphetamine
- 475.892 Unlawful delivery of methamphetamine within 1,000 feet of school
- 475.894 Unlawful possession of methamphetamine
- 475.904 Unlawful manufacture or delivery of controlled substance within 1,000 feet of school
- 475.906 Penalties for distribution to minors 475.992 Unlawful possession, manufacture or delivery of a controlled substance
- 161.405 Attempt to commit any of the above listed crimes.
- E. Background Checking Company Information:
  - 1. Any background check vendors are acceptable so long as the criteria of the background check matches that are outlined in the "Contractor Background Checks" document provided by Beaverton School District and is attached at the end of this section. Suggested Vendors include:
    - a. Advanced Reporting (https://advrep.com/orschools/) PO Box 12398 Salem, OR 97309 503-375-0451
    - b. Criminal Information Services (http://www.criminalinfo.com/index.php) PO Box 7235 Beaverton, OR 97007 503-591-1355

#### **SECURITY PROCEDURES**

#### 1.4 BUILDING SECURITY RULES

- A. The Contractor shall enforce strict discipline and good order among the Contractor's employees, subcontractors and other persons carrying out the contract while on District property. The District may require that the Contractor's employee or other person carrying out the contract be immediately removed from the project site and District property if the District finds them to be objectionable.
- B. If onsite during school hours/during school session, Contractor will check-in with the main office. Anytime a visit of this nature is planned it should be scheduled with the District Project Manager at least 24 hours in advance. If system shut downs are required notice of at least 48 hours is required.
- C. A District representative must be present onsite when a Contractor is performing work within an existing school facility. This representative will deactivate the security system upon arrival and reactivate it upon leaving. This process cannot be performed by a Contractor or anyone other than a District representative.
- D. Contractor will provide badges for each employee and person carrying out the contract. These badges are to be visible and worn at all time when onsite.
- E. The Contractor shall have a Responsible Party (i.e., superintendent, foreman, supervisor) onsite at all times during any work being performed by either their own forces or that of their subcontractors.
- F. The Responsible Party shall check-in with the District representative upon arrival. They will check-out with the District representative when all work is complete, Contractor personnel has left, and the area is secure.
- G. The Responsible Party shall be accountable for the security in area where work is being performed as well as ingress and egress to that area.
- H. A District representative will be issued a building key to allow access to any areas where work is being performed.
- I. The Contractor shall maintain a daily log defining what areas within the building were accessed by Contractor and Subcontractor personnel.
- J. Each of the Contractor's employees, subcontractors' employees and principals/owner involved at site may, at the option of the District, be subject to a security check, at any time, through the District Security Department, Beaverton Police Department, Washington County Sheriff's Department or other venue.

#### 1.5 OTHER SECURITY REQUIREMENTS

- A. Smoking and any use of tobacco products is not allowed within 50 feet of the campus property. Contractor may be fined up to \$500 for each incident of tobacco use within the area of work by the Contractor or Subcontractors.
- B. Firearms are not allowed on campus property. Law enforcement will be contacted if any contractor personnel are in possession of a firearm on site. (This includes firearms locked up in a vehicle.)
- C. Abusive, inappropriate, and/or foul language is strictly prohibited on active campus projects. Employees who abuse this rule will be asked to leave the project site.
- D. Contractor is responsible to maintain security of building per BSD operating procedures. Failure to do so will result in a fine being levied by BSD.

**Background:** In an effort to ensure the safety of children at Beaverton Schools, <u>ALL</u> Contractors, including, but not limited to, trade contractors, material vendors, professional service providers, architects or engineers, subcontractors or sub-consultants, retained by the District shall complete a criminal background check prior to beginning work. Furthermore, Contractors shall adhere to the following rules while on BSD campuses. The District may remove any Contractors as defined above, from any BSD property, for not complying with these requirements.

# Background Checking Procedure:

- 1. Contractor shall complete a Confidential Criminal Background Check Certification Form (copy attached) on each employee and provide the information to a third-party background checking company (see list of possible companies on Page 3).
  - a. Background checks need to cover the past 7 years and include offenses registered in the federal, county, sex offender and the Department of Corrections lists.
  - b. Fingerprinting is left up to the discretion of the District, however not required in most instances.
  - c. An existing background check may qualify an employee for badging if:
    - i. The background check was conducted within the last year
    - ii. The background check was conducted in accordance with work for another public or private school district within the State of Oregon
    - The background check covered the list of crimes rendering ineligibility as outlined on Page 2 of the Confidential Criminal Background Check Certification Form
    - iv. The employee has not taken up residency outside the State of Oregon since the time the background check was conducted
- Once an employee of the Contractor passes the Criminal Background Check, Contractor will
  provide to the District a letter on company letterhead with a listing of these names.
   NOTE: The District will not collect the background check certifications. However, the District
  reserves the right to request the background check certifications at any time.
- 3. After passing background checks, all Contractors and their employees are to be badged when onsite. Badges are to be prepared by the Contractor (template attached). Badges must include individual's legal name (not a nick-name), company name that they work for, location(s) that the Contractor will be working, and a recent (within the last 4 years) photo of the individual. Background checks are valid for one year.

# **Building Security Rules:**

- The Contractor shall enforce strict discipline and good order among the Contractor's employees, subcontractors and other persons carrying out the contract while on District property. The District may require that the Contractor's employee or other person carrying out the contract be immediately removed from the project site and District property if the District finds them to be objectionable.
- 2. If onsite during school hours/during school session, Contractor will check-in with the main office. Anytime a visit of this nature is planned it should be scheduled with the District Project Manager at least 24 hours in advance. If system shut downs are required notice of at least 48 hours is required.

- 3. A District representative must be present onsite when a Contractor is performing work within an existing school facility. This representative will deactivate the security system upon arrival and re-activate it upon leaving. This process <u>cannot</u> be performed by a Contractor or anyone other than a District representative.
- 4. Contractor will provide badges for each employee and person carrying out the contract. These badges are to be visible and worn at all time when onsite.
- 5. The Contractor shall have a Responsible Party (i.e., superintendent, foreman, supervisor) onsite at all times during any work being performed by either their own forces or that of their subcontractors.
- 6. The Responsible Party shall check-in with the District representative upon arrival. They will check-out with the District representative when all work is complete, Contractor personnel has left, and the area is secure.
- 7. The Responsible Party shall be accountable for the security in area where work is being performed as well as ingress and egress to that area.
- 8. A District representative will be issued a building key to allow access to any areas where work is being performed.
- 9. The Contractor shall maintain a daily log defining what areas within the building were accessed by Contractor and Subcontractor personnel.
- 10. Each of the Contractor's employees, subcontractors' employees and principals/owner involved at site may, at the option of the District, be subject to a security check, at any time, through the District Security Department, Beaverton Police Department, Washington County Sheriff's Department or other venue.

# Note: All personnel onsite must have a background check and be badged (see Background Checking Procedure).





# CONTRACTOR

Joe Black ABC Contractors All Facilities

# **Background Checking Company Information**

\*Please note the below vendors are only suggestions and may change with future revisions of this document. Any background check vendors are acceptable so long as the criteria of the background check matches that outlined in the "Background Checking Procedure" section on Page 1.

- Advanced Reporting (<u>https://advrep.com/orschools/</u>) PO Box 12398 Salem, OR 97309 503-375-0451
- Criminal Information Services (<u>http://www.criminalinfo.com/index.php</u>) PO Box 7235 Beaverton, OR 97007 503-591-1355



# **Confidential Criminal Background Check Certification Form**

Project Name:	Project Manager:		Location:				
Legal Name:				11 0			
	(Legal First)	(Full Middle)	(L	egal Last)			
Phone Number:		Date of Birth:					
A ddmaga.			(mr	n/dd/yyyy	)		
Auuress							
City:		State:	Zip Code:				
Last four digits of your Social Security Number:			Ge	ender:	М	/	F
Have you ever been convicted of any of the crimes listed below? No Yes			/es				
Signature:							

None of this information will be used for immigration status checks. Any warrants for arrest discovered in the process will be reported to the appropriate law enforcement agency. Falsifying or not disclosing information may result in disqualification of your application or termination of your ability to work on BSD job sites.

# **Crimes Rendering Ineligibility**

163.095 Aggravated murder 163.115 Murder 163.185 Assault in the first degree 163.235 Kidnapping in the first degree 163.355 Rape in the third degree 163.365 Rape in the second degree 163.375 Rape in the first degree 163.385 Sodomy in the third degree 163.395 Sodomy in the second degree 163.405 Sodomy in the first degree 163.408 Unlawful sexual penetration in the second degree 163.411 Unlawful sexual penetration in the first degree 163.415 Sexual abuse in the third degree 163.425 Sexual abuse in the second degree 163.427 Sexual abuse in the first degree 163.432 Online sexual corruption of a child in the second degree 163.433 Online sexual corruption of a child in the first degree 163.435 Contributing to the sexual delinquency of a minor 163.445 Sexual misconduct 163.465 Public indecency 163.515 Bigamy 163.525 Incest 163.547 Child neglect in the first degree 163.575 Endangering the welfare of a minor 163.670 Using child in display of sexually explicit conduct 163.675 Sale of exhibition of visual reproduction of sexual conduct by child 163.680 Paying for viewing sexual conduct involving a child 163.684 Encouraging child sex abuse in the first degree 163.686 Encouraging child sex abuse in the second degree 163.687 Encouraging child sex abuse in the third degree 163.688 Possession of materials depicting sexually explicit conduct of a child in the first degree 163.689 Possession of materials depicting sexually explicit conduct of a child in the second degree 164.325 Arson in the first degree 164.415 Robbery in the first degree

166.005 Treason 166.087 Abuse of corpse in the first degree 167.007 Prostitution 167.008 Patronizing a prostitute 167.012 Promoting prostitution 167.017 Compelling prostitution 167.057 Luring a minor 167.062 Sadomasochistic abuse or sexual conduct in live show 167.075 Exhibiting an obscene performance to minor. 167.080 Displaying obscene materials to minors 167.090 Publicly displaying nudity or sex for advertising purposes 475.808 Unlawful manufacture of hydrocodone within 1,000 feet of school 475.810 Unlawful delivery of hydrocodone 475.812 Unlawful delivery of hydrocodone within 1,000 feet of school 475.818 Unlawful manufacture of methadone within 1,000 feet of school 475.820 Unlawful delivery of methadone 475.822 Unlawful delivery of methadone within 1,000 feet of school 475.828 Unlawful manufacture of oxycodone within 1,000 feet of school 475.830 Unlawful delivery of oxycodone 475.832 Unlawful delivery of oxycodone within 1,000 feet of school 475.846 Unlawful manufacture of heroin 475.848 Unlawful manufacture of heroin within 1,000 feet of school 475.850 Unlawful delivery of heroin 475.852 Unlawful delivery of heroin within 1,000 feet of school 475.854 Unlawful possession of heroin 475.856 Unlawful manufacture of marijuana 475.858 Unlawful manufacture of marijuana within 1,000 feet of school 475.860 Unlawful delivery of marijuana 475.862 Unlawful delivery of marijuana within 1,000 feet of school

475.864 Unlawful possession of marijuana within 1,000 feet of school 475.866 Unlawful manufacture of 3,4 methylenedioxymethamphetamine 475.868 Unlawful manufacture of 3.4 methylenedioxymethamphetamine within 1,000 feet of school 475.870 Unlawful delivery of 3,4 methylenedioxymethamphetamine 475.872 Unlawful delivery of 3,4 methylenedioxymethamphetamine within 1,000 feet of school 475.874 Unlawful possession of 3,4 methylenedioxymethamphetamine 475.876 Unlawful manufacture of cocaine 475.878 Unlawful manufacture of cocaine within 1,000 feet of school 475.880 Unlawful delivery of cocaine 475.882 Unlawful delivery of cocaine within 1,000 feet of school 475.884 Unlawful possession of cocaine 475.886 Unlawful manufacture of methamphetamine 475.888 Unlawful manufacture of methamphetamine within 1,000 feet of school 475.890 Unlawful delivery of methamphetamine 475.892 Unlawful delivery of methamphetamine within 1,000 feet of school 475.894 Unlawful possession of methamphetamine 475.904 Unlawful manufacture or delivery of controlled substance within 1,000 feet of school 475.906 Penalties for distribution to minors 475.992 Unlawful possession, manufacture or delivery of a controlled substance 161.405 Attempt to commit any of the above listed crimes

#### **DELEGATED DESIGN PROCEDURES**

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for Delegated Design components of the Work.
- B. Sections with delegated design components include but are not limited to the following:
  - 1. Division 23 HVAC: Seismic Anchorage.
  - 2. Division 26 Electrical: Seismic Anchorage
- C. Project Record Requirements (also see 01 70 00 Execution and Closeout Requirements).

#### 1.2 DEFINITIONS

- A. Delegated Design: Certain components of the Work for which Contractor shall coordinate and assume or assign responsibility for design, engineering, calculations, permitting, submittals, fabrication, transportation, and installation. (Also called "Design-Build" components).
  - 1. Delegated Design components shall be complete systems that perform their intended functions.
- B. Permit Authority: All authorities having local jurisdiction (AHJ).
- C. Architect or Engineer of Record: MFIA, Inc., BBL Architects, or their consulting structural engineer.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Permit: Submit design and calculations to the AHJ and secure permit for Delegated Design component:
  - 1. Separate approval is required for each Delegated Design component.
    - 2. Pay for permit and permit review.
- B. Comply with current codes and regulations, except where more stringent requirements are specified.
- C. Engineer Delegated Design portions for gravity, lateral and seismic loads.
  - 1. Load criteria is indicated in Structural Drawings. If not indicated, request criteria.
  - 2. Indicate reactions to structure.
  - 3. Provide services of a qualified professional engineer licensed in the Project jurisdiction.
- D. Calculate and complete energy forms required by AHJ.
- E. Execute the design intent as indicated in Project Drawings and Specifications.
- F. Obtain Permits and inspections and pay fees required by AHJ.

#### DELEGATED DESIGN PROCEDURES

#### 1.4 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 00 Submittal Procedures.
  - 1. Submit permit submittal to the Design Team for review prior to submitting to Permit Authority.
  - 2. The Design Team will return copies to contractor for submittal to Permit Authority with "Reviewed" stamp.
  - 3. Delegated Design permit submittal is in addition to product data, shop drawing and sample submittals required for construction.
- B. Indicate design criteria, design assumptions, details, calculations, submittals, instructions for fabrication, assembly, installation and interface with other trades, unless noted otherwise in the specific Specification Section.
- C. Design and Calculations: Engineer's seal and calculations for that portion of Work by engineer licensed to practice in the State of Oregon.
  - 1. Submittals without required calculations, without the Delegated Design Engineer's seal, or which have not been reviewed by Contractor will not be reviewed by Architect or Engineer of Record.
- D. Permit Authority Requirements:

c.

- 1. Comply with Permit Authority policies regarding Delegated Design components of building projects.
- 2. Provide a minimum of three sets of design drawings clearly and legibly showing all members, dimensions, connections, materials used, and indicating how the part is attached to the main structure. Confirm with permitting agency for required number of permit review sets required.
  - a. Drawings shall be prepared, designed, and sealed by an Engineer licensed by the State of Oregon.
  - b. Drawings shall be signed indicating General Design Conformance by Architect or Engineer of Record.
    - Shop drawings or erection drawings are not acceptable as Delegated Design drawings.
- 3. Provide a minimum of three of sets of calculations including criteria, design assumptions, substantiating computations, and such additional data sufficient to show the correctness of the plans and compliance with the structural provisions of the Building Code. Confirm with permitting agency for required number of calculation sets required.
  - a. Calculations shall be prepared and sealed by the Delegated Design Engineer who prepared and sealed the drawings.
  - b. Calculations shall be signed by the Architect or Engineer of Record indicating acceptance of design concepts, loading criteria, and compatibility of designs.
- 4. Submit a Contractor Design Summary Sheet (when required by Permit Authority) listing Delegated Design subcontractors and their registered Delegated Design Engineer's name and phone number prior to main permit issuance.
- E. Architect's or Engineer of Record's review of Delegated Design submittals will be for design intent and shall not lessen nor shift the responsibility from Contractor or the assigned subcontractor to Owner nor to the design professional. The Owner shall not be responsible for paying for any delays, additional products, additional hours of work, or overtime, restocking or rework required due to failure by the Contractor or the sub-contractor to coordinate their Work with the Work of other trades on the project requiring permit by agency or to provide the Delegated Design portion or component in a timely manner to meet the schedule of the project.

#### **DELEGATED DESIGN PROCEDURES**

- F. Project Record Documents and Electronic Format Requirements for Delegated Design Components and Systems.
  - Provide the Owner with all Record Document drawings and specifications in electronic form to be uploaded to e-Builder:
    - a. Content:

1.

- 1) Record Documents shall contain all revisions made to the project by Addenda, Change Orders, shop drawing review and other modifications. The files shall be compiles as follows:
  - (a) Update all delegated design CAD files indicating the as-built conditions.
  - (b) The Contractor shall add the following, (see Format):
    - (1) Measured horizontal and vertical dimensions and locations of delegated design components and systems.
    - (2) Measured locations of appurtenances concealed in construction, referenced to visible and accessible features of the Work.
    - (3) Field changes of dimension and detail
    - (4) Details not on original Contract drawings and associated with the delegated design.
    - (5) Note to be included on each Sheet of Record Documents: "Project Record Documents - This document has been prepared using information furnished by (list Design Source Contractor Name, date, etc.)."
- b. Format:
  - 1) Files saved in latest AutoCAD format.
  - 2) All external reference files are to be bound, but need not be exploded.
  - 3) There should be only one (1) file for each and every drawing sheet. The file name will include the sheet number. For example A41.dwg., E32 dwg. or L2 dwg. will include the Architects' project number is optional but should be consistent through-out all drawings.
  - 4) No more than one (1) Paper Space layout per drawing. Files are to be saved as they should look ready to plot, and will exactly match the plotted Record Documents.
  - 5) Information added to the CAD files by the contractors, such as measured depths of foundations and utility location dimensions, should be put on a separate layer. These are to begin with an X, for example "X-GenC-Note" for notes, or "X-GenC-Dims" for dimensions.
  - 6) Other CAD information modified or moved by the Contractor should be located on its original layers.
- G. AHJ Approved Documents: Submit one copy of final approved documents from AHJ via e-Builder.

### 1.5 QUALITY ASSURANCE

- A. Documentation: Comply with the following:
  - 1. Uniform Drawing System
  - 2. Minimum text size: 1/8 inch
  - 3. Legible when microfilmed
  - 4. Other requirements by Permit Authority
- B. Design Requirements: Refer to requirements within individual specification sections.

#### DELEGATED DESIGN PROCEDURES

C. Delegated Design Engineer Qualifications: A professional engineer who is legally qualified to practice in State of Oregon and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of Delegated Design components that are similar to those indicated for this Project in material, design, and extent.

#### 1.6 SCHEDULING AND COORDINATION

- A. Comply with Permit Authority requirements current at time of submission.
- B. Submit material required by Permit Authority so that Permit Authority's review will not adversely affect construction schedule.
  - 1. Prior to submittal, meet with Permit Authority to identify Delegated Design components and review submittal requirements.
- C. Completed submission of Delegated Design documents prior to issuance of the building permit, when required by Permit Authority.
  - 1. Permit for Delegated Design must be issued and paid prior to fabrication.
- D. Owner will not be responsible for paying for any delays, additional products, additional hours of work, overtime, restocking or rework required due to failure by the Contractor to coordinate Delegated Design work or to execute Delegated Design work in a timely manner.

#### PART 2 - PRODUCTS (NOT USED)

#### PART 3 - EXECUTION (NOT USED)

#### **REGULATORY REQUIREMENTS**

#### PART 1 – GENERAL

#### 1.1 WORK INCLUDED

- Permit Applications: The Owner's Architect, Engineers, and Consultants will typically file the applications and the District will directly pay the regulating agency for the following:
   Plan review fees.
- B. Permits and Fees: The Contractor will pay the following permit fees and will invoice the District who will compensate the Contractor as a direct expense (no markup) item that is **not** included in the Contract:
  - 1. Building permit.
  - 2. All other permits, fees and licenses required of the Contractor to perform the work will be paid by the Contractor and included in contract value.
  - 3. BSD will reimburse the Contractor for the actual cost of the building permit, permanent utility connection permits and fees, and permits required for construction of work in the public right and associated bonds or assurances. Any other required permits including trade permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work, and any penalties, extensions or fines assessed to the above permits or fees shall be paid by the Contractor.
    - 1. The Contractor shall submit an invoice for direct payment of the BSD reimbursed permits, along with a copy of the permit and receipt from the issuing jurisdiction. Payment of permit fees is a Reimbursable Expense of actual cost only and will not be incorporated into the Contract by Change Order.
  - 4. The Contractor shall secure and closeout all permits. BSD will pay all system development charges, traffic impact fees, land use fees, building plan review and application fees applicable to the project.
    - 1. Typical Permits and Fees to be paid by Contractor as a part of the cost of the work, including but not limited to:
      - a. Deferred Submittal Fees
      - b. Demolition Permit Fee
      - c. Other permits or fees required during the construction phase
- C. The Contractor shall be responsible for securing and paying for all permits and fees in a timely manner so not to impede the progress of the Work.
- D. BSD will pay land use fees and the initial building and/or plan check fees. Contractor shall pay for design build or subsequent application and/or plan check fees.

#### REFERENCES

#### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

A. Codes, Ordinances and Regulations.

#### 1.2 RELATED DOCUMENTS

- A. Bidding Requirements.
- B. Conditions of the Contract.
- C. Drawings and Specifications.
- 1.3 CODES, ORDINANCES AND REGULATIONS
  - A. All work shall comply with the Codes, Ordinances and Regulations
    - 1. General Construction Work:
      - a. 2019 Oregon State Structural Specialty Code
      - b. State of Oregon Rules and Regulations of the State Board of Health.
      - c. Local Air Pollution Control and Agency and/or the Department of Environmental Quality, State of Oregon.
      - d. Department of Labor and Industries, State of Oregon.
      - e. Oregon Occupational Safety and Health Administration.
  - B. Comply with all applicable fire codes, plumbing codes, mechanical codes and electrical codes.
  - C. Comply with requirements of Washington County and State of Oregon Departments of Health. Comply with the requirements of the State of Oregon regarding the listing and handling of hazardous materials.
  - D. Comply with requirements of the State of Oregon, Department of Environmental Quality.
  - E. All temporary facilities and construction procedures shall comply with requirements of local and State Health codes and the United States Department of Labor, Occupational Safety and Health Administration (OSHA) Standards. (EPA).

#### 1.4 SPECIFICATION OF HIGHER STANDARD

A. Drawings and Specifications govern whenever Drawings and Specification require higher standards than are required by referenced codes and regulations.

#### PART 2- PRODUCTS (Not Used)

PART 3- EXECUTION (Not Used)

#### QUALITY CONTROL

#### PART 1 - GENERAL

#### 1.1 WORK INCLUDED

- A. The Owner will select, employ, and pay for services of an independent testing laboratory to perform inspections, sampling, testing, and other services required by the local building code and the Project Manual.
  - 1. Special inspections by independent inspection and testing laboratory services shall be provided by the District.
  - 2. The District may contract an independent consultant to review design and construction of the building envelope with particular emphasis in the areas of water intrusion.
- B. Specific quality control requirements are specified in individual Project Manual Sections.
- C. Inspection and testing services are intended to determine compliance of the Work with requirements specified.
- D. Refer to the Structural Notes on the Drawings for the special inspection and testing plan.

#### 1.2 SUBMITTALS

- A. Submit a certified written report of each inspection, test, or similar service to the Architect, Structural Engineer, Contractor, and the Owner. Include additional copies of each report to governing authorities when so directed.
- B. Report Data: Written inspection or test reports shall include:
  - 1. Name of testing agency or test laboratory.
  - 2. Date and location of samples, tests, or inspections.
  - 3. Names of individuals present.
  - 4. Complete inspection or test data.
  - 5. Test results.
  - 6. Interpretations.
  - 7. Recommendations.

#### **PART 2 - PRODUCTS**

- 2.1 SCOPE
  - A. Nature and Scope of Testing Services: In accordance with the requirements of governing authorities having jurisdiction over the work and as otherwise specified and consistent with reasonable standards of engineering practice.

#### **PART 3 - EXECUTION**

- 3.1 SPECIAL INSPECTION AND TESTING
  - A. Special inspection will be provided by the owner based on the requirements of the OSSC summarized in the Special Inspection and Testing Program on Structural Notes, Sheet S0.2. Contractor shall provide sufficient notice and access for the Special Inspector to perform these inspections.
- 3.2 TESTING LABORATORY'S RESPONSIBILITIES
  - A. Conduct, interpret tests, and report deviations or conditions that may lead to deviations from the Contract Documents to the Architect immediately by telephone.
  - B. State in each test report whether or not tests showed conformance with requirements of the Contract

#### QUALITY CONTROL

Documents and specifically note deviations, if any, from these requirements.

#### 3.3 CONTRACTOR'S OBLIGATIONS

- A. Cooperate with any representative of the Owner or the Testing Laboratory. Furnish tools, materials, equipment, and assistance.
- B. Notify the Architect, Testing Laboratory, and Owner 48-hours prior to each expected placement, installation, or fabrication phase requiring inspection tests as indicated herein.
- C. Where tests reveal defects requiring replacement, retest as required under this Contract at no change in Contract amount and reimburse Owner, Architect, and Consultants costs for preparation and supervision.
- D. When the initial tests indicate non-compliance with the Contract Documents, any subsequent retesting occasioned by non-compliance shall be performed by the same agency and the cost thereof borne by the Contractor.
- E. Representatives of the testing agency shall have access to the work at all times. The Contractor shall provide facilities for such access in order that the agency may properly perform its functions.
- F. Any testing laboratory stand-by time due to the Contractor's delays shall be paid for by the Contractor.
- G. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

#### 3.4 TEST OBSERVATIONS

- A. If the Design Team wishes to observe the inspections, tests, or approvals required by this paragraph, he will do so promptly and, where practicable, at the source of supply.
- B. Neither the observations of the Design Team in his Administration of the Construction Contract, nor inspections, tests, or approvals by persons other than the Contractor shall relieve the Contractor from his obligations to perform the Work in accordance with the Contract Documents.

#### 3.5 EVALUATION OF TESTS AND INSPECTIONS

- A. Results of laboratory or field control tests and inspections shall be the principal basis upon which satisfactory completion of the Work shall be judged.
- B. If results of tests and inspections indicate the Work is below requirements of the Contract Documents, that portion of the Work is subject to condemnation.

#### 3.6 ADJUSTMENTS

A. Remove and replace Work so condemned at Contractor's expense including costs of subsequent tests and inspections until the Work meets requirements of the Contract Documents.

#### QUALITY CONTROL

#### 3.7 STRUCTURAL OBSERVATION PROGRAM

A. The Structural Engineer of Record (SER) shall perform structural observation based on the requirements of the 2012 International Building Code (IBC) and the 2014 Oregon Structural Specialty Code (OSSC). Refer to General Structural Notes on Sheet S0.2 for tabulation of structural observation items and additional requirements. Structural observations shall be made at the stages of Construction therein listed. Provide sufficient notice and access to the Structural Engineer of Record (SER) for the SER to perform required observations.

#### TEMPORARY UTILITIES

#### PART 1 - GENERAL

#### 1.1 DESCRIPTION

- A. Remodels and Renovations: BSD will provide access to water and electrical as required. Contractor to provide all other temporary utilities.
- B. Contractor to provide all temporary job site facilities, materials, systems and services as required to complete the work and as hereinafter listed. Upon completion of the work, remove all temporary structures and materials. All necessary temporary facilities shall be furnished and paid for by the subcontractor unless specifically noted herein to be paid for by the Owner. All temporary facilities to be in place prior to construction.

#### 1.2 SITE MAINTENANCE

- A. Progress Cleaning:
  - 1. Maintain areas free of waste materials, debris and rubbish. Maintain site in a clean and orderly condition ON A DAILY BASIS.
  - 2. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces and other closed or remote spaces, prior to enclosing the space ON A DAILY BASIS.
  - 3. Broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate dust ON A DAILY BASIS.
  - 4. All construction debris and storage will be kept in an orderly, neat and organized fashion, and within the areas of work. Areas of work shall be free of construction debris ON A DAILY BASIS AT A MINIMUM.
  - 5. At existing building sites, Contractor shall provide secured construction dumpsters and shall not intermingle trash with school dumpsters.
## CONSTRUCTION FACILITIES

#### PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. Temporary Construction Offices: Contractor shall provide temporary construction offices. Coordinate location with BSD Representative.
- B. Contractor to provide drawing of acceptable areas for contractor staging, trailer locations and contractor parking on site plan(s). Owner will review.
- C. Project Personal Identification. All contract personnel shall wear an ID badge that is a distinctive color with the word "Contractor" on the badge. The badge must be worn by any contract personnel within existing buildings. Contractor's Superintendent to issue badges and maintain process.

## 1.2 SANITARY FACILITIES

- A. Workmen will not be permitted to use existing toilet facilities of the existing building. Provide portable facilities and drinking water as required for workmen. Keep facilities clean and in sanitary condition. Remove from the site upon completion of the Work.
- B. Comply with governing regulations including safety and health codes for the type, number, location, operation, and maintenance of fixtures and facilities.
- C. Supply toilet tissue, hand sanitizer, and similar disposable materials as appropriate for each facility. Provide covered waste containers for used material.

## 1.3 TEMPORARY TELEPHONE

A. Contractor shall not use existing phone service. A separate cell and fax service will need to be provided by the Contractor at the job site office.

#### 1.4 TEMPORARY WATER

A. Existing water services may be used. Make temporary connection, as required. Exercise control over usage to conserve water.

#### 1.5 TEMPORARY ELECTRICAL POWER SERVICE

- A. Contractor to provide temporary power, phone & data service for job trailer <u>and</u> for construction work. Existing electrical services not to be used if at all possible. Contractor to establish a utility allowance to cover cost of services.
- B. Provide temporary lighting throughout construction period as required by governing agencies.

#### PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

#### 3.1 INSTALLATION

A. Use qualified tradesmen for installation.

## CONSTRUCTION FACILITIES

- B. Locate temporary services and facilities where they will serve the project adequately and result in minimum interference with the Work.
- C. Temporary Utility Installation:
  - 1. Engage the local utility company 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 at each stage of construction.
  - 5. Prior to availability at the site, provide trucked-in services for start up of construction operations.
  - 6. Obtain and pay for easements required to bring temporary utilities to the site where the Owner's easement cannot be utilized for that purpose.

## 3.2 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision:
  - 1. Limit availability of temporary services and facilities to essential and intended uses to minimize waste and abuse.
  - 2. Do not permit temporary installations to be abused or endangered.
- B. Maintenance:
  - 1. Operate and maintain temporary services and facilities in good operating condition and in a safe and efficient manner until removal is authorized.
  - 2. Do not overload services or facilities.
  - 3. Protect from damage by freezing temperatures and similar elements.
  - 4. Do not allow unsanitary conditions, public nuisances, or hazardous conditions to develop or persist on the site.
  - 5. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24 hour basis where required to achieve indicated results and avoid the possibility of damage to the Work or to temporary facilities.

## 3.3 TERMINATION AND REMOVAL

- A. Remove each temporary service and facility promptly when need has ended, or when replaced by use of a permanent facility, but no later than Substantial Completion.
- B. Complete, or if necessary, restore permanent work delayed because of interference with the temporary service or facility.
- C. Repair damaged work, clean exposed surfaces, and replace work that cannot be repaired.
- D. At Substantial Completion, clean and renovate permanent services and facilities that have been used to provide temporary services and facilities during the construction period.

## **TEMPORARY CONSTRUCTION**

## PART 1 - GENERAL

#### 1.1 SITE MAINTENANCE

- A. Burning or burying of rubbish and waste materials on site is prohibited.
- B. Disposal of volatile fluid wastes (such as mineral spirits, oil or paint thinner) in storm or sanitary sewer systems is prohibited.
- C. Keep site and surrounding areas clear of accumulations of waste material and rubbish resulting from operations under this Contract. Remove waste from site systematically during the progress of construction and immediately upon completion of Work.

## 1.2 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

- A. Contractor can utilize a room in the school as a field office. Owner will determine area before construction. No field office for BSD personnel is needed.
- B. Provide a neat and uniform appearance in temporary construction and support facilities acceptable to the Architect and the Owner.
- C. Locate storage and fabrication sheds, and other support facilities for easy access to the Work.

## 1.3 TEMPORARY HEAT

- A. Provide temporary heat where needed for performance of the Work, for curing or drying of recently installed work, or for protection of work in place from adverse effects of low temperatures or high humidity.
- B. Provide UL or FM tested and labeled heating units known to be safe and without adverse effect upon work in place or being installed.
- C. Coordinate with ventilation requirements to produce the ambient condition and minimize fuel or energy consumption.
- D. Maintain a minimum temperature of 45°F in permanently enclosed portions of the building and areas where finished Work has been installed.

#### 1.4 STORAGE AND FABRICATION SHEDS

- A. Install storage and fabrication sheds as required to accommodate the Work. Maintain temperatures and ventilation as required for materials being stored.
- B. Sheds may be open shelters or fully enclosed spaces. Where fully enclosed, provide one ABC Type portable fire extinguisher in each shed.

## 1.5 FIRST AID SUPPLIES

A. Provide required first aid facilities. Comply with governing regulations and recognized recommendations within the construction industry.

## **TEMPORARY CONSTRUCTION**

#### 1.6 MISCELLANEOUS SERVICES AND FACILITIES

A. Design, construct, and maintain miscellaneous services and facilities as needed to accommodate performance of the work, including temporary stairs, ramps, ladders, staging, shoring, scaffolding, temporary partitions, waste chutes, and similar items.

#### 1.7 ENVIRONMENTAL PROTECTION

- A. Conduct construction activities, and by methods that comply with environmental regulations, minimize the possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result from the performance of work at the site.
- B. Avoid the use of tools and equipment that produce harmful noise.
- C. Restrict the use of noise making tools and equipment to hours of use that will minimize complaints.

## VEHICULAR ACCESS AND PARKING

#### PART 1 - GENERAL

- 1.1 ACCESS, PARKING, AND TRAFFIC
  - A. Parking area for project visitors and construction personnel shall be at location designated by the Owner's Designated Representative.
  - B. Provide barricades, warning signs, flagmen, or other traffic regulators that may become necessary for protection of the public, construction personnel, or property.
  - C. Street/Parking Lot work to not impede flow of traffic.
  - B. The provision of designation signage and temporary traffic flow signage is required if construction changes parking and/or access flow.

## TEMPORARY ENCLOSURES

## PART 1 – GENERAL

#### 1.1 TEMPORARY ENCLOSURE

- A. Provide temporary enclosure of materials, equipment, work in progress, and completed portions of the Work to provide protection from exposure, foul weather, other construction operations, and similar activities.
  - 1. Subcontractor is solely responsible for security of their own tools and equipment.
- B. Coordinate with ventilating, material drying, or curing requirements to avoid dangerous conditions.
- C. Close openings through the floor or roof decks and other horizontal surfaces with substantial load-bearing wood-framed or similar construction.

## 1.2 COLLECTION AND DISPOSAL OF WASTES

- A. Establish a system for daily collection and disposal of waste materials.
- B. Enforce requirements strictly.
- C. Do not retain collected materials longer than 7 days during normal weather or 3 days when the daily temperature is expected to rise above 80 degrees F.
- D. Handle waste materials that are hazardous, dangerous or unsanitary separately from other waste by containerizing.
- E. Dispose of waste material in a lawful manner.
- F. Burying or burning of waste materials on the site or washing waste material down sewers will not be permitted.
- G. Provide silt bags in catch basins and biobags around the basins adjacent to construction work.
- H. Offsite Disposal: Disposal of all waste materials caused by the construction will be off the site and will be the responsibility of the Contractor. Provide paperwork to landfill stating that no hazardous material is present in trash being dumped.

#### 1.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Provide a neat and uniform appearance in security and protection facilities acceptable to the Architect and the Owner.
- B. Maintain site in a safe, lawful and publicly acceptable manner.

#### 1.4 BARRICADES, WARNING SIGNS AND LIGHTS

- A. Comply with recognized standards and code requirements for erection of substantial barricades where needed to prevent accidents.
- B. Paint with appropriate colors and provide warning signs to inform personnel at the site and the public of the hazard being protected against.
- C. Provide lighting where needed including flashing red lights where appropriate.

## TEMPORARY ENCLOSURES

#### 1.5 ENCLOSURE FENCE

- A. Install an enclosure fence with lockable entrance gates to enclose the entire site or portion sufficient to accommodate the construction operation.
- B. Install so as to prevent persons, dogs, and similar animals from entering the site except through the entrance gates.
- C. Provide No. 11 gage galvanized open-mesh, chain-link fabric fencing 6 feet high with galvanized barbed wire top strand and galvanized steel pipe posts, 1-1/2" for line posts and 2-1/2" for corner posts.
- D. Set posts in precast post blocks.

## 1.6 CONSTRUCTION AID BARRIERS

- A. Provide ramps, ladders, stairs, guardrails, chutes and material hoists as required. Construct and maintain to requirements of governing agencies. Furnish for safety of public and construction personnel.
- B. Provide barriers to protect materials, equipment, new and existing work, construction personnel and the public.
- C. Provide temporary dust barriers and other appropriate protection, as required, to prevent dust from entering the existing portions of the building.
- D. Completely remove temporary materials and equipment upon completion of construction.
- E. Repair damage caused by installation of temporary items and restore finishes to specified condition.

## **PROJECT IDENTIFICATION**

## PART 1 - GENERAL

## 1.1 DESCRIPTION

A. The BSD Representative will direct the type of project identification signage to be placed at each project. General contractor to install BSD provided sign. No sign or advertising media of any nature shall be permitted on the site of Work or enclosing structures without the written approval of the BSD Representative. Any approved signs shall comply with the applicable laws, ordinances, and/or rules. Contractor shall not use in its external advertising, marketing programs, or other promotional efforts, any data, pictures or other representation of the District, except with prior specific written authorization from the BSD Representative.

## COMMON PRODUCT REQUIREMENTS

## PART 1 – GENERAL

#### 1.1 MATERIAL AND EQUIPMENT SELECTION

- A. Comply with Standards and these Specifications including size, make, type, and quality specified, or as accepted in writing by the Architect.
- B. All products shall be new and of current manufacture unless otherwise specified.
- C. All similar products shall be of the same manufacturer.
- D. Manufactured and Fabricated Products:
  - 1. Design, fabricate, and assemble in accordance with the best engineering and shop practices.
  - 2. Manufacture like parts of duplicate units to standard sizes and gauges and to be interchangeable.
  - 3. All similar products shall be of the same manufacturer. 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.
- E. Do not use material or equipment for any purpose other than that for which it is designed or is specified.
- F. Fabricate and install equipment to deliver its full rated capacity at the efficiency for which it was designed.
- G. Select and install equipment to operate at full capacity without excessive noise or vibration.
- H. Provide electrical products with Underwriter's Laboratories Label or as approved by the local inspection authority.
- I. Any software provided with products shall be provided with appropriate licensing and use agreements for a minimum of 10 years.

## 1.2 MANUFACTURER'S INSTRUCTIONS

- A. Perform work in accordance with manufacturer's printed installation instructions, obtain and distribute copies of such instructions to parties involved in the installation, including 3 copies to the Design Team.
- B. Maintain one set of complete instructions at the job site during installation and until completion.
- C. Handle, install, connect, clean, condition, and adjust products in strict accordance with manufacturer's printed instructions and in conformity with specified requirements.
  - 1. Consult with the Design Team for further instructions should job conditions or specified requirements conflict with manufacturer's instructions.
  - 2. Do not proceed with work without clear instructions.
- D. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by the Contract Documents.

## **PRODUCT OPTIONS**

## PART 1 – GENERAL

#### 1.1 PRODUCT OPTIONS

- A. Specifications for public improvement contracts may not expressly or implicitly require any product by any brand name or mark, nor the product of any particular manufacturer or seller unless the product meets exemption criteria under ORS 279C.345. Consult with BSD representative if seeking an exception.
- B. "Any brand" with standard of quality, performance and other characteristics clearly described, is the preferred specification and requires no specific approval by the BSD representative.
- C. Single Product Named: For products specified by naming one product or manufacturer and "or accepted substitute", the Contractor must submit a request for substitution for any product or manufacturer not specifically named. Submittal is to be in accordance with this Section. "Brand X" or approved equal specification may be used, when the use is advantageous for the District, because the brand name describes the standard of quality, performance and other characteristics of the product needed by the District. Specific approval by BSD representative is required.
- D. Two or More Products Named: For products specified by naming several products or manufacturers and "or accepted substitute", select any one of the products or manufacturers named, provided the product selected complies with the specifications. If another product or manufacturer not named is to be used, the Contractor must submit a request for substitution for that product or manufacturer in accordance with this Section.
- E. "Or Accepted Substitute" and "Or Equal" Provisions: Where products or manufacturers are specified by name accompanied by the term "or accepted substitute" or "or equal", provide either the product named or comply with the requirements for gaining approval of "substitutions" for the use of an unnamed product. BSD approval is required. May be used when the use is advantageous to the District, because the brand name describes the standard of quality, performance, and other characteristics of the product needed by the District. "Brand X" only specifications should rarely be used and only under conditions listed in ORS 279C.345 Specifications for contracts; exemptions.

It is unlikely that the exemption will encourage favoritism in the awarding of public improvement contracts or substantially diminish competition for public improvement contracts;

The specification of a product by brand name or mark, or the product of a particular manufacturer or seller, would result in substantial cost savings to the contracting agency;

There is only one manufacturer or seller of the product of the quality required; or

Efficient utilization of existing equipment or supplies requires the acquisition of compatible equipment or supplies.

F. No materials or products containing any hazardous materials are to be used in the construction of this project. If any material or product specified in this Project Manual is known to contain hazardous materials, it shall be brought to the attention of the Design Team and Owner before ordering or fabricating that material or product.

## PRODUCT DELIVERY REQUIREMENTS

#### PART 1 - GENERAL

## 1.1 TRANSPORTATION

- A. Arrange deliveries of products in accord with construction schedules; coordinate to avoid conflict with work and conditions at the site.
  - 1. Deliver products in undamaged condition and in manufacturer's original containers or packaging with identifying labels intact and legible.
  - 2. Immediately upon delivery, inspect shipments to assure compliance with requirements of the Contract Documents and to assure products are properly protected and undamaged.
- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

## PRODUCT STORAGE AND HANDLING REQUIREMENTS

#### PART 1 - GENERAL

## 1.1 STORAGE AND PROTECTION

- A. Store products in accordance with manufacturer's instructions with their seals and labels intact and legible.
  - 1. Store products subject to damage by the elements in weather tight enclosures.
  - 2. Maintain temperature and humidity within the ranges required by the manufacturer's instructions.
  - 3. Protect equipment and systems from moisture, chemical, or mechanical damage before and after installation.
  - 4. Protect shafts and bearing housings from rust.
- B. Exterior Storage:
  - 1. Store fabricated products above the ground on blocking or skids to prevent soiling or staining. Cover products that are subject to deterioration with impervious sheet covering. Provide adequate ventilation to avoid condensation.
  - 2. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
- C. Inspection: Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions and free from damage or deterioration.
- D. Protection after Installation:
  - 1. Provide substantial coverings as necessary to protect installed products from damage by traffic or subsequent construction operations.
  - 2. Plug or cap pipe and conduit openings to prevent the entrance of foreign matter.
  - 3. Remove when no longer needed.

## CLEANING AND WASTE MANAGEMENT

#### PART 1 - GENERAL

## 1.1 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

A. District sustainability goals require that this Project generate the least amount of waste possible. Every effort shall be made to minimize waste generated due to poor planning, breakage, mishandling, contamination, or other factors. Waste that is generated shall be reused, salvaged, or recycled when economically feasible. Waste disposal in landfills shall be minimized in accordance with Metro requirements.

#### **PART 3 - EXECUTION**

- 3.1 FINAL CLEANING
  - A. Contractor to provide final cleaning of Work prior to Substantial Completion Inspection.
    - 1. Use cleaning materials that are non-hazardous.
    - 2. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and materials being cleaned.
    - 3. Clean debris from roofs, gutters, downspouts, and drainage systems.
    - 4. Clean site; sweep paved areas, rake clean landscaped surfaces.
    - 5. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner, do not burn or bury.
    - 6. Re-clean areas or equipment; after Substantial Completion Inspection, or if dirtied as result of Contractor's work in preparing for final inspection or completion of punch list.

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## PROTECTING INSTALLED CONSTRUCTION

#### PART 1 - GENERAL

- 1.1 DESCRIPTION
  - A. Contractor shall adequately protect materials being stored, completed construction, and/or construction in progress so as to prevent damage from subsequent operations or vandalism. This would include but is not be limited to control of traffic to prevent damage to equipment and surfaces and providing coverings to protect finished surfaces from damage.
  - B. If materials or construction is damaged due to inadequate protection or vandalism, the Contractor shall clean and repair the Work and/or, at the BSD's representative's direction, replace the Work.

## **CLOSEOUT PROCEDURES**

## PART 1 - GENERAL

#### 1.1 CONTRACT CLOSEOUT

- A. Prerequisites to Substantial Completion:
  - 1. Obtain and submit releases enabling Owner's full and unrestricted use of the work and access to services and utilities, including (where required) occupancy permits, operating certificates, and similar releases.
  - 2. Complete final cleaning up requirements, including touch up of marred surfaces.
  - 3. Upon receipt of Contractor's written request for substantial completion inspection, Architect will either proceed with inspection or advise Contractor of prerequisites not fulfilled.
  - 4. Following initial inspection, the Design Team will either prepare certificate of substantial completion, or advise Contractor of work which must be performed prior to issuance of certificate; and repeat inspection when requested and assured that work has been substantially completed.
  - 5. Results of completed inspection will form initial "punch list" for final acceptance.
- B. Prerequisites to Contract Closeout:
  - 1. Letter referencing the Design Team's last punch list by date, stating that all items listed have been completed and requesting a contract completion inspection.
  - 2. Submit final payment request with final releases and supporting documentation not previously submitted and accepted. Include releases and waivers of liens from Contractors subcontractors and material suppliers, in form approved by the Owner. Include certificates of insurance for projects and completed operations where required.
  - 3. Submit updated final statement, accounting for additional (final) changes to Contract sum.
  - 4. Submit certified copy of the Design Team's final punch list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed and dated by Architect.
  - 5. Submit consent of surety.
  - 6. Revise and submit evidence of final, continuing insurance coverage complying with insurance requirements.
  - 7. Submit specific warranties, workmanship/ maintenance bonds, maintenance agreements, final certification and similar documents, all complete in final form.
- C. Reobservation Fees: Should the Design Team perform more than one reobservation due to failure of the Work to comply with the claims of status of completion made by the Contractor,
  - 1. Owner will compensate the Design Team for such additional services, and
  - 2. Owner will deduct the amount of such compensation from the final payment to the Contractor.
- D. Submissions to e-Builder: Submit all closeout submittals to e-Builder.

#### PART 1 - GENERAL

#### 1.1 CLOSEOUT DELIVERABLES

- A. As-built electronic documentation shall include the following as a minimum:
  - 1. Documentation of all deviations from the design and/or shop drawing submittals, including products that were changed and the reason for the change.
  - 2. Copies of final test reports and any deficiency lists.
  - 3. Documentation of all deviations in Operation and Maintenance (O&M) information from that provided with original equipment submittals.
  - 4. Other information as itemized in this Section.

#### 1.2 WARRANTY, MAINTENANCE, AND OPERATIONAL MANUALS

- A. General:
  - 1. The purpose is to provide BSD with record information necessary for future operation and maintenance of the Project. Organize warranty and operating and maintenance data into suitable sets.
  - 2. Include the following types of information:
    - a. Emergency instructions
    - b. Spare parts list
    - c. Summary schedule of all warranties
    - d. Copies of warranties and contact information
    - e. Wiring diagrams
    - f. Recommended "turn around" cycles
    - g. Inspection procedures
    - h. Record Shop Drawings and Installed Product Data
    - i. Fixture lamping schedule
    - j. Ballast and driver schedule
- C. Submittal will generally include:
  - 1. A table of contents.
  - 2. A list of all Subcontractors with contact information including emergency phone number.
  - 3. All information needed to operate and maintain systems and equipment provided in the Project presented and arranged in a logical manner for efficient use by the BSD's operating personnel.
  - 4. A list of manufacturers with phone numbers and addresses of local distributors, services representatives, parts dealers, etc. Include 24-hour service representatives when available.
  - 5. Equipment manufacturer, make, model number, size, and nameplate data.
  - 6. Description of system, configuration and operation, including component identification and interrelations. A master control schematic drawings(s) will normally be required for this purpose.
  - 7. Dimensional and performance data for specific unit provided. Extraneous catalog data must be eliminated.
  - 8. Manufacturer's recommended cleaning methods and materials.
  - 9. Manufacturer's recommended operating instructions as appropriate.
  - 10. Manufacturer's recommended maintenance requirements and preventative maintenance recommendations including lubrication and other servicing data.
  - 11. Complete parts list, including reordering information, recommended spares, and anticipated useful life (if available). Include name, telephone, and fax numbers of manufacturer's authorized service/parts distribution outlets nearest to Project.
  - 12. Emergency instructions.
  - 13. Warranties/guarantees.
  - 14. Extra stock receipts.

- 15. Training schedule.
- D. Include the following tabs:
  - 1. Table of contents
  - 2. Contact list
  - 3. Certificate of substantial completion
  - 4. Contractor statement of warranty
  - 5. Lead and asbestos free certification letter
  - 6. Certificate of occupancy
  - 7. Final permit inspection approvals
  - 8. Product data and warranties
    - a. Product data, warranty and shop drawings to be included.
    - b. Electronic Manuals: For each product, provide a pdf for the O&M and a pdf for the warranty, each named according to CSI/Specification number. Include a pdf of shop drawings if applicable.
- E. Review Procedures:
  - 1. Submit an electronic O&M Manual for preliminary review/acceptance; submit via e-Builder. Preliminary copy shall be complete.
  - 2. Upon approval of preliminary copy, prepare and submit to BSD one final copy of each manual.
- F. Provide final O&M Manual, final and complete as built files, specifications, as built drawings set in PDF format, redlined record drawings and permit drawings. Submit via eBuilder.
  - 1. Final and complete sets of as built drawings shall accurately and cleanly reflect as-built conditions.
  - 2. The AHJ Stamped Drawings are acceptable in either print or electronic format.
- G. Submissions to e-Builder: Submit all closeout submittals to e-Builder.

#### 1.3 CERTIFICATIONS

- A. Asbestos Free Certification:
  - 1. Absolutely no materials containing asbestos are to be provided or installed as part of this Project. The Contractor shall ensure that no subcontractor or any of Contractor's own forces installs any materials containing asbestos. At final closeout of the Project, the Contractor shall provide to the School District certification that no materials containing asbestos have been installed in the Project and that the Project is asbestos free as required by the State of Oregon.
- B. Lead Free Certification: Absolutely no materials containing lead are to be provided or installed as part of this Project. The Contractor shall ensure that no subcontractor or any of Contractor's own forces installs any materials containing lead. At final closeout of the Project, the Contractor shall provide to the School District certification that no materials containing lead have been installed in the Project and that the Project is lead free as required by the State of Oregon.
- B. Certificate of Occupancy.
- C. Final permit inspection and approvals.

#### 1.4 PROJECT RECORD DOCUMENTS

- A. General:
  - 1. Contractor shall not use Record Documents for construction purposes; protect from deterioration and loss in a secure location; provide access to Record Documents for BSD's reference during normal working hours.
- B. Contractor's Redlines and As-Builts:
  - 1. Contractor to maintain a clean, undamaged set of prints of Contract Drawings and Shop Drawings for preparation of Contractor's Redlines and As-Builts. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
  - 2. Mark Contractor's Redlines and As-Builts with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
  - 3. Mark new information that is important to the BSD, but was not shown on Contract Drawings or Shop Drawings.
  - 4. Note related Change Order numbers where applicable.
  - 5. Contractor's Redlines and As-Builts shall be the same size. Paper sizes are limited to ANSI B Plot (11"x17"), ANSI D Plot (24"x36"), and ARCH E1 Plot (30"x42").
  - 6. Organize sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates, and other identification on the cover of each set.
  - 7. Create copy of mechanical, electrical, and plumbing "As Built" Sets and submit directly to BSD Representative at Substantial Completion via e-Builder.
    - a. Final and complete sets of as built drawings shall accurately and cleanly reflect asbuilt conditions.
  - 8. Deliver complete Contractor's Redlines and As-Builts to the Design Team. An electronic copy of Contractor's Redlines and As-Builts to be given to the Owner at the end of the Project via eBuilder.
    - a. Final and complete sets of as built drawings shall accurately and cleanly reflect asbuilt conditions.
  - 9. Architect will thereafter prepare Record Set incorporating Contractor's Redlines and As-Builts.

- C. Record Specifications:
  - 1. Contractor to maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related Record Drawing information and Product Data.
  - 2. Upon completion of the Work, submit Record Specifications for the BSD's records. Submit electronic copy via eBuilder at end of Project.
- D. Record Product Data:
  - 1. Contractor to maintain one copy of each Product Data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark-up of Record Drawings and Specifications.
  - 2. Upon completion of mark-up, submit complete set of Record Product Data to the Design Team for the BSD's records. An electronic copy on a thumb drive of Record Product Data to be given to the Owner at the end of the Project.
  - 3. Any marked-up data to be provided in O&M manual. Do not submit varying versions of the same product data.
- E. Miscellaneous Record Submittals:
  - 1. Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Design Team for the BSD's records.
- F. Submit 1 hard copy or electronic copy of Permit Drawing Set with original stamp, signature and date to BSD Representative.
  - 1. The AHJ Stamped Drawings are acceptable in either print or electronic format.
- G. Schedule/Log of Closeout Submittals: Prepare Schedule/Log of Required Submittals specifically related to Closeout and include preparation as a line item in Schedule of Values.

#### **DEMONSTRATION AND TRAINING**

#### PART 1 - GENERAL

## 1.1 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to Final Completion or acceptance, fully instruct the Owner's Designated Representative and maintenance personnel in the operation, adjustment, and maintenance of all products, equipment, and systems.
  - 1. BSD reserves the right to video tape training sessions.
- B. Operating and maintenance manual shall constitute the basis of instruction.
  - 1. Review contents of manual with Owner's personnel in full detail to explain all aspects of operations and maintenance.
  - 2. Review complete heating and cooling cycles with Owner's Designated Representative. Review location of dampers, valves, and control equipment.
- C. Building Operators:
  - 1. Operational and safety training shall be attended by building personnel and maintenance staff.
  - 2. Provide training that emphasizes daily maintenance requirements, cleaning and safety procedures.
  - 3. Training for maintenance shall cover specialized material handling requirements including concerns during application, cleaning, disposal, and safety concerns.
- D. Maintenance:
  - 1. Maintenance training shall provide a minimum of the following:
    - a. Review of complete O&M manuals, including but not limited to, Material Safety Data Sheets (MSDS), required maintenance and troubleshooting, and must include contact names and phone numbers for factory support.

## SELECTIVE STRUCTURE DEMOLITION

#### PART 1 - GENERAL

#### 1.1 WORK INCLUDED

- A. Provide all selective building demolition necessary and preparatory to construction. Refer to the Drawings for location of existing materials requiring removal. Verify existing conditions at the site of the work and include all work evident by inspection.
- B. Provide for the salvage of existing materials for the Owner or for reuse as indicated at the end of this Section.

#### 1.2 REFERENCES

- A. Oregon Administrative Rules (OAR), Department of Human Services, Public Health Division: Chapter 333, Division 70 Renovation, Repair and Painting Activities Involving Lead-Based Paint.
- B. Code of Federal Regulations: 40 CFR: Protection of the Environment.

#### 1.3 QUALITY ASSURANCE

- A. Regulatory Agency Requirements: Comply with applicable codes and ordinances concerning demolition operations and refuse removal.
- B. Pre-demolition Meeting: Meet at the Site with the Mechanical Engineer, Architect, and Owner. Review location of service lines. The Contractor shall be responsible for protection from dust and water damage and flying aggregate. Establish location of interior dust barriers.

#### 1.4 SITE CONDITIONS

A. Interior Dust Control: Provide dust control barriers consisting of curtains or doors to limit the spread of demolition dust and debris in construction work. Use all precautions to confine dust to the work area. Maintain throughout the construction process.

## PART 2 - PRODUCTS

#### 2.1 EQUIPMENT

- A. Sawing Equipment: Use diamond edged saw blades of proper size for depth of cut.
- B. Drilling Equipment: Use non-impact rotary tool with diamond core drills.

#### **PART 3 - EXECUTION**

## 3.1 PREPARATION

A. Protection: Provide protection and conduct demolition operations to prevent personal injury or property damage.

## SELECTIVE STRUCTURE DEMOLITION

- B. Service Disconnection: Disconnect existing service lines to be abandoned and cap exposed service lines to be maintained.
- C. Interior Demolition:
  - 1. Provide slurry control to protect all existing facilities from water damage during sawing and drilling.
  - 2. Provide dust barriers inside the existing building until completion of demolition work.
  - 3. Install bracing and shoring prior to sawing structural components.
  - 4. All floor materials indicated to be removed are to include the striping of the adhesive to the concrete substrate.

## 3.2 HAZARDOUS MATERIALS

- A. Removal: A licensed abatement contractor will remove all accessible hazardous-containing materials prior to the commencement of the building and site demolition work.
- B. Copies of the asbestos surveys and abatement specifications will be provided by the School District for reference by the demolition contractor.
- C. During the course of demolition work, additional hazardous materials may be encountered. If hazardous materials are encountered, this contractor shall immediately notify the School District Representative. The District's hazardous material abatement consultant will evaluate the suspected hazardous material and provide additional direction for the handling of the material.
- D. If any hazardous material is damaged during the course of the demolition work, immediately evacuate non-trained personnel. Clean up of the area and decontamination of personnel shall be at the direction of the Owner's hazardous material abatement consultant.
- E. Lead Base Paint: For renovations, repairs and painting (RRP) in "Child-Occupied Facilities" (where kids under the age of 6 regularly spend time and built before 1978), the General Contractor shall follow all Federal, State and local rules (including OSHA and US EPA rules and Oregon Administrative Rules Chapter 333, Division 70) associated with lead-based paints (LBP).
  - 1. The Contractor is responsible for the identification of LBP hazards and providing engineering controls for trigger activities that disturb LBP.
  - 2. Any time painted surfaces are disturbed, the work must be performed by a certified firm with a trained and certified "renovator" in accordance with 40 CFR (including Part 745.82 Lead).
  - 3. Post the areas of the building that will be affected with appropriate signage warning of the potential hazard.

## 3.3 DEMOLITION

- A. Remove existing materials as indicated on the Drawings.
- B. Remove abandoned plumbing and electrical lines to concealed spaces and cap.
- C. Sprinkle and dampen debris and rubbish with water to control dust. Remove debris from the site as demolition progresses and do not allow accumulation on the premises.
- D. Save and protect existing utilities shown to remain. Notify the Architect at once if unknown utilities are found in the work.
- E. Execute the demolition in an orderly and careful manner with due consideration for the Owner and the public. Provide mufflers for compressors and other noisy motors.

## SELECTIVE STRUCTURE DEMOLITION

- F. Provide shoring and bracing as required at saw cutting areas. Do not over-cut corners.
- G. Recycle as much of the demolition waste as possible.
- H. Mechanical Demolition:
  - 1. Remove and dispose of unused heating piping, and air handling equipment ductwork where accessible during the normal course of work. Any utilities that serve equipment in operation or that is required for building use are to be kept in operation. Refer to the Mechanical Demolition Drawings for piping and ducts left in service. Exercise care in removing used piping and ducts.
  - 2. Avoid damage to piping and ductwork that will remain installed to keep the fans and other systems in operation.
  - 3. Where existing equipment is to remain for future connection, leave sufficient pipe ends for capping during demolition for protection, removal of cap, and connection of new pipe.
  - 4. Where parts of existing equipment are removed and stored for reinstallation, the Contractor shall record the location of each part as removed on a clean 1/8" scale floor plan. All parts shall be marked with a system corresponding to the plan so that the part can be easily located in its original location when reinstalled.
  - 5. If during demolition, any pipe, duct, or equipment is found that is not noted to remain or to be removed, or may require review by the Architect or the Owner to determine service, the Contractor will immediately notify the Architect. The Owner and the Architect will then review the pipe, duct, or equipment and direct Contractor on its disposition.
- I. Electrical Demolition:
  - 1. Remove and dispose of all electrical devices, conduits, and conductors that are shown to be removed. Refer to the Electrical Demolition Drawings for locations.
  - 2. Take necessary precautions while removing electrical devices, conduits, and conductors so that power, fire alarms, and the communication system are maintained while work is being accomplished.
  - 3. Provide all required temporary lighting during demolition.
  - 4. Do not remove any electrical conduits, conductors, or cabling that penetrates the construction area en route to any other area or floor unless shown on the Drawings.
  - 5. The demolition of all electrical devices including light fixtures, wiring devices, alarm equipment, mechanical, equipment, telephone equipment, wiring, etc., must be performed by a licensed electrician.
  - 6. If during demolition, any electrical items or equipment are found that are not noted to remain or be removed, or may require review by the Architect or the Owner to determine service, the Contractor will immediately notify the Owner. The Owner and the Architect will then review the electrical item or equipment and direct Contractor on its disposition.

## 3.4 ADJUSTING AND CLEANING

- A. Clean-up: Remove all demolition debris, including broken concrete and masonry, from the building as soon as selective demolition has been completed.
- B. Disposal:
  - 1. Do not store, sell, or burn demolished or salvaged materials on the Site.
  - 2. Transport debris to an approved and licensed land fill area.
- C. Repairs: Repair damage to existing facilities and adjacent property to meet conditions existing prior to demolition operations.

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## SELECTIVE STRUCTURE DEMOLITION

D. Cleaning: Broom clean interior surfaces, exterior slabs, and paving that have been soiled by demolition activities. Vacuum ducts and replace air filters at the end of demolition work.

# SECTION 02 82 13 ASBESTOS ABATEMENT

## PART 1 GENERAL

## 1.1 SCOPE

- A. This section covers the removal of materials that contain, or are presumed to contain, greater than one percent asbestos.
- B. The abatement contractor shall provide all labor, materials, equipment, services, permits, and insurance required to complete asbestos abatement procedures as indicated in these Specifications and/or the drawings.
- C. The following tables list asbestos-containing materials (ACM) to be removed. Abatement includes soft (non-structural) demolition, asbestos-containing materials removal, and disposal.

Asbestos-Containing Building Materials	Approximate Quantity	Units (SF), (LF), (EA), (NQ)	Locations
Hard Fittings on Fiberglass Pipe Insulation	450	EA	Throughout. Refer to Plumbing Demolition Drawings
Sink with Asbestos-Containing Undercoating	1	EA	A-Wing Work Room
Wallboard with Less Than One- Percent Asbestos		NQ	Refer to Specification Section 02 82 21 - OSHA Requirements for Removal of Materials with less than 1% Asbestos

Table 1. Asbestos-Containing Materials to be Removed

SF: Square Feet; LF: Linear Feet; EA: Each; NQ: Not Quantified

D. The quantities and location of asbestos-containing hard fittings indicated above, and on the asbestos abatement drawing HM1, are only best estimates limited by the physical constraints imposed by occupancy of the building. Accordingly, minor variations of plus or minus 10 percent of the estimated quantities are considered as having no impact on contract price and schedule of this contract. Locations of ACM different than indicated on drawings, but within the limits of building, are considered as having no impact on contract price and schedule of this contract.

# **1.2 DEFINITIONS**

- A. Abatement: Procedures to control fiber release from asbestos-containing building materials, which include encapsulation, enclosure, removal, repair, and related activities.
- B. Aggressive Sampling: Air sampling method that assures that asbestos fibers remain airborne during sampling. All surfaces inside the work area will be agitated by the liberal use of compressed air, leaf blowers, or similar. Fans will then be run throughout the sampling period to keep all suspended fibers airborne.
- C. AHERA: Asbestos Hazard Emergency Response Act, 40 CFR Part 763.
- D. Air Lock: A system for permitting ingress or egress without permitting air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways at least three feet apart.

- E. Air Monitoring: The process of measuring the asbestos fiber content of a specific volume of air in a stated period of time.
- F. Amended Water: Water containing a surfactant additive.
- G. Asbestos-containing Material (ACM): Any material containing more than one percent asbestos as defined under NESHAPS CFR 40, Part 61, OAR Chapter 340, Division 248, OR-OSHA 437, 1926.1101, and OSHA 29 CFR Part 1926.1101.
- H. Authorized Visitor: The owner or designated representative, or a representative of any regulatory or other agency having jurisdiction over the project, and having required training, medical, fit test, etc.
- I. Certified Industrial Hygienist (CIH): An industrial hygienist certified in comprehensive practice by the American Board of Industrial Hygiene.
- J. Construction, Manager/General Contractor (CMGC): A construction delivery method in which the construction manager acts as the general contractor with schedule and cost risk. The CMGC provides design phase assistance in evaluating costs, schedule, and implications of systems and materials during design.
- K. Class I Asbestos Work: Activities involving the removal of TSI and surfacing ACM and PACM.
- L. Class II Asbestos Work: Activities involving the removal of ACM, which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and mastics.
- M. Clean Room: An uncontaminated area or room that is part of the worker decontamination enclosure system, with provisions for storing workers' street clothes and clean protective equipment.
- N. Critical Barrier: Solid barrier constructed from minimum of 2- by 4-inch studs, 16-inch o.c.; 0.5-inch plywood or drywall sealed airtight and covered on both sides (where applicable) with two layers of 6-mil plastic.
- O. Curtained Doorway: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms, typically constructed by placing three overlapping sheets of plastic over an existing or temporarily-framed doorway, securing each along the top of the doorway in a pleated fashion and securing one vertical side of each sheet on alternating sides of consecutive sheets. Two curtained doorways spaced a minimum of three feet apart to form an air lock.
- P. Disposal: Procedures necessary to transport and deposit the asbestos-contaminated material in an approved waste disposal site in compliance with the Environmental Protection Agency (EPA) and other applicable regulations.
- Q. Enclosure: Procedures necessary to completely seal all asbestos-containing material behind airtight, impermeable, permanent barriers, including PVC jackets.
- R. Encapsulant (Sealant): A liquid material that can be applied to asbestos-containing material and that controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulant), or by penetrating the material and binding its components together (penetrating encapsulant).
- S. Environmental Consultant: Environmental consultant specializing in asbestos abatement—PBS Engineering and Environmental Inc., 4412 SW Corbett Avenue, Portland, Oregon, 97239, 503.248.1939—or any subcontractor designated by PBS.
- T. Equipment Room: A contaminated area or room, which is part of the worker decontamination enclosure system, with provisions for storage of contaminated clothing and equipment.
- U. Fitting: With regard to pipe insulation, a fitting is any elbow, offset, reducer, tee, etc.
- V. Fixed Object: Fixtures that are attached to the building or too heavy or bulky to remove from the work area.
- W. Glovebag: A manufactured device consisting of a transparent plastic bag with inward projecting sleeves, an internal tool pouch, provisions for fastening and sealing at the top and sides, and a receptacle in the bottom to hold asbestos waste. The glovebag is installed to surround the material to be removed and contain all fibers released during the process. Glovebags are used to remove insulation from small sections of pipe and fittings.
- X. HEPA Filter: A high efficiency particulate air (absolute) filter capable of trapping and retaining 99.97 percent of asbestos fibers greater than 0.3 microns in length.
- Y. HEPA Vacuum Equipment: High efficiency particulate air (absolute) filtered vacuuming equipment with a filter system capable of collecting and retaining asbestos fibers. Filters of 99.97 percent efficiency for retaining fibers of 0.3 microns in length or larger shall be installed for filtering discharge air.
- Z. Independent Testing Laboratory: A laboratory financially independent from and hired by the owner, architect, or contractor that is either AIHA-accredited for asbestos with demonstrated proficiency via the AIHA PAT program, or has analysts proficient in the AIHA AAR program for air sample analysis.
- AA. Industrial Hygienist: An employee of the Independent Testing Laboratory who is experienced and trained in asbestos sampling and analysis as specified.
- BB. Insulating Cement: Cementitious material applied to pipe reducers, manifolds, etc.
- CC. Isolated Work Area: A totally contained area of the facility where abatement activities are performed.
- DD. Movable Object: Furnishings not attached to the building structure that can be removed from the work area.
- EE. Negative-air Glovebag: A manufactured device consisting of a transparent plastic bag with inward projecting sleeves, an internal tool pouch, provisions for fastening and sealing it at the top and sides, and a receptacle in the bottom to hold asbestos waste. The glovebag is installed to surround the material to be removed and contain all fibers released through the process, with provisions for allowing continuous airflow through the bag while maintaining negative pressure inside.
- FF. Owner Representative: Designated by the Owner, and/or designated employee(s) of the Owner Representative.
- GG. PACM: Presumed asbestos-containing materials.
- HH. Pressure Differential Fan System: An air-purifying fan system located inside or outside the isolated work area that draws air out of the work area through a HEPA filter, keeping static air pressure in the work area lower than in adjacent areas, and preventing escape of contaminated air from work area to adjacent areas.
- II. Public Area: Any area outside the isolated work area. When work area isolation measures are removed, the work area becomes a public area.
- JJ. Removal: All operations where ACM and/or PACM are taken out or stripped from structures or substrates, and include demolition activities.

- KK. Shower Room: A room between the clean room and the equipment room in the worker decontamination enclosure system that is equipped with soap, shampoo, and hot and cold running water controllable at the faucet, and suitably arranged for complete showering during decontamination. The shower room must be separated from the clean room and equipment room by air locks.
- LL. Special Fitting: With regard to pipe insulation, a special fitting is any valve, union, strainer, thermometer, flange, etc.
- MM. Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.
- NN. Tack Coat: A coat of penetrating encapsulant applied to all surfaces from which asbestos-containing materials have been removed.
- OO. Thermal System Insulation (TSI): ACM applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain.
- PP. Vacuum Loader Removal: Wetting and pneumatic conveying of loose material through a vacuum hose to a sealed collection tank specially equipped to prevent escape of fibers.
- QQ. Wet Cleaning: The process of eliminating asbestos from building surfaces and objects by using cloths, mops, or other cleaning tools that have been dampened with water.
- RR. Worker Decontamination Enclosure System: A showering facility for workers, typically consisting of a clean room, a shower room, and an equipment room. Each of these rooms is separated from the others by air locks. The equipment room is separated from the work area by a curtained doorway. The clean room is separated from the public area by a curtained doorway.
- SS. Worksite Entry Logbook: A logbook kept in the clean room that must be signed by everyone entering or leaving the work area. All pages of the logbook must be the same as the sample page bound into these Specifications.

# **1.3 DOCUMENTS INCORPORATED BY REFERENCE**

- A. The current issue of each document shall govern. Where conflict among requirements or with these Specifications exists, the most stringent requirements shall apply.
  - 1. US Environmental Protection Agency National Emissions Standards for Hazardous Air Pollutants (NESHAPS). (Code of Federal Regulations Title 40, Part 61, Subparts A and M.)
  - 2. US Environmental Protection Agency Office of Toxic Substances Guidance Document, "Guidance for Controlling Friable Asbestos-Containing Materials in Buildings." EPA Report Number 560/5-85-024 ("Purple Book").
  - 3. US Department of Labor Occupational Safety and Health Administration (OSHA):
    - a. Title 29 Code of Federal Regulations Section 1910.1001—General Industry Standard for Asbestos.
    - b. Title 29 Code of Federal Regulations Section 1910.134—General Industry Standard for Respiratory Protection.
    - c. Title 29 Code of Federal Regulations Section 1910 et al.—Occupational Exposure to Asbestos; Final Rule.
    - d. Title 29 Code of Federal Regulations 1926.1101—Construction Standard for Asbestos.

- e. Title 29 Code of Federal Regulations Section 1910.1020—Access to Employee Exposure and Medical Records.
- f. Title 29 Code of Federal Regulations Section 1910.1200—Hazard Communication.
- 4. National Institute for Occupational Safety and Health (NIOSH), 42 CFR, Part 84, Respiratory Protective Devices.
- 5. American National Standards Institute (ANSI) NY; ANSI Standard Z 88.2-1980 "American National Standards Practice for Respiratory Protection," latest edition.
- 6. Oregon Administrative Rules Chapter 340, Division 248, Department of Environmental Quality; Chapter 340, Division 33, Licensing and Certification Requirements.
- 7. Oregon Administrative Rules Chapter 437, Divisions 2 and 3.
- 8. Oregon Revised Statutes (ORS), Chapters 279C, Certified Asbestos Contractors and Prevailing Wage; 656, Workers Compensation; and 701, Construction Contractors and Contracts.
- 9. All related electrical work shall be performed in accordance with the National Electrical Code.
- 10. All local ordinances, regulations, or rules pertaining to asbestos, including its storage, transportation, and disposal.

# **1.4 SUBMITTALS AND NOTICES**

- A. Contractors shall submit three bound indexed copies of each submittal package as indicated below.
- B. Contractors shall submit to the architect and environmental consultant the following information prior to beginning work on the project:
  - 1. CONTRACTOR'S LICENSE. Submit proof that the asbestos abatement contractor is currently and for the duration of the project licensed in the state of Oregon to perform asbestos abatement, per ORS Chapter 701, and OAR Chapter 340, Division 248.
  - 2. ASBESTOS SUPERVISOR. Submit the name and resume of the assigned on-site foreman. At minimum, the foreman shall have successfully completed the Department of Environmental Quality (DEQ) asbestos supervisor course as approved by the State of Oregon. Other criteria such as references and similar projects will also be reviewed. At the architect or environmental consultant's request, the contractor shall arrange an oral interview with the assigned on-site foreman. The owner, architect, and the environmental consultant reserve the right to reject the foreman from the work at any time during the project. The contractor shall then assign another on-site foreman for the owner, architect, and environmental consultant's approval as described above.
  - 3. INSURANCE CERTIFICATE. Submit a copy of the certificate of asbestos-specific liability insurance policy.
  - 4. WORKER CERTIFICATION. Submit written proof indicating that all employees impacting asbestos-containing materials are Oregon state certified asbestos workers. Proof shall include photocopies of certificates and a signature from the contractor's principal indicating that all employees assigned to this project have completed such a program.
  - 5. RESPIRATOR PROGRAM. Submit written proof indicating respirator program complies with all parts of OSHA Asbestos Regulations CFR Title 29, Part 1910.134 and 1926.1101, OR-OSHA Chapter 437, 1910.134 and 1926.1101.

- 6. MEDICAL PROGRAM. Submit written proof medical exam program complies with OSHA Asbestos Regulations CFR Title 29, Section 1926.1101 and OR-OSHA Chapter 437, 1926.1101.
- 7. EMERGENCY PLANS. Submit a written emergency control and cleanup plan to be followed by the contractor in the event of an accidental breach in containment, power failure, and accidental disturbance of ACMs in non-isolated areas.
- 8. NOTIFICATION. Submit copy of written notification to DEQ of the proposed asbestos work not fewer than 10 days before work commences on this project.
- 9. DISPOSAL PLAN. Submit written proof that all required permits and arrangements regarding the transportation and disposal of asbestos-containing or contaminated materials, supplies, etc. have been obtained. The disposal site must be approved by the EPA and/or DEQ and other responsible agencies.
- 10. WORK PLAN. Submit a written "work plan" satisfactory to the architect and environmental consultant describing the schedule for asbestos abatement, decontamination procedures, and plans for construction and location of decontamination enclosure systems, pressure differential exhaust fans, etc. in compliance with these Specifications and applicable regulations, including calculations for determining required number of negative-air filtration units. The plan shall schedule the systematic flow of work throughout the facility per Specifications on a day-by- day basis, outlining room-by-room, or area-by-area procedures and planned alternative control measures. The contractor shall keep close coordination of his work with the architect and environmental consultant.
- 11. AIR MONITORING. Submit information pertaining to the proposed Air Monitoring Program for this project, if appropriate. This information shall include the name(s) of the certified industrial hygienist appointed, the name of the on-site industrial hygiene technician working under his supervision, types of equipment, and sampling schedule, sampling procedures, calibration recordkeeping, and testing laboratory proposed.
- 12. PRODUCT INFORMATION. Submit complete product information for any materials and products for which the contractor requests approval for use on this job (other than those specified).
- 13. EMERGENCY PHONE NUMBER. Submit a local phone number at which the contractor or on-site foreman can be reached on a 24-hour basis during the course of the work.
- C. Contractor shall not begin work until submittals are reviewed and accepted by architect and the environmental consultant. Allow a ten-day review period.
- D. During the work, the contractor shall submit the following to the architect and environmental consultant, on a periodic basis as agreed to by the architect, environmental consultant, and contractor:
  - 1. Waste shipment and disposal documentation.
  - 2. Air monitoring data.
  - 3. Notification updates.
- E. Contractor shall submit to the environmental consultant, in writing, all information required above regarding any new asbestos workers hired by, or subcontracted to, the contractor before these new asbestos abatement workers begin work.
- F. Prior to removal of decontamination systems and isolation barriers, the contractor shall obtain specific written permission from the environmental consultant.

- G. Prior to making final application for payment the contractor shall:
  - 1. Complete all work under this contract.
  - 2. Submit to the environmental consultant all required submittals, including all waste shipment records completely filled out and signed.
  - 3. Submit to the owner all payroll reports for work on this contract and other information as described elsewhere in the Specifications, if appropriate, under the contract.
  - 4. Submit to the environmental consultant "as-abated" drawings along with a signed affidavit stating that all asbestos-containing materials have been removed as indicated on the drawings.
- H. See other sections of these Specifications, and EPA, OSHA, and other standards referenced therein, for further information and requirements not included above.

# **1.5 BUILDING PROTECTION**

- A. Building Security and Protection
  - 1. The contractor shall post adequate warning signs at all potential entrances to work areas as required by EPA and OSHA.
  - 2. The contractor shall protect all existing fixed equipment, building finishes that are to remain, and existing systems and functions from damage during the abatement process. Extra precautions are to be taken in protecting existing electrical panels, light fixtures, etc. Any damage to existing building, services, and/or equipment shall be remedied by the contractor at their expense.
  - 3. Contractor shall clean external surfaces of contaminated containers and equipment thoroughly by wet sponging and HEPA vacuum.
  - 4. Contractor shall maintain access and use of existing fire lanes.

# **1.6 PERSONAL PROTECTION**

- A. Training
  - 1. Prior to commencement of work, contractor shall ensure all workers have been trained as specified.
  - 2. The contractor shall provide and post, in the clean room(s) and the equipment room(s), the decontamination, respirator, and work procedures to be followed by the workers.
- B. Personnel Personal Protective Equipment for Asbestos Removal
  - 1. Work clothes shall consist of disposable full-body coveralls and head and foot covers ("Tyvek" or approved), boots, or sneakers. Eye, hearing, fall protection, and hard hats should be available as appropriate.
  - At minimum, respiratory protection shall be approved by National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA); US Department of Labor; US Department of Health, Education, and Welfare; Centers for Disease Control; and as listed below. Respiratory protection shall provide workers with a maximum calculated fiber level inside the mask of 0.01 f/cc.
    - a. Glovebag or modified glovebag: full-face mask, powered air-purifying respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 100.

- b. Demolition of walls and ceilings that may impact friable asbestos-containing material: half-face mask, negative-pressure respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 10.
- c. Pre-abatement work in close proximity to friable asbestos-containing materials: half-face mask, negative-pressure respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 10.
- d. Abatement in isolated areas: full-face mask, powered air-purifying respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 100.
- e. HEPA vacuuming and wet cleaning of surfaces: half-face mask, negative-pressure respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 10.
- f. Vinyl asbestos floor tile removal: half-face mask, negative-pressure respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 10.
- g. Handling of double-bagged asbestos-contaminated waste: half-face mask, negativepressure respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 10.
- 3. Additional respiratory protection shall be as required by CFR 29 1910.134 and 1926.1101, OR-OSHA Chapter 437, 1910.134 and 1926.1101.
- 4. As part of the Contractor's Respiratory Protection Program, all workers shall be provided with a selection of brands and sizes of respirators to choose from. At a minimum, all workers shall be qualitatively fit-tested at the time of respirator selection per OR-OSHA Worker's Compensation Department Rule 22-069 (4)(e)(5)(i), and semiannually thereafter.
- 5. Contractor shall supply replacement filter cartridges, as required. Cartridges that have become wet or clogged shall be replaced immediately.
- C. Worker Decontamination Enclosure System
  - 1. The contractor shall construct a personnel decontamination facility immediately outside of the isolated work area consisting of three chambers and two air locks as follows:
    - a. The equipment room shall consist of an air lock to the shower room, and a curtained doorway to the work area.
    - b. The shower room shall have two air locks, one to the equipment room and one to the clean room. All showers shall have hot and cold water controllable at the taps and installed in this room. The contractor shall supply and maintain soap, shampoo, and towels at all times in the shower area. Shower wastewater shall be filtered to remove all fibers larger than five microns, or as required by local regulations, before disposal in the municipal sewer system, or shall be collected and disposed of as asbestos-contaminated material. Permits shall be obtained and all water discharge regulations complied with, as required by local municipalities. Water filters shall be disposed of as asbestos-contaminated material.
    - c. The clean room shall consist of an air lock to the shower room and a curtained doorway to the adjacent building area. The clean room shall contain a first aid kit, a place to sit down, the Worksite Entry Logbook, and storage for workers' and visitors' clothing and shoes. Work, respirator, and decontamination procedures; regulations; and prevailing

wage rates shall be conspicuously posted. There shall be a supply of clean, protective clothing, and respirators and cartridges in the clean room at all times.

- d. A monometer measuring pressure differential within and outside the containment shall be installed and remain operable on any containment from the start of abatement work until work is complete, and satisfactory clearance results are obtained. Air pressure within the containment shall remain at or below -0.02 inches of water (compared to ambient air pressure) throughout.
- 2. Contractor shall not begin asbestos abatement work unless this system is functional, in good repair, and has been found acceptable for specification compliance by the environmental consultant.
- D. Personnel Protection Procedures in Isolated Work Areas
  - 1. Each worker shall, upon entering the jobsite, remove street clothes in the clean change room, put on and fit-test their respirator, put on clean protective clothing, and sign in on the Worksite Entry Logbook before entering the equipment room or the work area.
  - 2. Workers shall, each time they leave the work area, remove gross contamination from clothing before leaving the work area; proceed to the equipment room and remove and dispose of disposable work clothes; remove and store shoes, boots, and other equipment except respirators; still wearing the respirator, proceed to the showers and clean the outside of the respirator with soap and water while showering; remove the respirator; thoroughly shampoo and wash themselves; remove filters, dispose of filters in the container provided for that purpose, and wash and rinse the inside of the respirator.
  - 3. Following showering and drying off, each worker shall proceed directly to the clean change room and dress in clean clothes at the end of each day's work or before eating, smoking, or drinking. Before reentering the work area from the clean change room, each worker shall put on his respirator with clean filters, dress in clean protective clothing, and sign in on the Worksite Entry Logbook.
  - 4. Contaminated work footwear and other equipment shall be stored in the equipment room when not in use in the work area. Upon completion of asbestos abatement, footwear shall be disposed of as contaminated waste or cleaned thoroughly inside and out, using soap and water, before removing from work area.
  - 5. Workers shall not eat, drink, or chew gum at the worksite except in the established clean room. Smoking or using other tobacco products is prohibited.
  - 6. Workers shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of asbestos-containing or contaminated material and until final cleanup is completed.
- E. Access to Isolated Work Area by Others
  - 1. Except for emergency personnel, the contractor shall limit access to the work area to authorized visitors.
  - 2. The contractor shall provide protective clothing, respirators, and equipment for all authorized visitors, as specified above.
  - 3. All authorized visitors shall be subject to the personnel protection provisions specified above, and shall sign in and out on the Worksite Entry Logbook.

- F. Personal Protection during Work in Non-Isolated Work Areas:
  - 1. Work clothes per Section 1.06 B.
  - 2. Respiratory protection per Section 1.06 B.
  - 3. Worker protection procedures will differ from Section 1.06 D, in that two layers of coveralls shall be worn after removal of street clothes. Worker decontamination through a Worker decontamination enclosure is required. The first layer of coveralls must be removed when exiting the glovebag work area. The worker shall immediately proceed to the worker decontamination unit. The remaining requirements of Section 1.06 D still apply.
  - 4. Contractor shall submit to the architect and environmental consultant for approval an emergency control and cleanup plan to be followed in the event of asbestos contamination during glovebag use. Contractor shall ensure all workers are thoroughly familiar with approved plan.
  - 5. Contractor shall promptly remove all bags as they are used to the bag-holding and decontamination enclosure system.
- G. Emergency Precautions
  - 1. The contractor shall establish emergency and fire exits from the work area. Contractor shall ensure these exits are well marked and remain unobstructed.
  - 2. The contractor shall be prepared to administer first aid to injured personnel after decontamination. Seriously injured personnel shall be treated immediately or evacuated without delay for decontamination.
  - 3. Contractor shall notify the local fire department of the asbestos abatement project prior to beginning work area preparation.

# **1.7 SAFETY**

With regard to the work of this contract, the safety of the contractor's employees, the owner's employees, and the public is the sole responsibility of the contractor.

# **1.8 LIABILITY**

The contractor is an independent contractor and not an employee of the owner, architect, or the environmental consultant. The owner, architect, and environmental consultant shall have no liability to the contractor, or any third persons, for contractor's failure to faithfully perform and follow the provisions of these Specifications and the requirements of the governing agencies. Notwithstanding the failure of the owner, architect, or the environmental consultant to discover a violation by the contractor of any of the provisions of these Specifications, or to require the contractor to fully perform and follow any of them, shall not constitute a waiver of any of the requirements of these Specifications, which shall remain fully binding upon the contractor.

## **1.9 DELIVERY**

Contractor shall deliver all materials to the worksite in the original packages, containers or bundles bearing the name of the manufacturer and the brand name.

# 1.10 STORAGE

Contractor shall store all materials subject to damage off the ground, away from wet or damp surfaces, away from heat sources, and under cover sufficient to prevent damage, contamination, or fire.

# 1.11 PROTECTION

Damaged or deteriorating materials shall not be used and shall be removed from the premises by the contractor. Materials that become contaminated with asbestos shall be disposed of in accordance with the applicable regulations by the contractor.

# **1.12 SUBCONTRACTORS**

Any subcontractors employed by the contractor shall be bound to all the work and safety standards specified elsewhere in this Specification. Subcontractor's personnel shall be fully trained and supervised by the contractor during performance of this work.

# 1.13 AIR MONITORING BY ABATEMENT CONTRACTOR

- A. An Independent Testing Laboratory shall be retained by the Abatement Contractor. All airmonitoring analysis shall be performed by an Industrial Hygienist. The Industrial Hygienist must be experienced and trained in asbestos sampling and analysis. At a minimum, documentation of prior asbestos sampling and analysis experience, plus satisfactory completion of the NIOSH 582 course or equivalent formal asbestos education, will be required. The laboratory must meet the requirements specified in Section 02 82 13. Air sample collection may be performed by an Industrial Hygienist or the Abatement Contractor's foreman at the Abatement Contractor's option.
- B. Documentation shall be kept for each filter sample procured as to worker sampled, work area location, date, and time taken, volume of air drawn through filter, pump identification number and calibration. Documentation shall indicate in what areas tests were taken and shall clearly indicate the specified maximum allowable fiber levels for each area tested. Submit chain-of-custody records along with all samples.
- C. The samples shall be collected on 25 millimeter (mm) filters and analyzed within 12 hours using the membrane filter method at 400-500x magnification with phase contrast illumination NIOSH Analytical Method No. 7400 for laboratory and field analysis. The analyst shall sign and submit permanent records of all samples analyzed directly to the Environmental Consultant. The Independent Testing Laboratory shall seal the unused portion of all filters in airtight containers so that individual samples can be reanalyzed at a later date if necessary. The containers shall be clearly labeled with project name and sample number and shall become property of the Owner at work completion at the Owner's request.
- D. The Abatement Contractor's testing laboratory shall submit sample analysis results to the Environmental Consultant verbally within 18 hours from the time of collection and written within two weeks including chain-of-custody and equipment calibration records.
- E. Abatement Contractor's Sampling During Abatement:
  - 1. Air monitoring shall be performed to provide samples during the period of asbestos abatement in each work area. Begin sampling when asbestos removal commences. Samples are to be taken where Class I or II work is being conducted during each 8-hour work shift until abatement is complete in that work area or until a negative exposure assessment is established per 29 CFR 1926.1101.
  - 2. The Abatement Contractor shall determine which worker(s) in each work area is probably experiencing the most severe exposure. This is the "Most Contaminated Worker(s)". Eight (8)-hour TWA and 30-minute excursion samples shall be collected on this worker(s). This worker shall wear a personal sampling pump and the sample shall be drawn from the breathing zone of this worker. All other samples are area samples.

- 3. The number of air samples collected shall be determined by the Abatement Contractor, and may be altered during the project based on work activity and results.
- 4. The maximum allowable fiber levels shall be as determined by the Environmental Consultant based on the respiratory protection being utilized.
- F. Abatement Contractor shall notify the Department of Environmental Quality of air monitoring clearance results as supplied by Environmental Consultant. Notification shall be within 30 days after monitoring procedures were performed in accordance to OAR 340-32-465.

# 1.14 AIR MONITORING BY OWNER

- A. The Owner will retain an experienced Industrial Hygienist/Environmental Consultant to collect and analyze asbestos air samples. Documentation of sample results will be forwarded to the Abatement Contractor as appropriate to regulatory requirements.
- B. Samples analyzed by phase contrast microscopy (PCM) will use NIOSH Analytical Method No. 7400. Samples analyzed by transmission electron microscopy (TEM) will use either the AHERA methodology, 40 CFR Part 763, or Yamate Level Two.
- C. Owner's Air Sampling During and After Abatement:
  - 1. Air Sampling Table is to be used as a guide. The Owner's Industrial Hygienist/Environmental Consultant may modify criteria. Modifications to the Maximum Allowable Fiber Count shall be made in writing by the Owner.

Type of Sample	Average Samples per 8-hour Work Shift	Sample VolumeL (Liters [L])	Approximate Flow Rate	Maximum Allowable Fiber Count (f/cc)
HEPA Fan Exhaust	0 or selected units	400- 2000 L	2 to 10 LPM	0.01 f/cc
Outside of Work Area	0-5	400- 2000 L	2 to 10 LPM	0.01 f/cc or <pre- abatement</pre- 
Clearance PCM	5/work area	800- 3000 L	2 to 10 LPM	0.01 f/cc
Clearance TEM	5/work area	1200- 1800 L	2 to 10 LPM	<70 s/mm <sup>2</sup> average

LPM = liters per minute

f/cc = fibers per cubic centimeter

s/mm<sup>2</sup> = structures per millimeters squared

2. Air sampling for post-abatement work in isolated work areas will use the aggressive sampling method. Use of aggressive sampling in other areas shall be as directed by the Environmental Consultant. Aggressive sampling shall be conducted to assure that fibers remain airborne during sample collection.

- 3. Analysis of all clearance samples shall be via PCM.
- 4. The Abatement Contractor shall allow 48 hours for the collection and analysis of final PCM air clearance samples. In addition, the Abatement Contractor must provide at least 24 hours advance notice to the Environmental Consultant for final visual Inspection and clearance air monitoring.
- 5. The Owner reserves the right to monitor Abatement Contractor's performance via air samples on abatement workers and in the work area in addition to the Abatement Contractor's air monitoring.

# 1.15 QUALITY ASSURANCE

- A. If, at any time during the work, analysis of an air sample taken by the Abatement Contractor, Owner, or Owner's representative, indicates a fiber count in excess of the allowable maximums specified, the Industrial Hygienist who analyzed the air sample shall immediately notify:
  - 1. The Abatement Contractor's Foreman
  - 2. The Environmental Consultant: PBS Engineering and Environmental Inc.
  - 3. Other workers, employees, occupants, etc. in affected area(s).
- B. Immediately upon being notified of fiber count exceeding the specified maximum allowable levels, the Abatement Contractor shall perform the following steps in the order presented, at no additional cost to the Owner:
  - 1. Stop abatement work.
  - 2. Identify source of high fiber counts.
  - 3. Immediately correct any containment breaches, pressure differential changes or other potential cause, and other concerns with the Environmental Consultant, and the Owner, if the Owner is available. The Environmental Consultant will determine the affected area and affected adjacent areas considered to be contaminated. The Environmental Consultant will determine the actions to be taken by the Abatement Contractor at no additional cost to the Owner.
    - a. Clean the affected area and the affected adjacent areas. Cleaning shall use wet methods and HEPA vacuuming.
    - b. Resample air until fiber counts are determined to be below one half of the specified maximum levels.
    - c. Secure and repair containment barriers, repair or add equipment.
    - d. Modify work procedures, and make other changes determined to be the possible cause of high fiber counts.
  - 4. Carefully resume work under close air monitoring.
  - 5. The Abatement Contractor shall be responsible for costs of any testing, cleanup, repair, down time loss, etc. that is a result of the Abatement Contractor's negligence, poor maintenance of isolated areas or improper procedures.

# PART 2 PRODUCTS

# 2.1 MATERIALS

- A. Plastic Sheet: Plastic sheet shall be flame-retardant polyethylene material sized in lengths and widths to minimize the frequency of joints. The minimum thickness shall be 6-mil.
- B. Plastic Bags: Plastic bags shall be 6-mil polyethylene printed with warning labels per OSHA and EPA regulations.
- C. Tape: Tape shall be capable of sealing joints of adjacent sheets of plastic; attaching plastic sheet to finished or unfinished surfaces of dissimilar materials; and adhering under dry and wet conditions, including use of amended water. Minimum of 2-inch-wide tape must be used.
- D. Disposal Containers: Disposal containers shall be suitable to receive and retain any asbestoscontaining or contaminated materials until disposal at an approved site. The containers shall be labeled in accordance with OSHA and EPA regulations. Containers must be both airtight and watertight, and have hard top, bottom, and sides.
- E. Warning Labels and Signs: Warning labels and signs shall be posted as required by OR-OSHA, ODOT, and DEQ regulations.
- F. Amended Water: Clean potable water containing a surfactant additive. The surfactant additive shall be 50 percent polyoxyethylene ether and 50 percent polyethylene ester, or equivalent, and shall be mixed with water at a concentration of one ounce surfactant to five gallons of water, or as recommended by the manufacturer in the case of an equivalent.
- G. Encapsulants (Sealants): Encapsulants shall be of the bridging or penetrating variety and shall be listed as "satisfactory" by the EPA. Encapsulants shall provide a suitable substrate bonding agent for application of new material where appropriate. Penetrating Encapsulant: No. 207 Special Sealer #33775-27A as manufactured by Makus-Cincinnatus, Inc.; "Asbestop 30B-2" as manufactured by Asbesco Corp.; "Cable Coating 22-P" as manufactured by American Coatings Corp., or approved. Bridging Encapsulant: Decadex Firecheck, manufacturer's standard color "Magnolia," as manufactured by Pentagon Plastics, Inc.; "Cable Coating 2-B," manufacturer's standard color gray, as manufactured by American Coatings Corp.; or approved.
- H. Rewettable Lagging Cloth: Twelve ounce glass fabric lagging cloth saturated with dried lagging adhesive. "Dip-Lag" as manufactured by Claremont Co. or approved.
- I. Enclosure: Protective plastic jacketing systems, framed gypsum board enclosures, suspended ceilings or other materials as specified elsewhere.
- J. Other Materials: Provide all other materials such as lumber, nails, and hardware, which may be required to construct and dismantle the decontamination area, and the barriers that isolate the work area, and as required to complete the work, as specified.

# 2.2 TOOLS AND EQUIPMENT

- A. Water Sprayer: The water sprayer shall be an airless or other low-pressure sprayer for amended water application.
- B. Air-Purifying Equipment: Air-purifying equipment shall consist of high-efficiency particulate air (HEPA) filtration systems. No air movement system or air equipment shall discharge asbestos fibers outside the work area. Each unit shall be capable of variable volume from a minimum of 500 cubic feet per minute (CFM) to at least 1700 CFM under load and shall have at least two stages of pre-filtration

ahead of the HEPA final filter. Each unit shall be overload protected, and equipped with an elapsed time indicator (hour meter), static pressure gauge with low flow alarm, and heat and smoke sensors that visually and audibly warn workers and shut unit fan down within 30 seconds. The units shall be: Micro-Trap Portable Air Filtration System manufactured by Asbestos Control Technology, Inc., "HOG 2000" Negative-air Protection System manufactured by Control Resource Systems, or approved.

- C. Pressure Differential Monitoring Equipment: A combination sensing, alarm, and recording device shall be in operation at all times during use of the HEPA air-purifying equipment. The unit shall be a "Neg-A-Master," manufactured by Control Resource Systems, Inc., or approved.
- D. Water-purifying Equipment: Water-purifying equipment shall be capable of removing all fibers longer than five microns, or as required by local regulations, from water used in abatement work and decontamination showers. Control Resource Systems, Inc. "AQUA-HOG" or approved.
- E. Airless Sprayer: An airless sprayer, suitable for application of penetrating encapsulant material, shall be used.
- F. Vacuum Equipment: All vacuum equipment used in the work area shall be High-efficiency Particulate Air (HEPA) equipment, and suitable for wet/dry usage.
- G. Scaffolding: Scaffolding, as required to accomplish the specified work, shall meet all applicable safety regulations. All special scaffolding shall have drawings and calculations stamped and signed by a civil or structural engineer registered in the state of Oregon.
- H. Transportation Equipment: Transportation equipment, as required, shall be suitable for loading, temporary storage, transit, and unloading of contaminated waste without exposure to persons or property. Equipment shall have a hard top, bottom, and sides. If equipment is rented, notify rental agency in advance, in writing, of intended use of equipment.
- I. Electrical: Electrical tools, equipment, and lighting shall meet all applicable codes and regulations. Ground fault protection as required by OSHA, shall be in effect at all times. Contractor shall take all additional precautions and measures necessary to ensure a safe working environment during wet removal.
- J. Glovebags: Bags shall be clean poly bags seamless at the bottom, with pre-printed asbestos warning labels, 6-mil PVC with attached TYVEK arms, and latex gloves. Bags shall be Profo' Bag manufactured by Asbestos Control Technology, Inc., or Asbest'O'Saf/SAC by Control Resource Systems, Inc., or approved.
- K. Remote Filter Housing: Stainless steel housing shall have pre-filters and HEPA filter sealed to cabinet flanges by Century Equipment "Advance Guard II" or approved equal.
- L. Other Tools and Equipment: Other suitable tools shall be provided for the removal, enclosure, encapsulation, patching, and disposal activities including, but not limited to, hand-held scrapers, wire brushes, sponges, and rounded-edge shovels.

# PART 3 EXECUTION

# **3.1 FULL ISOLATION WORK AREA PREPARATION**

A. Contractor shall perform the following isolation procedures in the order in which they are presented. Any alternative control measures considered for Class I/II work shall be performed in accordance with 29 CFR 1926.1101.

- 1. Shut down, remove filters, and isolate HVAC systems to prevent contamination and fiber dispersal. Coordinate with building users and CMGC prior to shutdown.
- 2. Coordinate all electrical, safety, and other service connections, requirements and equipment with the CMGC. Use a journeyman electrician at a minimum. It is the contractor's responsibility to verify operation of systems that will be shut off during abatement. If any system is found to be defective or not operating satisfactorily, the contractor shall notify the CMGC or environmental consultant in writing prior to shutoff.
- 3. Install critical barriers as follows: seal off all openings including, but not limited to, doorways, windows, and other penetrations of the work area with solid critical barriers except openings left for HEPA air-purification system, which shall be properly HEPA-filtered. Where doors exist, sealing may be done by closing door, sealing with tape on both sides, and then covering both sides with two layers of plastic sheeting.
- 4. Pre-clean movable objects, such as furniture and equipment to be removed (and carpeting), within the proposed work areas using HEPA-filtered vacuum equipment and/or wet cleaning methods as appropriate, and remove such objects from work areas to a temporary location, or consolidate such objects away from removal work and enclose with critical barriers.
- 5. Pre-clean fixed objects within the proposed work areas using HEPA-filtered vacuum equipment and/or wet cleaning methods as appropriate, and enclose with critical barriers. Equipment that must continue operating shall be enclosed and ventilated to avoid damage.
- 6. Set up the worker decontamination enclosure system (decon). Once this system is installed and abatement commences, it shall be used in the specified manner for the ingress and egress of all personnel and equipment, except in emergency situations. All personnel shall sign the Worksite Entry Logbook each time they pass in or out of the decontamination enclosure.
- 7. Install HEPA air-purifying equipment pressure differential fan system so as to ensure lower static pressure in the isolated work area than in surrounding areas, a flow of air through all parts of the isolated work area towards the air-purifying equipment, and minimum air contamination levels at abatement worker breathing zones. Discharge from air-purifying equipment shall be ducted outside the building. Use one or more units of capacity as recommended by the manufacturer for the volume of the isolated work area, but in no case shall airflow be less than six air changes every 60 minutes with a minimum pressure differential of 0.02 inches wg between the work area and the decon clean room.
- 8. Cover floor and wall surfaces with plastic sheeting sealed with tape. Cover floors first so that plastic extends at least 12 inches up on walls, then cover walls with plastic sheeting to overlap floor plastic by a minimum of 24 inches, thus overlapping the horizontal floor material by a minimum of 12 inches. Install additional layer of plastic sheeting on floor and walls in similar manner. Contractor may use mechanical fastening techniques, such as tack strips, as necessary to secure wall plastic sheeting. Contractor shall repair any damage resulting from mechanical fasteners.
- 9. Maintain emergency and fire exits from the work areas, or establish alternative exits satisfactory to the local building or fire department officials. Ensure that all exits remain unobstructed and well marked.
- 10. Adequate portable fire extinguishing equipment shall be maintained within work area as defined by OSHA and/or local fire department officials.

- B. No asbestos abatement work shall occur unless the work area isolation has been found acceptable for Specification compliance by the environmental consultant.
- C. Isolated work area enclosure system maintenance. The contractor shall be responsible for daily documentation of the following:
  - 1. Prior to the first use, and at the beginning of each shift during abatement work, containments shall be given a complete visual inspection by the contractor's shift foreman and industrial hygienist. Inspection shall include the HEPA air-purification system and associated filters. A smoke tube test by the shift foreman shall then be made of the worker decontamination enclosure system and other critical areas to verify that the isolated area is under negative air pressure. Work shall not begin until all defects have been repaired.
  - 2. Periodic inspections shall be made, as required, during each shift to assure continued proper functioning of the containment and HEPA system.

# **3.2 NON-ISOLATED WORK AREA PREPARATION**

- A. Contractor shall perform the following procedures in the order in which they are presented and describe procedures for glovebag work and other work in non-isolated work areas. Any alternative control measures considered for Class II work shall be performed in accordance with 29 CFR 1926.1101.
  - 1. Shut down heating, ventilation, and air conditioning (HVAC) systems. Coordinate with building users and the CMGC prior to shutdown.
  - 2. Restrict access to work area and post warning signs. Do not perform glovebag work or any abatement work in an occupied area.
  - 3. Completely pre-clean entire work area using HEPA vacuum equipment or wet cleaning methods.
  - 4. Set up the worker decontamination enclosure system. Once this system is installed and abatement commences, it shall be used in the specified manner for the ingress and egress of all personnel, except in emergency situations. All personnel shall sign the Worksite Entry Logbook each time they pass in or out of the decontamination enclosure.
  - 5. At the direction of the environmental consultant, install HEPA exhaust fan in work area. Duct fan intake to immediate area of work in such a manner that any fibers released will be drawn away from the worker and into intake duct.
  - 6. Cover floor and other surfaces below work area with 6-mil plastic sheeting. Seal openings and install curtained doorways and air locks as directed by the environmental consultant.
  - 7. Have emergency cleanup equipment and supplies, including HEPA vacuum, amended water, disposal bags, mop, buckets, towels, and sponges on hand prior to start of abatement work.
- B. No asbestos abatement work shall occur unless the work area has been found acceptable for Specification compliance by the environmental consultant or industrial hygiene technician.

## 3.3 REMOVAL OF ASBESTOS-CONTAINING MATERIALS IN FULL ISOLATION WORK AREAS

- A. Contractor shall isolate work area as specified.
- B. Remove all asbestos-containing vinyl floor tile as Class 1 friable asbestos removal.
  - 1. Contractor shall spray the asbestos material with amended water. A fine spray of this solution shall be applied to prevent fiber disturbance preceding the removal of the asbestos material. The

asbestos shall be sufficiently saturated to prevent emission of airborne fibers in excess of specified fiber levels.

- 2. Contractor shall remove asbestos material while damp and pack it in sealable containers. Containers shall be moved to bag load out facility or equipment room in the worker decontamination system.
- 3. Contractor shall collect all water used in the removal and cleaning process and dispose of as contaminated waste or filter to remove all fibers more than five microns in length before disposal in the municipal sewer system, or as required by local regulations. Water filters shall be disposed of as asbestos-contaminated material.
- C. All wooden subfloor associated with asbestos-containing mastic shall be wholly removed and disposed of as asbestos waste in accordance with section 3.9, Disposal.
- D. Contractor shall maintain a safe and uncluttered work area, worker decontamination system, and bag load out facility on a daily basis.

# 3.4 REMOVAL OF ASBESTOS-CONTAINING MATERIALS IN NON-ISOLATED AREAS

- A. Contractor shall apply spray coat of amended water to material to be removed; material shall be kept damp during entire removal process.
- B. Glovebag work shall be as follows. All removal using the glovebag method shall be performed strictly according to regulations, manufacturer's printed instructions, and as demonstrated by the manufacturer's representative or as further specified in this section. Workers are not to smoke or wear hand or wrist jewelry while using glovebags.
  - Contractor shall install port for hose of HEPA vacuum to create reduced pressure inside glovebag. Installing of fresh air intake and/or bridging to prevent collapse of bag are acceptable. Reduced pressure shall be maintained throughout entire abatement procedure.
  - 2. During the removal phase, contractor shall use amended water to reduce potential for airborne fibers.
  - 3. Contractor shall seal flap if used and, using a HEPA vacuum, remove all contaminated air in the upper chamber.
  - 4. Contractor shall promptly double-bag the glovebag after removal is complete, place it into a sealed container, and remove to the bag holding enclosure.
- C. Exterior door and window caulking shall be removed using the following methods:
  - 1. Caulking shall be removed in a non-friable state. Caulking that is determined to be friable or which is rendered friable during the abatement process shall be removed using either containment or glovebag methods.
  - 2. The contractor shall utilize wet methods during removal and packaging for disposal.
  - 3. The contractor may utilize a heat gun if at any time the caulking has the potential to become friable during removal.
  - 4. The contractor shall have HEPA vacuums available and shall use them during removal.
  - 5. The use of abrasive or mechanical methods to remove the caulking is prohibited.
  - 6. Burning or blistering of the caulk with excessive heat by the heat gun is prohibited.

7. All asbestos-containing caulk and building components with residual asbestos caulk shall be disposed of as asbestos-containing waste as specified below.

# **3.5 CLEANUP IN FULL ISOLATION WORK AREAS**

- A. At the conclusion of removal in the isolated work area, conduct cleanup in the sequence described below. Windows, doors, HVAC vents, etc. shall remain sealed and HEPA-filtered pressure differential fan systems shall remain in service.
  - 1. REMOVE MATERIAL AND EQUIPMENT. Contractor shall remove visible accumulations of material and debris (including filters removed from HVAC equipment and HEPA air-purification equipment). Contractor shall include all sealed containers and equipment used in the work area in the cleanup, and remove them from work area after decontamination of outer surfaces.
  - 2. FIRST CLEAN. Contractor shall clean all surfaces in the work area and any other contaminated areas with water and/or with HEPA-filtered vacuum equipment.
  - 3. WAIT 24 HOURS. After the first cleaning of the work area, wait 24 hours to allow for settlement of dust. During this settling period, no entry to the work area shall be allowed.
  - 4. SECOND CLEAN. Wet-clean or clean with HEPA-filtered vacuum equipment all surfaces in the work area. After completion of the second cleaning operation, perform a complete visual inspection of the work area to ensure that the work area is free of visible debris.
  - 5. VISUAL INSPECTION. Prior to application of post-removal encapsulant, contact the environmental consultant for a visual observation of the work area. The work area shall be free of visible debris. Observation by the consultant does not alleviate the contractor of responsibility to provide work in compliance with Specifications. Contractor shall contact environmental consultant at least 24 hours prior to desired inspection time.
  - 6. REMOVE PLASTIC SHEETING. After visual observation by the consultant, contractor shall apply a coat of approved encapsulant to all surfaces in the work area where asbestos has been removed and to disposable plastic sheeting as a post-removal encapsulant. Encapsulant application shall follow all applicable manufacturer's recommendations and shall provide a compatible bonding agent for application of new material.
  - 7. FINAL CLEAN. After the encapsulation is complete, the contractor shall remove all noncritical plastic and clean all floors, walls, fixtures, and other surfaces within the work area with only critical barriers in place using wet methods or HEPA-filtered vacuum equipment. Plastic sheeting over carpets may remain in place.
  - 8. CONTACT ENVIRONMENTAL CONSULTANT. Contact the environmental consultant for a visual observation of the work area. The work area shall be free of visible debris. Observation by the consultant does not alleviate the contractor of responsibility to provide work in compliance with Specifications. Contractor shall contact environmental consultant at least 24 hours prior to desired inspection time. Consultant shall conduct final air monitoring as specified after work area has been allowed sufficient time to dry.
  - 9. TEARDOWN. When the final observation by the environmental consultant and air sampling test results are satisfactory, the contractor shall then remove the decontamination systems and remaining barriers.

10. DISPOSAL. Contractor shall properly dispose of all waste materials. All polyethylene material, tape, cleaning material, and contaminated clothing shall be double-bagged, sealed, and labeled as described above for asbestos waste material.

# 3.6 CLEANUP IN NON-ISOLATED WORK AREAS

- A. FIRST CLEAN. Contractor shall remove visible accumulations of asbestos material and debris. All surfaces shall be cleaned within the affected work area. Cleaning shall be with amended water and/or HEPA-filtered vacuum equipment. In a large open area, the affected work area shall include the immediate work area and an area that encompasses at least 6 feet in all directions or as defined by the environmental consultant. In small work areas, the affected work area shall include the entire room.
- B. AFFECTED AREA. The affected work area may be further defined in the scope of work by the environmental consultant. During the work, high fiber levels, as indicated by air monitoring results, may increase the area to be cleaned. The increase in the affected area due to high fiber levels or other indications of fiber dispersal will be defined by the environmental consultant, and the contractor shall bear all costs of additional cleaning.
- C. VISUAL INSPECTION. After completion of the cleaning operation, the environmental consultant shall perform a visual observation of the affected work area to ensure that the affected work area is free of visible dust and debris. Observation by the consultant does not alleviate the contractor of responsibility to provide work in compliance with Specifications. Contractor shall contact environmental consultant at least 24 hours prior to desired inspection time.
- D. ENCAPSULANT. After visual observation by the environmental consultant, contractor shall spray-apply encapsulant to the material substrate, all temporary plastic sheeting, and other temporary protective materials.
- E. CLEARANCE SAMPLING. Post-abatement air sampling shall be at the discretion of the Environmental Consultant and will be determined by the ongoing sample results.
- F. TEARDOWN. When the final observation by the environmental consultant and air sampling test results (if required) are satisfactory, the temporary plastic sheeting and other temporary protective materials shall be removed by the contractor.
- G. DISPOSAL. Contractor shall properly dispose of all waste materials, all polyethylene material, tape, and cleaning material, and contaminated clothing shall be double-bagged, sealed, and labeled as described for asbestos waste material.

# **3.7 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS**

- A. When cleanup is complete, contractor shall:
  - 1. Relocate objects moved to temporary locations in the course of the work to their former positions. Coordinate with the CMGC.
  - 2. Clean, repair and/or repaint all surfaces soiled, discolored, or damaged by removal of tape, adhesive, or other work of this contract to match existing surfaces. The contractor shall bear all costs associated with damage incurred during the abatement, which includes, but is not limited to, perimeter plaster walls, wall murals, windows, and mullions
  - 3. If the contractor uses caulking to seal cracks in concrete floor, the caulking must be removed to architect's satisfaction at completion of project.

- 4. Return mechanical, electrical, and other systems shut down by the contractor to complete and functional operation.
- 5. Re-secure objects removed in the course of work in their former positions, including air dampers in plenums, and adjust for proper operation.
- 6. Clean, repair and/or repaint all surfaces soiled, discolored, or damaged by removal of tape, adhesive, or other work of this contract to match adjacent surfaces.

# 3.8 DISPOSAL

A. Contractor shall affix warning labels having waterproof print and permanent adhesive to the lid and sides of all containers. Warning labels shall be conspicuous and legible, and contain the following words:

# DANGER CONTAINS ASBESTOS FIBERS AVOID CREATING DUST CANCER AND LUNG DISEASE HAZARD AVOID BREATHING AIRBORNE ASBESTOS FIBERS

- B. The contractor shall determine current waste handling, transportation, and disposal regulations for the work site and for each waste disposal landfill. The contractor must comply with these regulations and all US Department of Transportation, DEQ, and EPA requirements. Double-bagged material in containers shall be delivered to the pre-designated disposal site for burial. Labels and all necessary signs shall be in accordance with DEQ and OSHA standards.
- C. Contractor shall remove decontaminated containers from the site as soon as possible. Notify disposal site in advance of delivery of material to assure immediate burial of containers.
- D. If the bags are broken or damaged, or the container is contaminated, the contractor shall clean and decontaminate the entire container for reuse.
- E. Contractor shall submit three copies of written proof of disposal at approved disposal site to the environmental consultant prior to completion of the abatement work specified in this section. Use copies of the DEQ Waste Shipment Record ASN-4, completely filled out and signed, and accompanied by tickets and/or receipts from disposal site.

# **END OF SECTION**

# **SECTION 02 82 21: OSHA Requirements for Removal of Materials containing less than 1% Asbestos**

## PART 1 GENERAL

## 1.1 SCOPE

- A. All work shall be conducted in accordance with 29 CFR 1926.1101.
- B. The following pertains to all contractors who will impact materials containing less than one percent (<1%) asbestos-containing materials. This includes demolition contractors, abatement contractors, and any other contractor whose work might disturb <1% materials.
- C. Less than 1% materials are not regulated by the Oregon Department of Environmental Quality (DEQ); however, some Oregon Occupational Safety and Health Administration (OSHA) regulations apply:
  - 1. DEQ does not require use of a licensed abatement contractor, abatement notification, or disposal as hazardous waste.
  - 2. OSHA requires training, air monitoring, and use of specific work practices.
- D. The following table lists <1% asbestos-containing materials to be removed. Reference abatement drawings for specific locations. The following is a list of materials to be removed from the building:

Asbestos-Containing Building Materials	Location	Note
<1% Asbestos Gypsum Wallboard	Throughout A Ming	Selective demolition as necessary
and Joint Compound Wall Systems	Throughout A-wing	to facilitate pipe replacement

## **1.2 RELATED SECTIONS**

- E. 02 82 13 Asbestos Abatement
- F. 02 82 16 Asbestos Air Monitoring Requirements

## PART 2 PRODUCTS

## 2.1 NOT APPLICABLE

## PART 3 EXECUTION

## **3.1 PROCEDURES**

- A. All work shall comply with Oregon Administrative Rule (OAR) 437 1926.1101.
- B. All work shall comply with air monitoring requirements as noted in OAR 437 1926.1101 and in Section 02 82 16 subsection 1.1 as contained within these specifications.
- C. All work shall comply with recordkeeping requirements under OAR 437 1926.1101(n).
- D. Impacting <1% asbestos-containing materials shall be performed using the following methods:
  - 1. Wet methods to control employee exposures during impact activities.
  - 2. Prompt clean-up with HEPA vacuum and wet methods in leak-tight containers.
  - 3. No abrasive blasting, torch cutting, power sanders, or "dry" disc saws.
  - 4. Wet cutting; cutting slurry must be captured in a containment dam.
  - 5. No use of compressed air for cleanup activities.
  - 6. Employee rotation may not be used as a means of reducing employee exposure.
  - 7. Waste shall be packaged and handled in accordance with (OAR) 437 1926.1101.
- E. Training shall be required for all who perform work in or around <1% materials:
  - 1. The contractor shall bear costs associated with training and any air monitoring associated with working with asbestos materials.
  - 2. All who work with or around asbestos (including <1% materials) shall be required to be notified of asbestos-related hazards per OSHA 1910.1200 hazard communication standard and to have received two-hour asbestos awareness training.
  - 3. In addition to the above training, workers who remove, demolish, and/or otherwise impact asbestos-containing joint compound associated with gypsum wallboard shall have OSHA Class II abatement training including hands-on task-specific training.
  - 4. Workers performing small-scale, short-duration work on <1% materials may substitute the above training for OSHA Class III training.
  - 5. All training shall be in accordance with EPA Model Accreditation Plan (MAP) asbestos abatement workers training (40 CFR Part 763, subpart E, appendix C).

## END OF SECTION

#### PART - GENERAL

#### 1.1 WORK INCLUDED

- A. This section covers all contractors performing any task such as; demolition, selective demolition, plaster removal, sanding, patching, paint preparation, on-site chemical stripping, torch burning, welding, abrasive blasting or any task performed on painted or varnished surfaces which may result in occupational exposures to lead. All contractors performing tasks as identified under OAR 437-03-001 (Lead for the Construction Industry Standard, Oregon) shall be required to perform work in accordance with the standard and these specifications.
- B. Work Requirements under this section include but are not limited to; Initial testing and evaluation of work practices, development of a written lead compliance program, lead awareness training, employee monitoring, respiratory protection, engineering controls, containment, wash facilities and signage.
- C. Lead-Based Paint and varnishes are located throughout the building. Unless noted otherwise on the plans, contractors are to assume painted or varnished surfaces to be lead containing.
- D. Any Contractor that is subject to potential lead exposure shall provide all labor, materials, equipment, services, necessary to comply with OSHA standard.
- E. The General Contractor and its subcontractors shall endeavor to select work methods that minimize the creation or spreading of lead dust. If work practices or surface preparation methods (e.g. dry sanding, abrasive blasting) create dust that cannot be readily controlled via wet methods or by using basic work area isolation, then the District will utilize its Hazardous Material Abatement contractor to perform all or portions of the work. The Contractor shall coordinate with the District and its Hazardous Material Abatement Contractor as necessary to accommodate the work.

#### 1.2 DEFINITIONS

- A. Action Level: Employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period.
- B. Air Monitoring: The process of measuring the airborne concentrations of a specific volume of air in a stated period of time.
- C. Atomic Absorption: A method of measuring elements such as lead. The lead is vaporized at high temperature, usually several thousand degrees, and light of a very specific wavelength is shined through the vapor.
- D. Biological Monitoring: The analysis of a person's blood and/or urine, to determine the level of lead contamination in the body.
- E. Containment: A process for protecting both workers and the environment by controlling exposures to lead dust and debris created during lead handling tasks.
- F. Contractor: The General Contractor, Subcontractor, Abatement Contractor or person performing lead handling procedures specified herein.
- G. Engineering Controls: Measures implemented at the work site to contain, control and/or otherwise reduce exposure to lead dust and debris.
- H. Exposure Monitoring: The personal air monitoring of an employee's breathing zone to determine the amount of contaminant (e.g. lead) to which he/she is exposed.

**SECTION 02 83 13** 

## LEAD HANDLING PROCEDURES

- I. Fixed Object: Fixtures that are attached to the building or are too heavy or bulky to remove from the work area.
- J. Independent Testing Laboratory: A qualified AIHA ELPAT laboratory financially independent from and hired by the Owner or Contractor.
- K. Industrial Hygienist: The representative assigned to monitor work progress, perform sampling and visually inspect areas during and after lead handling procedures.
- L. The Industrial Hygienist will be certified by the American Board of Industrial Hygiene or an industrial hygienist in training, or an individual with appropriate education or experience.
- M. Medical Removal: The temporary removal of workers due to elevated blood lead levels as defined in the OSHA Lead Standard.
- N. Micrograms: One millionth of a gram: □g: The prefix "micro" means "1/1,000,000 of" (one millionth of). Since there are 453 grams in one pound and 16 ounces in one pound, one gram equals 0.035 ounces. A microgram is equal to about 35/1,000,000,000 (thirty-five billionths) of an ounce.
- O. Movable Object: Furnishings which are not attached to the building structure and can be removed from the work area.
- P. Off-Site Paint Removal: The removal of paint or varnish at a site away from the project such as the stripping of lead paint from the surface of a component at the facilities of a commercial paint-stripping operation occurring in chemical tanks.
- Q. Paint Removal: Stripping or removal of lead paint from surfaces of components.
- R. ppm: Stands for "parts per million", meaning the weight of one part per weight of the total amount of material. For example, a lead concentration of 1 ppm expresses the ratio of one gram of lead dissolved into one million (1,000,000) grams of water.
- S. Public Area: Any area outside the isolated work area. When work area isolation measures are removed, the work area becomes a public area.
- T. Regulated Area: An area where the Permissible Exposure Limit has been or is expected to be exceeded and where only trained personnel with appropriate personal protective equipment are allowed.
- U. TCLP: Toxic Characteristic Leaching Procedure is one of the tests for the determinations of whether a solid waste is classified as a hazardous substance via EPA Method 1311.

#### 1.3 SUBMITTALS AND NOTICES

- A. The Contractor shall submit three copies of the following information to the Architect, Owner and Environmental Consultant prior to beginning work on the project.
  - 1. Worker Training Programs: Submit written proof indicating that all employees impacting leadcontaining materials have received training per OAR 437-03-001.

# BSD – TERRA LINDA ES REPIPE & RESTROOM REMODEL 19036.00.L

## LEAD HANDLING PROCEDURES

- 2. Lead Compliance Plan: Submit a written "Compliance Plan" satisfactory to the Architect, Owner And Environmental Consultant describing the methods for lead handling procedures, and plans for construction and location of decontamination enclosure systems, worker training and protection measures, engineering controls, dust control and collection techniques, etc. in compliance with OAR 437 Division 3-001, these Specifications and applicable regulations. The Contractor shall update the Lead Compliance Plan as necessary while work progresses. The General Contractor may elect to incorporate affected subcontractors individual work plans into an overall project lead compliance program.
- 3. Product Information and Material Safety Data Sheets: Submit complete product information for chemical removal agents and for any materials, products and procedures for which the Contractor requests approval for use on this job. The Contractor shall identify any concerns with possible chemical reaction with new materials, coatings, etc. to be installed after chemical stripping.
- B. Contractor shall not begin work until submittals are complete, reviewed and accepted by District and the Environmental Consultant. Allow a five day review period.
- C. During the work the Contractor shall submit all sampling and exposure monitoring data.

### 1.4 LEAD EXPOSURE MONITORING AND TESTING REQUIREMENTS

- A. Contractors shall perform employee exposure assessments as required under OAR 437-03-001 for any employees performing tasks that may result in exposures above the Action Level.
- B. An Independent Testing Laboratory shall be retained by the contractor. All exposure monitoring analysis shall be performed in accordance with 29 CFR Part 1926.62 as adopted by OR-OSHA.
- C. The District reserves the right to monitor Contractor's performance via air, dust wipe and TCLP samples during removal work, in addition to the Contractor's exposure monitoring and testing.

#### 1.5 QUALITY ASSURANCE

- A. Periodic monitoring of air and surface dust may be analyzed by the Districts Environmental Consultant in occupied spaces and containment areas. The following lead exposure limits shall apply to all areas where lead handling procedures are undertaken.
  - 1. Air Samples:

b.

- a.  $30 \ \mu g/m3$  OSHA Action Level
  - (8-hour Time-Weighted Average)
  - 50 μg/m3 OSHA Permissible Exposure Limit (8-hour Time-Weighted Average)
- 2. Dust Samples: (Expected levels at completion of major demolition)
  - a. 40 µg/ft2 Clearance for Stripped Surfaces, Components, etc.
    - b.  $40 \ \mu g/ft2$  Clearance Level for floors
    - c.  $250 \,\mu g/ft2$  Clearance Level for interior window sills
    - d.  $250 \mu g/ft2$  Clearance Level for rough surfaces
    - e. Note: The above noted Dust Sample standards shall only apply to elementary, preschool and Day Care facilities. The District Representative may modify these standards, if appropriate, in other facilities.
- 3. Blood Lead Levels:
  - a.  $40 \,\mu g/dl$  (OSHA) permissible blood level for worker
  - b. 50 µg/dl (OSHA) blood level requiring medical removal of worker
- 4. Dispose of as Hazardous Waste: 5-ppm Pb (analyzed as "leachable" using Toxicity Characteristic Leachate Procedure TCLP EPA Method 1311)
- 5. Paint: Painted surfaces with lead concentrations greater than the limits of detection as determined by atomic absorption, EPA Method 7420-3050.

- 6. Soil: 400-ppm High Traffic Play Areas; 1,200-ppm Non-Play Areas
- 7. Waste Water: (.7 mg/l Pb or less to dispose of in the sanitary sewer). Verify with the City on local requirements.
- B. If, at any time during the work, analysis of occupied area air or wipe samples taken by the Contractor, District, or District's representative, indicates a concentration in excess of the allowable maximums specified, the contractor shall immediately notify:
  - 1. The General Contractor's Superintendent
  - 2. The Environmental Consultant: PBS Engineering + Environmental, (503) 248-1939.
- C. Immediately upon being notified of concentrations exceeding the specified maximum allowable levels, the Contractor shall perform the following steps in order presented, at no additional cost to the District:
  1. Stop Lead related work.
  - 2. The Environmental Consultant will determine the affected area and affected adjacent areas considered to be contaminated and will determine the actions to be taken.
  - 3. Modify work procedures, if feasible and make other changes determined to be the possible cause of high lead concentrations.
  - 4. Carefully resume work under close supervision and monitoring.
  - 5. The Contractor shall be responsible for costs of any testing, cleanup, repair, down time loss, etc. that is a result of the Contractor's negligence, poor maintenance of containment areas or improper procedures.

## 1.6 PERSONNEL PROTECTION

- A. Training:
  - 1. When demolition or lead handling activities result or are expected to exceed the Action Level, the Contractor shall follow personnel protection and work area isolation procedures outlined in this section.
  - 2. Prior to commencement of work, Contractor shall ensure all workers have been adequately trained as specified in 29 CFR 1926.62.
  - 3. The Contractor shall provide and post at hand wash locations, the decontamination, respirator, and work procedures to be followed by the workers as outlined in the written Lead Compliance Program.
  - 4. Workers shall not eat, drink, chew gum or apply cosmetics in the established work area. Smoking or using other tobacco products is prohibited.
  - 5. Workers shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of lead-containing or contaminated material and until final cleanup is completed.
- B. Building Security and Protection:
  - 1. The Contractor shall post adequate warning signs at all potential entrances to work areas as required by EPA and OSHA.
  - 2. Contractor shall protect all existing fixed equipment, existing building finishes that are to remain, and existing systems and functions from damage. Extra precautions are to be taken in protecting existing electrical panels, light fixtures, etc. Any damage to existing building, services, and/or equipment shall be remedied by the Contractor at his expense.
  - 3. Contractor shall maintain access and use of existing fire lanes.

## 1.7 SAFETY

A. With regard to the work of this contract, the safety of the Contractor's employees, the District's employees, and the public is the sole responsibility of the Contractor.

#### 1.8 **PROTECTION**

A. Damaged or deteriorating materials shall not be used and shall be removed from the premises by the Contractor. Materials that become contaminated with lead shall be disposed of in accordance with the applicable regulations by the District.

#### 1.9 SUBCONTRACTORS

A. Any Subcontractors employed by the Contractor shall be bound to all the work and safety standards specified elsewhere in this Specification. Subcontractor's personnel shall be fully trained and supervised by the Contractor during performance of this work.

#### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Plastic Sheet: Plastic sheet shall be fire-retardant polyethylene material sized in lengths and widths to minimize the frequency of joints. The minimum thickness shall be 6-mil.
- B. Plastic Bags: Plastic bags shall be 6-mil polyethylene printed with warning labels per OSHA and EPA regulations.
- C. Tape: Tape shall be capable of sealing joints of adjacent sheets of plastic and for attachment of plastic sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under dry and wet conditions, including use of amended water.
- D. Disposal Containers: Disposal containers for all listed hazardous waste shall be ODOT-approved #1-A2 55-gallon steel drums unless approved otherwise by the TSD and Environmental Consultant.
- E. Warning Labels and Signs: Warning labels and signs shall be posted as required by OR-OSHA, ODOT and DEQ regulations.
- F. Chemical Strippers: Use of chemical strippers shall require review from the District, Architect, General Contractor and Environmental Consultant.

#### 2.2 TOOLS AND EQUIPMENT

- A. Water Sprayer: The water sprayer shall be an airless or other low-pressure sprayer for high phosphate wash water application.
- B. Scaffolding: Scaffolding, as required to accomplish the specified work, shall meet all applicable safety regulations. All special scaffolding shall have drawings and calculations stamped and signed by a civil or structural engineer registered in the state of Oregon.
- C. Electrical: Electrical tools, equipment and lighting shall meet all applicable codes and regulations. Ground fault protection as required by OSHA, shall be in effect at all times. Contractor shall take all additional precautions and measures necessary to insure a safe working environment during wet removal.

### PART 3 – EXECUTION

#### 3.1 WORK AREA CONTAINMENT PREPARATION

- A. The Contractor shall perform lead handling procedures under full or partial containment when work practices are expected to create exposures greater than the Permissible Exposure Limit (PEL) of 50  $\mu$ g/m3. The following lead handling procedures shall always be performed under full containment: abrasive blasting, welding and torch cutting, grinding or dry sanding, heat gun removal, and chemical stripping of lead paints or varnishes with volatile and caustic chemicals. Partial containment will be acceptable for tasks such as selective demolition, spot chemical removal and patching of surfaces.
- B. Contractor shall perform the following containment procedures in the order in which they are presented. Alternative engineering control methods considered by the Contractor must be proven by historical data and approved by the Environmental Consultant. The liberal use of water spray, ventilation and HEPA air filtration devices are most effective for reducing airborne lead concentrations.

## 3.2 PARTIAL CONTAINMENT WORK AREA PREPARATION

- A. Tasks requiring partial containment include items such as: Selective demolition, exterior paint removal, patching and repair of painted components and other tasks where incidental exposures to airborne lead concentrations are likely to occur. Historical monitoring of similar procedures may alleviate partial containment requirements.
- B. Contractor shall perform the following procedures in the order in which they are presented and describe procedures for exterior paint removal and other work in non-isolated work areas.
  - 1. Seal off airflow HVAC systems serving other building areas.
  - 2. Restrict access to work area and post warning signs.
  - 3. Install localized HEPA exhaust fan in work area if feasible. Locate fan intake to immediate area of work in such a manner that any lead dust released will be drawn away from the worker and into intake duct.
  - 4. Cover floor and other surfaces below work area with 6-mil plastic sheeting.
  - 5. Have emergency cleanup equipment and supplies, including HEPA vacuum, wash water, disposal bags, mop, buckets, towels and sponges, on hand prior to start of abatement work.
- C. When work is complete, the Contractor shall remove all visible debris from the work area. Once area has been cleaned, the Contractor shall notify the District Environmental Consultant to perform Dust Wipe Sampling as specified in this section. If the area is clean and free of dust and debris, but sample analysis shows concentrations above the stated levels, the District may choose to have its Hazardous Materials Abatement Contractor perform additional cleaning.

#### 3.3 WASTE DISPOSAL

- A. General: Disposal of building demolition waste coated with lead-based paint will generally not require a hazardous waste determination (i.e., TCLP testing) if demolition debris is disposed of at a solid waste landfill that is permitted by DEQ and which meets the current design standards for municipal solid waste disposal facilities of 40 CFR Part 258.
- B. Other Contractor generated waste streams shall be tested and properly disposed of by the Contractor. Concentrated lead-based paint waste will require a hazardous waste determination (i.e., TCLP testing). The Contractor shall properly dispose of concentrated lead-based paint waste that is deemed hazardous.

#### **END OF SECTION**

## CONCRETE

## PART 1 - GENERAL

- 1.1 WORK INCLUDED
  - A. Provide infill concrete slab at Riser room as indicated on the Drawings and as specified herein.

#### 1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM A185: Standard Specification for Steel Welded Wire Reinforcing, Plain, for Concrete.
  - 2. ASTM A615: Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
  - 3. ASTM C31: Standard Practice for Making and Curing Concrete Test Specimens in the Field.
  - 4. ASTM C33: Standard Specification for Concrete Aggregates.
  - 5. ASTM C39: Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
  - 6. ASTM C94: Standard Specification for Ready-Mixed Concrete.
  - 7. ASTM C143: Standard Test Method for Slump of Hydraulic Cement Concrete.
  - 8. ASTM C150: Standard Specification for Portland Cement.
  - 9. ASTM C172: Standard Practice for Sampling Freshly Mixed Concrete.
  - 10. ASTM C260: Standard Specification for Air-Entraining Admixtures for Concrete.
  - 11. ASTM C494: Standard Specification for Chemical Admixtures for Concrete.
- B. American Concrete Institute (ACI):
  - 1. ACI 304R: Guide for Measuring, Mixing, Transporting, and Placing Concrete.
  - 2. ACI 305R: Hot Weather Concreting.
  - 3. ACI 306R: Cold Weather Concreting.
  - 4. ACI 347R: Guide to Formwork for Concrete.

#### 1.3 QUALITY ASSURANCE

- A. Workmanship: Set and maintain screeds, lines, and forms within the following tolerance limits:
  - 1. Variations from Plumb:  $\pm 1/8$ " per foot not cumulative; not to exceed 1/4" in 10 feet.
  - 2. Variations from Grade:  $\pm 1/8"$  per foot not cumulative; not to exceed 1/4" in 10 feet.
  - 3. Finish Floor Slabs: 1/8" in 10 feet and 1/16" per foot.
- B. The Owner may employ a separate testing laboratory to evaluate concrete delivered to and placed at the site.

## PART 2 – PRODUCTS

## 2.1 MATERIALS

- A. Materials for Concrete:
  - 1. Portland Cement: ASTM C150, type as required.
  - 2. Aggregates: ASTM C33.
  - 3. Water: Clean, free of oils, acids, and organic matter.
  - 4. Air-Entraining Admixture: ASTM C260.
  - 5. Water-Reducing Admixture: ASTM C494, Type A.
- B. Form Materials:
  - 1. Unexposed Concrete Surfaces: Suitable material dressed on at least 2 edges and 1 side for tight fit.
  - 2. Exposed Concrete Surfaces: Provide 3/4" PS 1, Type I, concrete form grade plywood with grade and type stamped.

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- 3. Form Coating Manufacturers: Nox-crete, Edcoc Burke-Release, or accepted substitute non-staining pine oil derivative type.
- C. Reinforcing Bars and Dowels: ASTM A615, Grade 40.

### 2.2 MIXES

- A. Ready-Mixed Concrete: ASTM C94, Mix Design Alternate No. 3; and in addition:
  - 1. Minimum Cement Content per Cubic Yard: 470-pounds.
  - 2. Slump for Flat Work: 4" maximum (plus 0, minus 2-1/2").
  - 3. Use air-entraining admixture in concrete exposed to freezing and thawing, providing not less than 4% or more than 8% entrained air.
- B. Compressive Strength: 3000-psi minimum at 28-days.

### **PART 3 - EXECUTION**

#### 3.1 FORMING AND PLACING CONCRETE

- A. Formwork: Construct so concrete members and structures are of correct size, shape, alignment, elevation, and position complying with ACI 347.
- B. Provide openings in formwork to accommodate work of other trades. Accurately place and securely support items built into forms.
- C. Surface Preparation: Remove loose material from the compacted sub-base surface immediately before placing concrete.
- D. Clean and adjust forms prior to concrete placement. Apply form release agents or moisten forms, as required. Re-tighten forms after concrete placement to eliminate mortar leaks as required.
- E. Reinforcement: Position, support, and secure reinforcement against displacement. Locate and support with metal chairs, runners, bolsters, spacers and hangers, and cinder blocks as required. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- F. Installation of Embedded Items: Set and build into the Work, anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting diagrams, templates, and instructions provided by others for locating and setting.
- G. Concrete Placement:
  - 1. Comply with ACI 304R. Do not begin placement until work of other trades affecting concrete has been completed.
  - 2. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping, so that concrete is worked around reinforcement and other embedded items and into all parts of forms.
  - 3. Protect concrete from physical damage or reduced strength due to weather extremes. In cold weather, comply with ACI 306R. In hot weather, comply with ACI 305R.

## 3.2 CONCRETE FINISHES

A. Slab Trowel Finish: Apply trowel finish to monolithic slab surfaces that are exposed-to-view or are to be covered with resilient or other thin film coating. Consolidate concrete surface by finish troweling, free of trowel marks and uniform in texture and appearance.

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## CONCRETE

## 3.3 CURING

- A. Begin initial curing as soon as free water has disappeared from exposed surfaces. Where possible, keep continuously moist for not less than 72-hours. Continue curing by use of moisture-retaining cover or membrane-forming curing compound.
- B. Provide protection to prevent damage to exposed concrete surfaces.

### 3.4 CONCRETE TESTING

- A. When required by Chapter 17, Structural Tests and Inspections, of the 2009 International Building Code (IBC) and the Oregon 2010 Structural Specialty Code Amendments, The Owner will employ a separate testing laboratory to evaluate concrete delivered to and placed at the Site. Concrete strength tests for quantities less than 50 cubic yards will not be required when waived by the Building Official and the Architect.
- B. Comply with the 2009 International Building Code (IBC) and the Oregon 2010 Structural Specialty Code Amendments, Section 1903, Specifications for Tests and Materials, and Section 1904, Durability Requirements, for evaluation and acceptance of concrete.
- C. Test one field cured cylinder prior to removing shoring under structural slabs, joists, or beams.
- D. When required, perform tests as follows:
  - 1. Sampling: ASTM C172.2.
  - 2. Slump: ASTM C143, one test for each truck load at point of discharge for ready mixed concrete and each batch of Site mixed concrete.
  - 3. Air Content: ASTM C31, one for each set of compressive strength specimens.
  - 4. Compressive Strength: ASTM C39, one set for each day of structural concrete pour or each 50cubic yards, or fraction thereof of each class of concrete. Two specimens tested at 7 days, two specimens tested at 28 days, and one retained for later testing if required.

#### END OF SECTION

#### SHEET METAL FABRICATIONS

## PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Definition: Miscellaneous sheet metal includes items custom-fabricated from metal sheets that are not specified in other Sections of these Specifications.
- B. Types of sheet metal items in this section include:
  - 1. Stainless steel piping shrouds.

## 1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM A167: Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

## 1.3 SUBMITTALS

- A. Product Data:
  - 1. Submit manufacturer's product data, installation instructions and general recommendations for each specified miscellaneous sheet metal product, including paint products and other finishing materials.
- B. Shop Drawings: Submit shop drawings for the fabrication of sheet metal work. Include plans, elevations and detail sections. Indicate jointing, fasteners, anchorage, and accessory items, and specify finishes.
- C. Samples: Submit 6" square samples of each metal finish required. Prepare samples on metal of same alloy and gage to be used for the work.
- D. For color anodized aluminum whose normal color and texture variations are to be expected, include 2 or more units in each set of samples showing the limits of such variation.

#### 1.4 QUALITY ASSURANCE

A. Shop Assembly: Preassemble items in the shop to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitation. Clearly mark units for reassembly and coordinated installation.

## 1.5 PROJECT CONDITIONS

A. Coordinate work of this section with adjoining work for proper sequencing of each installation.

## **PART 2 - PRODUCTS**

- 2.1 MATERIALS
  - A. General: Provide materials selected for their surface flatness, smoothness and freedom from surface blemishes where exposed to view in the finished unit. Do not use materials having exposed-to-view surfaces exhibiting pitting, seam marks, roller marks "oil canning", stains, discoloration or other imperfections.
  - B. Sheet Steel: Provide commercial quality cold-rolled carbon steel sheet as follows, unless otherwise indicated:

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#### SHEET METAL FABRICATIONS

- 1. Stainless Steel Sheet: ASTM A167, Type 302/304, with No. 4 finish, unless otherwise indicated.
- C. Fasteners:
  - 1. Use fasteners made of the same basic metal as the fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.
  - 2. Do not use exposed fasteners except where unavoidable. Match finish of metal surrounding fasteners, unless otherwise indicated.
- D. Anchors and Inserts: Use non-ferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

### 2.2 FABRICATION, GENERAL

- A. Fabricate items to comply with requirements indicated, including those for quality, thickness and finish of material as well as those indicating dimensions and details. Use heavier metal gages, stiffeners or metal backing, as required to produce surface flatness, free of "oil-canning", and to impart sufficient strength for use indicated. If not otherwise indicated, provide the following minimum thickness of metal and comply with SMACNA recommendations for fabrication, and installation details.
  - 1. Stainless Steel: 16-gage.
- B. Form sheet metal items in maximum lengths and keep joints to a minimum. Do not expose cut edges of sheet metal except as indicated. Fold back exposed ends of unsupported sheet metal to form a 1/2" wide hem on the concealed side, or ease exposed edges with backing to a radius of approximately 1/32". Form items with flat, flush surfaces, true to line and level, and without cracking and grain separation at bends.
- C. Welds:
  - 1. Continuously weld all joints and seams except where other methods of joining are indicated; grind welds smooth and flush on exposed surfaces. Comply with AWS and other metal authorities.
- D. Provide straps, plates and brackets as required for support and anchorage of fabricated items to adjoining work.
- E. Reinforce sheet metal items as required for attachment and support of hinges, catches and other hardware for operating components.

## 2.3 CLOSURES AND TRIM

- A. Form closures and trim members to profiles indicated, using 18-gage sheet steel unless otherwise indicated. Furnish all components required for support and installation of closures and trim. Fabricate closures and trim to tightly close with adjoining work, and with weathertight joints at exterior installations.
- B. Locate fasteners to be concealed where possible; otherwise to be as inconspicuous as possible. Size to securely support the work and space to prevent buckling or waviness of the finished surface.
- C. Drill and tap holes required for securing closures to other surfaces.
- D. Provide gaskets of closed-cell sponge neoprene or mastic sealing tape where indicated or required for concealed, continuous seal at abutting surfaces.

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#### SHEET METAL FABRICATIONS

E. Provide concealed support at joints to hold meeting faces in flush alignment. Miter or cope trim members at corners to form tight joints.

## PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Field Measurements: Perform sheet metal work in cooperation with other trades. Verify size, location and placement of miscellaneous sheet metal work prior to fabrication. Coordinate field measurements and shop drawings with fabrication and shop assembly.
- B. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the project site.

## 3.2 INSTALLATION

- A. Locate and place sheet metal items plumb, level and in alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect sheet metal surfaces and to make a weathertight connection.
- C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers, as indicated
- D. Repair finishes damaged by cutting, welding, soldering and grinding operations required for shop fitting and jointing. Restore finishes and prime coats of paint so that there is no evidence of corrective work. Return items that cannot be refinished in the field to the shop, make required alterations, and refinish the entire unit or provide new units, at fabricator's option.
- E. Provide concealed gaskets, flashings, sealants, fillers and insulation, and install as the work progresses to make the installations weathertight or sealed.

## END OF SECTION
# ARCHITECTURAL METALS

# PART 1 - GENERAL

#### 1.1 WORK INCLUDED

A. Provide all custom stainless steel work for stainless steel wall panels, accessory trims, flashings, as indicated on the Drawings and as herein specified.

## 1.2 SUBMITTALS

- A. Shop Drawings: Show complete details and instructions for fabrication, assembly, and installation of all custom fabricated items.
- B. Clearly indicate materials, components, fasteners, hardware, equipment, finishes, methods of installation and assembly, supplementary support, or bracing.
- C. Submit 5 copies of the manufacturer's Material Safety Data Sheets on all materials prior to delivery to site.

## 1.3 QUALITY ASSURANCE

- A. Fabricator and installer are to maintain personnel and facilities totally engaged in design, fabrication, and provision of custom architectural metal work of type and size specified for this project.
- B. Installation performed only by personnel thoroughly familiar and trained to the manufacturer's recommended methods of installation.
- C. Provide at least one person who shall be thoroughly trained and experienced in the skills required, who shall be completely familiar with the requirements of this work, and who shall personally direct all installation performed under this Section of these Specifications.

## 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver materials or assemblies to the site until spaces are ready to receive the installation.
- B. Wrap and crate finished components and assemblies to prevent damage or marring of the assemblies or surfaces during shipping and handling.
- C. Deliver all materials in one piece. When impractical, deliver in largest sections and field assemble as continuous unit without obvious joints, by butt-welding.
- D. Deliver all items with protective covering and protect work of other trades.
- E. Cover and protect work from damage through times of construction until Final Acceptance by the Owner.

# ARCHITECTURAL METALS

# PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Stainless Steel Wall Panels: 16-gage at wall panels. Type 304 stainless steel in #4 finish ((horizontal grain). Panel sizes as indicated on Drawings. Provide with hemmed edges as detailed on Drawings.
- B. Stainless Steel Flashings and Accessory Pieces: Type 304 stainless steel in #4 finish. Profiles and shapes as detailed on Drawings. Includes:
  - 1. Pocket Hem Strips and Ends: 22-gage.
  - 2. Inside Corners: 22-gage.
  - 3. Corner Guards: 16-gage. Size and shape as shown on Detail 11 on Drawing Sheet A5.1.
  - 4. Fasteners and Toggles: As indicated on Drawings.
    a. Toggles: 3/16 24 "SnapToggle", or accepted substitute.
- C. "Z" Brackets at Top of Cove Base: 16 gage stainless steel "Z" brackets as indicated on Drawings.
  - 1. Fasteners
    - a. Fasten through new stainless steel wall panels to existing wall construction using button head tamperproof machine screws with stainless steel bonded sealing washers.
       1) Toggles: 3/16 24 "SnapToggle", or accepted substitute.
  - 2. Fasteners: Stainless steel drywall TEK screws as indicated on Drawings.
  - 3. Toggles: 3/16 24 "SnapToggle", or accepted substitute.
- D. Accessories: Provide stainless steel angles, screws, bolts, and brackets required for support and attachments. Specified fasteners and washers to be used to attach stainless steel sheets to the wall. Fasten to studs or use specified toggles where a stud is not available.
- E. Adhesive: Any formulated for the permanent bondage of stainless steel to existing wall substrate.
- F. Sealant: As specified in Section 07 92 00 JOINT SEANANTS..

## 2.2 CUSTOM FABRICATION

- A. Items to be constructed in a strong manner with bracing, reinforcing, and welding for rigidity.
- B. Welding by AWS standard heliarc method with welding rod of the same composition as parts welded. Exposed joints continuously welded to appear as one-piece construction.
- C. Directionally grind and polish all welds to match factory finish that is smooth and without depressions or metal discoloration.
- D. Brake bends and sheared edges will not mar uniform appearance of the material, texture at bend, or edge burrs polished to smooth uniform condition.

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# ARCHITECTURAL METALS

- E. Fasten with concealed fasteners to framework or adjacent items. Surface depressions from any weld studs are unacceptable.
- F. General Appearance and Correction:
  - 1. All custom fabricated items must retain a uniformity of overall appearance consistent with the quality level specified.
  - 2. All work to be corrected to the highest quality level if visual appearance indicates inconsistency in the skill level of fabrication.
  - 3. The repair of defective work at no additional cost to the Owner.

# **PART 3 - EXECUTION**

## 3.1 PREPARATION

- A. Verify all dimensions with measurements in the field before fabrication.
- B. Confirm passage of equipment to installation locations. Advise the Architect of anticipated difficulties prior to fabrication and site delivery.

# 3.2 INSTALLATION

- A. Install, assemble, level, and complete work of this Section in accordance with the manufacturer's printed instructions and reviewed shop drawings.
- B. Over bend pocket hem strips for tight fit.
- C. Mount stainless steel flashing to wall over existing gypsum board and screw for water tight fit.
- D. The continuous vertical pocket hem strip must be mounted to wall in straight line then install sheets by sliding into hem strips.
- E. Glue the screws into wall for security purposes.
- F. Sealant: Apply sealant where indicated on Drawings as recommended by sealant manufacturer. See Section 07 92 00 JOINT SEALANTS.

# ARCHITECTURAL METALS

# 3.3 CLEANING AND ADJUSTING

- A. Remove masking protection from stainless steel and other finished surfaces.
- B. Polish out, remove, or replace damaged finished surfaces.
- C. Leave the entire installation clean and free from defects at time of Substantial Completion. Remove surplus materials, debris, and tools from the site.

# WOOD FRAMING

## PART 1 - GENERAL

#### 1.1 WORK INCLUDED

- A. Provide lumber framing and accessories for floor, wall, ceiling, and roof framing systems as indicated on the Drawings and as specified herein.
- B. Include the construction and framing of stair risers, treads, and stringers as indicated on the Drawings and as herein specified.

#### 1.2 REFERENCES

- A. U.S. Department of Commerce: PS 20, American Softwood Lumber Standard.
- B. ASTM International (ASTM):
  - 1. ASTM A307: Standard Specification for Carbon Steel Bolts and Studs, 60,000-psi Tensile Strength.
  - 2. ASTM D226: Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- C. 2009 International Building Code (IBC) and the Oregon 2010 Structural Specialty Code Amendments.
- D. Federal Specification/Standard; General Services Administration Specifications Branch (FS).
- E. West Coast Lumber Inspection Bureau (WCLIB): No. 17 Standard Grading Rules.
- F. Western Wood Products Association (WWPA).

#### 1.3 DELIVERY, STORAGE, AND HANDLING

A. Wrap, cover, and protect lumber products and trusses in shipment and while stored on the site to prevent weather exposure and damage. Maintain stacks neat and in good order; level and off ground or floors; raised on pallets or dunnage to prevent contact with water or earth.

## **PART 2 - PRODUCTS**

# 2.1 CONCEALED FRAMING LUMBER

- A. Lumber Standard: American Softwood, PS 20.
- B. Species and Dressing: Douglas Fir or Douglas Fir-Larch, standard or better quality, smooth four sides (S4S).
- C. Minimum Grades and Bending Stress Rating: (WCLB and WWPA).
  - 1. Post and Beams: (5x5 and larger) No. 1 grade.
  - 2. Beams and Stringers: (5x9 and larger) No. 1 grade.
  - 3. Structural Framing: (2x6 to 4x14) No. 2 grade.
  - 4. Studs: (2x2 to 4x6) Stud grade.
  - 5. Light Framing for Blocking and Bridging: (2x2 to 4x4) Utility grade or No. 3 grade and Standard grade or No. 2 grade.
  - 6. Boards For Furring: (1x2 to 1x4) Standard grade of No. 3 common.

# WOOD FRAMING

- D. Moisture Content: Kiln dry lumber 4x or less to 19% moisture content at time of dressing.
- E. Blocking/Backing: 1 inch thick AC, fire resistive, plywood 12 inches by stud width for door hardware, toilet accessories, hand towel and soap dispensers.

#### 2.2 ACCESSORIES

- A. Bolts, Nuts, and Screws:
  - 1. Expansion Shields, Lag Screws, Lag Bolts: FS FF-B-561.
  - 2. Wood screws: FS FF-S-111.
  - 3. Bolts: FS FF-B-575.
  - 4. Nuts: FS FF-N-836.
- B. Nails and Staples: FS FF-N-105.
  - 1. Exterior: Galvanized Common Nails.
  - 2. Interior: Common Nails.

## PART 3 - EXECUTION

- 3.1 INSTALLATION
  - A. Fasteners: Minimum fasteners per the 2009 International Building Code (IBC) and the Oregon 2010 Structural Specialty Code Amendments Table 2304.9.1, Fastening Schedule, or as indicated on the Drawings.
  - B. Structural Blocking: Locate as indicated and as required to support toilet accessories, cabinets, toilet partitions, plumbing, fire sprinkler, mechanical, and electrical equipment. Solid block joists and rafters at bearing walls and beams. All wall 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 at a minimum of 1 <sup>1</sup>/<sub>2</sub>" thick and provide adequate support for any fixture that hangs on walls or ceilings. Fixtures requiring blocking include, but are limited to:

Kitchen/restroom sinks	Dispensers
Handrails	Magnetic/manual door stops
Hose bibs	Door hold open devices
Alarms	Gym equipment
Monitors	Projection equipment
Door stops	Mirrors
Casework	Toilet partitions
Grab bars	Wall hangings

## 3.2 MINIMUM NAILING SCHEDULE FOR FRAMING

- A. Minimum Quantity and Size For End Nailing:
  - 1. Blocking to Joist Each End: 2-8d or 2-10d.
  - 2. Stud to Sole or Top Plate: 2-16d.
- B. Minimum Quantity and Size For Toe Nailing:
  - 1. Blocking to Plate and Bridging to Joist Each End: 2-8d or 2-10d.
  - 2. Stud to Sole Plate: 4-8d or 4-10d at 2x4 studs and 6-8d or 6-10d at 2x6 studs.
  - 3. Stud to Header: 3-8d or 3-10d.
  - 4. Joist to Plate or Beam: 3-8d or 3-10d at 2x4 studs and 4-8d or 4-10d at 2x6 studs.

# WOOD FRAMING

- 5. Rafter to Plate: 3-8d or 3-10d at 2x4 studs and 4-8d or 4-10d at 2x6 studs.
- C. Minimum Quantity and Size For Face Nailing:
  - 1. Double Top Plates Spiked Together: 16d at 16" on center or 10d at 8" on center at 2x4 studs or 16d at 12" on center at 2x6 studs.
  - 2. Double Header Top and Bottom Edges Staggered: 16d at 16" on center or 10d at 8" on center along each edge.
  - 3. Double Studs: 16d at 24" on center or 10d at 12" on center at 2x4 studs and 16d at 16" on center at 2x6 studs.
  - 4. Bottom Plate to Joists or Blocking: 16d at 16" on center or 10d at 8" on center.
  - 5. Rafter to Joist: 3-16d.
  - 6. Double Joist Lapped Over Partition or Beam: 3-16d.
  - 7. Double Top Plates at Laps and Intersections: 2-16d or 4-10d each face at 2x4 studs and 3-16d at 2x6 studs.
  - 8. Roof Stripping to Purlins or Joists: 2-8d or 2-10d at 12" on center.

# 3.3 MINIMUM BOLTING

- A. Anchor Bolts, Plates to Foundation: 4'-0" on center maximum.
- B. Lag Bolts, Pre-drill Holes:
  - 1. 5/8" Diameter Bolt: Drill 1/2" diameter hole.
  - 2. 3/4" Diameter Bolt: Drill 9/16" diameter hole.

# FIRESTOPPING

## PART 1 - GENERAL

#### 1.1 WORK INCLUDED

- A. Provide firestopping materials designed to retain the integrity of time rated construction maintaining a barrier against the spread of flame, smoke, and gasses as herein specified. All penetrations in separation walls shall be sealed with an approved firestopping material.
- B. Application to include, but not limited to, penetrations through time rated, floors, partitions, or fire walls.

## 1.2 REFERENCE STANDARDS

- A. ASTM International (ASTM):
  - 1. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 2. ASTM E814: Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
- B. UL Building Materials Directory.
- C. Uniform Building Code (ICBO).
- D. National Fire Protection Association (NFPA):
  - 1. NFPA 101 Life Safety Code.
  - 2. NFPA 70 National Electric Code.

## 1.3 SUBMITTALS

A. Submit the manufacturer's product data with certification that materials meet the requirements of applicable codes. Include description of materials, prefabricated devices, reinforcement, anchorage, and method of installation.

# 1.4 DESIGN CRITERIA

- A. Firestopping material shall be asbestos-free and capable of maintaining an effective barrier against flame, smoke and gasses, and suitable for firestopping of penetrations made by steel, glass, plastic, and insulated pipe. The fire rating classification shall not require removal of insulation on insulated pipe.
- B. The rating of the firestopping materials shall not be less than the rating of the time rated floor or wall assembly.
- C. All firestopping to be of a single type from the same manufacturer. In existing facilities identify and match the existing firestopping material.

## 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in unopened containers bearing the manufacturer's name and product description.
- B. Store under cover and protected from damage. Remove damaged material from the job site.

# FIRESTOPPING

## PART 2 - PRODUCTS

## 2.1 ACCEPTABLE MANUFACTURERS

- A. United States Gypsum Thermafiber "Safeing" mineral fiber insulation.
- B. 3M Brand CP-25, Caulk; 303 Putty; FS-195 Wrap/Strip; CS-195 Composite sheet; 7900 Series Penetrating Sealing System.
- C. Dow Corning 3-6548 Silicone RTV Fire Stop Foam.
- D. General Electric Company RTV 850 Silicone Foam.
- E. Grace Construction Products "FlameSafe" Systems.
- F. Bio Fire Shield Firestopping systems.
- G. Metacaulk Brand, 800 series and 900 series.
- H. SpecSeal by Specified Technologies Inc.
- I. Or accepted substitute.

# PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Clean surfaces to be in contact with the firestopping materials of dirt, grease, oil, or other substance that may affect proper installation or fire resistance.
- B. Install materials as indicated in accordance with the manufacturer's instructions. Seal all holes or voids to provide an effective barrier.
- C. Examine firestopped areas to ensure proper installation prior to closing or covering. Area to remain accessible until inspection by applicable authority as may be required.

# JOINT SEALANTS

## PART 1 - GENERAL

#### 1.1 WORK INCLUDED

- A. Provide complete sealant systems as indicated on Drawings and specified herein.
- B. Section includes building sealants for weatherproofing, including but not limited to, perimeter joints of jambs, sills and trim; perimeter of door and window frames; penetrations of mechanical, electrical, and roof drainage equipment and parts through exterior wall, soffit and trim; expansion joints. Miscellaneous sealant products used throughout job.

#### 1.2 QUALITY ASSURANCE

- A. Guarantee: Furnish written guarantee at completion of work. Guarantee period shall be 2 years from date of substantial completion. Include repair and replacement of defective work, such as leaks, failure of material, loss of adhesion, running of compound, or staining of adjacent work.
- B. Provide manufacturer's standard warranties as follows:
  - 1. 20 year Structural Adhesion Warranty.
  - 2. 20 year Weatherseal Warranty.
  - 3. 20 year Non-Staining Warranty.
- C. Installer must have 5 years of experience in the installation of sealants specified herein.
- D. Laboratory Adhesion Tests: Contractor shall furnish samples of surface materials being sealed to the Sealant manufacturer for laboratory testing. Sealant Manufacturer shall perform laboratory tests of staining, weatherseal, and structural adhesion of sealant on each type of material being sealed. Sealant Manufacturer shall furnish written report of results and recommendations to the Architect and the Contractor prior to first pre-installation conference.
- E. Pre-installation Conferences: Notify the Architect, sealant manufacturer's representative, and sealant installer at least 2 weeks before starting sealant work. Arrange a mutually acceptable time for meeting at the job with all notified parties to review the sealant specifications and job conditions. Obtain acceptance and approval of all parties on materials, details, and methods before beginning sealant installation.
  - 1. Schedule 2 on-Site Pre-installation Meetings.
  - 2. First Pre-installation Meeting: The sealant manufacturer shall perform field adhesion tests of each type of material to determine and reconfirm if primer is required. Install sealants (and primers, where recommended) at representative areas at the first Pre-installation Meeting preparatory to the pull tests. After applying sealant at test locations, allow a minimum of 7 days to 14 days for sealants to cure prior to performing pull tests. Refer to recommendations made by sealant manufacturer resulting from laboratory adhesion tests.
  - 3. Second Pre-installation Meeting: Reconvene at the Site to perform pull tests. Allow at least 7 to 14 calendar days for test sealants to cure prior to second meeting.
- F. Sealant Manufacturer's Inspections: Arrange for required manufacturer's periodic and final field inspections.
- G. Contractor to notify BSD representative prior to applying sealant. Test compatibility with existing coatings prior to application. District will provide an inspector/observer on site during application.

# JOINT SEALANTS

# 1.3 SUBMITTAL

A. Product Data: Submit product data and MSDS sheets for all sealants to be used at interior locations indicating compliance with VOC limits of the Bay Area Air Resources Board Reg. 8, Rule 51.

## PART 2 - PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS

- A. Organic (at Interior Locations Only):
  - 1. Pecora Corporation.
  - 2. Sika Corporation.
  - 3. Sonneborn Building Products Division, Contech, Inc.
  - 4. Tremco, Inc. / Mameco Vulkem
  - 5. Bostik.
  - 6. Or accepted substitute.

## 2.2 MATERIALS

- A. Acrylic Latex Sealant: General interior application for finishing gaps between various materials where painting of sealant is specified. Use single or multi-component products as appropriate.
- B. Sealant Color: Color as selected by the Architect to match adjacent surfaces at exposed joints. At concealed joints, manufacturer's highest performance color.
- C. Joint Cleaner and Primer/Sealers: As recommended by sealant manufacturer for the joint surface to be cleaned, primed, or sealed.
- D. Bond Breaker Tape: Polyethylene or other plastic self-adhesive tape, compatible with sealant, which will not bond to sealant.
- E. Sealant Backer Rod: Nonabsorptive closed cell compressible rod stock, compatible with sealant, which will not bond to sealant as recommended by the sealant manufacturer.

## **PART 3 - EXECUTION**

## 3.1 JOINT SURFACE PREPARATION

- A. Clean, prime, and seal joint surfaces as recommended by the sealant manufacturer.
- B. Support sealant from back with construction indicated or with joint filler or backer rod where recommended by the sealant manufacturer.

## 3.2 INSTALLATION

- A. Comply with the manufacturer's printed instructions. Verify that the Architect has selected the sealant color during the submittal process or at the first pre-installation meeting.
- B. Skilled workmen shall install each type of material in locations as called for. All material struck neat to line and cleaned from adjacent surfaces.
- C. Apply sealants only to clean and dry surfaces at correct temperatures, and with approved protection from adverse weather conditions and dust.

# JOINT SEALANTS

- D. Thoroughly clean and remove any non-compatible substances remaining on surfaces such as lacquers, curing compounds, form coatings, bond breakers and silicone water repellents. Clean out any dust and loose material by brushing, scraping and blowing with air jet as necessary. Clean metal and glass with solvents.
- E. Run full, continuous and uniform beads of sealant in joints to be sealed keeping faces of work clean. Dry tool joint to concave profile.
- F. 1/2" maximum joint depth and 3/4" maximum width. Use backing rod to make approximately 1:2 joint section depth to width ratio. Use polyethylene bond breaker tape as required to prevent adhesion to back of joints where backer rod cannot be used or would not allow for proper depth to width ratio.
- G. Install elastomeric sealants in non-traffic joints to size and shape indicated or with slightly concave surface and depth equal to 50% of normal joint width, but not more than 1/2" and not less than 1/4".
- H. Install elastomeric sealants in concrete traffic joints to size and shape indicated or with slightly concave surface and depth equal to 75% of normal joint width, but not more than 5/8" and not less than 3/8" deep.
- I. Install non-elastomeric sealants to size and shape indicated or with slightly concave surface and depth from 75% to 125% of normal joint width.

# 3.3 ADJUSTING AND CLEANING

- A. Remove excess and spillage promptly.
- B. Replace materials improperly installed as directed by the Architect.
- C. Protect all horizontal sealants from dust and dirt until sealant is no longer tacky by covering the joint.

## PART 1 - GENERAL

## 1.1 WORK INCLUDED

A. Provide gypsum drywall partitions and ceilings on wood framing and wood furring.

## 1.2 REFERENCES

## A. ASTM International (ASTM):

- 1. ASTM A641: Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- 2. ASTM A653: Specification Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- 3. ASTM C473: Standard Test Methods for Physical Testing of Gypsum Panel Products.
- 4. ASTM C475: Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- 5. ASTM C557: Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
- 6. ASTM C645: Standard Specification for Nonstructural Steel Framing Members.
- 7. ASTM C754: Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel.
- 8. ASTM C840: Standard Specification for Application and Finishing of Gypsum Board.
- 9. ASTM C919: Standard Practice For Use of Sealants in Acoustical Applications.
- 10. 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.
- 11. ASTM C1177: Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- 12. ASTM C1178: Standard Specification for Glass Mat Water-Resistant Gypsum Backing Panel.
- 13. ASTM C1396: Standard Specification for Gypsum Board.
- 14. ASTM D3273: Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- 15. ASTM E119: Standard Test Methods for Fire Tests of Building Construction and Materials.
- B. Gypsum Association:
  - 1. GA-214: Recommended Levels of Gypsum Board Finish.
  - 2. GA-216: Application and Finishing of Gypsum Panel Products.

## 1.3 SYSTEM DESCRIPTION

- A. Structural Requirements:
  - 1. Steel Framing Systems: Maximum deflection of L/240 for design loads.
  - 2. Steel Ceiling Suspension Systems: Maximum deflection of L/360 for design loads.
  - 3. Seismic Loads: Provide steel bracing members to carry loads created by seismic movement of the ceiling systems.
- B. System Tolerances: Do not exceed 1/4" variation in 8'-0" from plumb, level and true lines.

# 1.4 SUBMITTALS

A. Product Data: Submit the manufacturer's specifications and installation instructions for each gypsum drywall product component, including other data as may be required to show compliance with these specifications.

- B. Submit wall and ceiling texture sample on 24" x 24" gypsum board materials properly prepared to match specified wall finishing or on 10 square feet of prepared wall surface for the Architect's review. Acceptable texturing may be retained as finish surface. Remove all texturing that is not approved prior to drying on the wall surface. Texturing to be applied by the technician scheduled to do the texturing.
- C. Submit product preparation instructions and recommendations, storage and handling requirements and installation methods.

## 1.5 QUALITY ASSURANCE

- A. Regulatory Agency Requirements:
  - 1. Comply with building code and governing authorities requirements for fire-rated partitions and ceilings.
  - 2. Provide materials, accessories and use application procedures that have been listed and approved by UL, ICC, and tested in accordance with ASTM E119 for the type of construction scheduled. When requested, provide UL design numbers for fire-rated wall and ceiling assemblies.
- B. Field Samples: Provide 100 square foot minimum of in-place wall and ceiling joint and fastener treatment for the Architect's review prior to the joint finishing of gypsum board surfaces. The Architect will review smoothness and hiding of board joints and fasteners only. Acceptable samples may be incorporated in the work.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate the delivery of materials with the installation to minimize storage periods. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store gypsum and steel materials in dry, ventilated space, under cover protected from weather, direct sunlight, and above grade floor slabs. Neatly stack gypsum boards flat to prevent sagging.
- C. Protect structural members from excessive stress during delivery and erection.
- D. Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal corner beads and trim from being bent or damaged.

## 1.7 SITE CONDITIONS

- A. Temperature Requirements: Do not begin installing gypsum board until building is enclosed or ambient temperature remains above 55°F.
- B. Cold Weather Protection: When ambient outdoor temperatures are below 55°F, maintain continuous, uniform, comfortable building working temperatures of not less than 55°F for a minimum period of 48 hours prior to, during, and following application of gypsum board and joint treatment materials or bonding of adhesives.
- C. Ventilation: Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent too rapid drying.

## PART 2 - PRODUCTS

## 2.1 ACCEPTABLE MANUFACTURERS

A. Obtain all components and materials of the gypsum drywall system from a single manufacturer, or from producers recommended by the manufacturer, unless otherwise indicated.

# 2.2 FACE AND BACKING BOARDS

- A. Gypsum Face Panels: ASTM C1396. Long edges tapered. 5/8" thick, 48" wide, Type "X" gypsum core, UL classified.
  - 1. Use moisture and mold resistant type for walls and ceilings in toilet rooms, janitor rooms, shower areas, sink areas and other high moisture spaces. Conform to ASTM C473, ASTM C1396 and ASTM D3273.
- B. Gypsum Base Panels: ASTM C1396, Type "X" fire retardant type, UL classified, with long edges tapered.
- C. Tile Backer Board: 1/2 thick water-resistant treated core with glass mat moisture protectant coating and embedded glass mats, both sides. The face side is surfaced with heat-cored copolymer water- and vapor-retardant coating, conforming to ASTM C1178. Provide fire rated material where required.

#### 2.3 GYPSUM ACCESSORIES

- A. Acoustical Sealants: U.S. Gypsum Acoustical sealant, Tremco Drywall Sealant, A.C. Horn Vulcatex Thriftube, non-setting, non-staining, acoustically tested caulking, or accepted substitute.
- B. Acoustical Insulation: U.S. Gypsum Thermafiber sound attenuation fire blankets, 3" thick, 15-25 flame spread, smoke developed 0; Certainteed Acoustitherm Batts, Owens/Corning Fiberglas Sonobatts, unfaced, 3-1/2" thick, Type II, smoke developed 10; or accepted substitute.
- C. Screw Fasteners: ASTM C1002. No nailing of gypsum materials will be allowed.
- D. Fastening Adhesive for Wood Framing: ASTM C557. Supplement adhesive with permanent or temporary fasteners as recommended by the manufacturer.
- E. Laminating Adhesives: Product recommended by gypsum board manufacturer.
- F. Gypsum Board Metal Trim: Manufacturer's standard 26-gage galvanized steel. All trim to have fine mesh expanded metal flanges. Fine mesh corner beads: Mini-Bead 800/900 by ClarkDietrich Building Systems, Niles Mini-Bead 800/900, Mini Veneer Bead by Phillips Manufacturing Co., or accepted substitute. Certainteed No-Coat Corner System.
- G. Interior Joint Reinforcing Tape: Fiber tape not less than 2-1/4" wide, ASTM C475.
- H. Exterior Joint Reinforcing Tape: Open weave glass fiber tape not less than 2-1/2" width, ASTM C475.
- I. Interior Joint Treatment Materials: ASTM C475, ready-mixed type as recommended by gypsum wallboard manufacturer. Provide 2 separate grades, 1 specifically for bedding tapes and filling depressions and 1 for topping and sanding. Use chemical-hardening type for bedding and filling where required.
- J. Exterior Joint Treatment Materials: ASTM C475, special chemical-hardening type as recommended by the gypsum wallboard soffit board manufacturer.

K. Skim Coat: "First Coat" by U.S. Gypsum, Georgia-Pacific "Ready-Mix All-Purpose Joint Compound", or accepted substitute. Certainteed All Purpose Joint Compound. Certainteed Extreme All Purpose (for MMR or exterior soffits).

## **PART 3 - EXECUTION**

## 3.1 PREPARATION

- A. Protection: Provide temporary covering to eliminate splattering of joint compound and spray texture on adjacent finished surfaces.
- B. Suspension wires must be supported from structure above unless approved otherwise by the Architect.
- C. Do not bridge building expansion joints with support systems, frame both sides of joints with furring and other supports as indicated.

# 3.2 INSTALLATION OF WALL AND CEILING PANELS

- A. General and Fire Rating Requirements:
  - 1. Comply with Gypsum Association Specifications GA-216.
  - 2. Install acoustical insulation where indicated, without gaps and with snug fit against studs and support where necessary to prevent movement or dislocation. Install full height of partition, unless otherwise indicated. Fit carefully behind electrical outlets and other work that penetrates partition or face of wall.
  - 3. Install panels of thickness indicated and as required meeting structural and fire rating requirements.
  - 4. Glue and screw wallboard to wood framing members as recommended by the manufacturer. Nailing of gypsum panels will not be allowed.
  - 5. For vertical partition wallboard installation, offset panel joints on opposite sides of stud framing.
  - 6. In areas where gypsum wallboard is scheduled for wall and ceilings, install the ceiling first then the wallboard.
  - 7. Verify that acoustical insulation is in place, where scheduled, prior to completing panel installation.
  - 8. Where partitions are sound or fire rated construction, acoustical sealant shall be applied to all cutouts and intersections with adjoining structure as described herein. This will require that the gypsum board be cut for loose fit around the partition perimeter leaving a space approximately 1/8" wide.
  - 9. Cut board neatly and fit around pipes, electrical outlets, mechanical work, etc. Remove any loose face paper at cuts and fill holes or openings with quick setting plaster.
  - 10. Use panels of maximum practical length to minimize end joints. Arrange joints on opposite sides of partition walls to occur on different studs and stagger butt joints on the same surface. Where partitions intersect exterior walls, start installation at exterior end to position butt joints as far away from exterior wall as possible. Board shall be brought into contact but not forced into place with all ends and edges neatly fitted. Bottom edge of gypsum board on walls shall be a maximum of 1/4" above floor.
  - 11. Attach to framing with all edges over framing members using screw fasteners. Space screws at 12" on center on ceiling and 16" on center on walls, staggered on abutting edges. Power drive screws at least 1/32" deep. Space screws at not less than 3/8" from edge and ends of board. Where board may appear loose from framing, install second fastener within 1-1/2" for the first fastener.

- 12. While fasteners are being driven, hold the gypsum board in firm contact with underlying supports, fastening from the center of the board toward ends and edges. Drive fasteners home with heads slightly below surface, taking care to avoid breaking the paper face.
- 13. Install gypsum base panels as a substrate for face panels where 2 layers are required. Fasten both the base layer and face layer separately to framing members with screws.
- 14. Finish in every location with metal edge and corner bead unless other finishing details are given and edge is covered with molding or trim.
- 15. Install control joints vertically at corners of door and relite frames, and at a maximum of 30 feet apart on unbroken wall surfaces whether shown on the Drawings or not. Extend control joint from head to ceiling and from window sill to floor.
- 16. Verify all expansion joint locations with the Architect prior to installation of gypsum board. Use casing beads at exposed edges of plaster and drywall and corner beads with 1 <sup>1</sup>/<sub>4</sub>" minimum width flange at outside corners.
- 17. Cover both faces of stud framing with gypsum board in concealed spaces (above ceilings, etc.), except in chase walls that are braced internally. Except where concealed application is required for sound, fire, air or smoke ratings, coverage may be accomplished with scraps of not less than 8 square feet area, and may be limited to not less than 75% of the full coverage.
- 18. Use water resistant type board on all wet and high moisture areas. Seal all cut ends and openings with recommended sealant.

## 3.3 INSTALLATION OF GLASS MESH MORTAR UNITS

A. Install horizontally with end joints over framing members. Secure to framing with screws spaced at not more than 8" on center with 1" bugle head Type "S" High-Low screws. Do not tape the joints of the boards.

# 3.4 SEALANT APPLICATIONS

- A. Partition Perimeter: Apply a 1/4" minimum bead of sealant on each side of plates, including those used at intersections with dissimilar wall construction. Immediately install gypsum board, squeezing sealant to form contact with adjacent surfaces. Fasten board as specified. Conform to ASTM C919 for sealant application.
- B. Partition Intersections: Seal edges of face layer of wallboard abutting intersection partitions, before taping and finishing.
- C. Openings: Apply a 1/4" bead of acoustical sealant around all cut outs to seal openings of electrical boxes, ducts, pipes and similar penetrations. Seal sides and backs of all electrical boxes.
- D. Control Joints: Before installing control joints, apply sealant in back of joint to reduce flanking sound path.
- E. Install acrylic latex sealant where required to fill exposed openings.

# 3.5 PATCHING EXISTING SURFACES

A. This subcontractor shall check the Drawings and building site to determine areas requiring patching in the area of the Work described on the Drawings. Wherever patching is necessary or indicated, perform this work using materials as specified. The same materials are to be used as the material of the adjoining surfaces and finished the same. Exercise care in the finishing of the patched area. Feather and blend to the adjoining surface to produce as invisible a joint as possible.

B. In buildings requiring remodeling, patched materials and surfaces must be finished so that existing and new materials match one another, not only in color but also in patterns and surface texture. The intent is to not have a patched appearance. In areas where partitions must be removed to create new areas, careful planning is required to ensure that finishes of the existing and the newly created surfaces are homogenous. The existing materials should blend into the new so that the transitions form one material to the other cannot be readily observed. IF the desired level of finish cannot be achieved, arrange contrasting materials in a pleasing design.

## 3.6 FINISHING

- A. Levels of Finish:
  - 1. Level 0: No taping, finishing, or accessories required.
  - 2. Level 1: All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
  - 3. Level 2: All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. Mop down all walls after the final mud coat prior to priming. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
  - 4. Level 3: All joints and interior angles shall have tape embedded in joint compound and one additional coat of joint compound applied over all joints and interior angles. Fastener heads and accessories shall be covered with two separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Mop down all walls after the final mud coat prior to priming.Note: It is recommended that the prepared surface be coated with a drywall primer prior to the application of final finishes.
  - 5. Level 4: All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Mop down all walls after the final mud coat prior to priming.
  - 6. Level 5:
    - a. All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. A thin skim coat shall be trowel applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.
    - b. The skim coat is trowel applied as a thin coat over the entire surface to fill imperfections in the joint work, smooth the paper texture, and provide a uniform surface. Excess compound is immediately sheared off with the trowel, leaving a film of skim coating compound completely covering the paper.
- B. Exposed Board in Finished Areas: Provide Level 3, 4 or 5 finish.
- C. Exposed Board in Unfinished Areas: Provide Level 1 finish.
- D. Water Resistant Gypsum Board Substrate for Ceramic Tile: Level 2 finish.

E. Water Resistant Cementitious Backing Board: Do not apply tape and compound at joints. Seal edges and joints with water-resistant sealant.

# 3.7 CLEAN UP

A. Do not dispose of or leave excess drywall materials or debris on the premises. Leave each area "broom clean" after completing drywall work. Clean spots and spills of taping and finishing compounds off of all adjacent surfaces and equipment.

## PART 1 - GENERAL

## 1.1 WORK INCLUDED

A. Provide ceramic tile in locations as detailed on the Drawings and as herein specified.

## 1.2 REFERENCES

- A. American National Standards Institute, Inc. (ANSI):
  - 1. ANSI A108.1B: Installation of Ceramic Tile on a Cured Portland Cement Dry-Set or Latex-Portland Cement Mortar.
  - 2. ANSI A108.5: Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
  - 3. ANSI A108.6: Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy.
  - 4. ANSI A108.10: Installation of Grout in Tilework.
  - 5. ANSI A118.1: Dry-Set Portland Cement Mortar.
  - 6. ANSI A118.4: Latex-Portland Cement Mortar.
  - 7. ANSI A118.6: Standard Cement Grouts for Tile Installation.
  - 8. ANSI A136.1: Organic Adhesives for Installation of Ceramic Tile.
- B. ASTM International (ASTM):
  - 1. ASTM C144: Standard Specification for Aggregate for Masonry Mortar.
  - 2. ASTM C150: Standard Specification for Portland Cement.
  - 3. ASTM C206: Standard Specification for Finishing Hydrated Lime.
  - 4. ASTM C207: Standard Specification for Hydrated Lime for Masonry Purposes.
- C. Tile Council of America, Inc. (TCA): TCA 137.1, American National Standard Specifications for Ceramic Tile.

## 1.3 SUBMITTALS

- A. Shop Drawings: Submit elevations of walls and floor plan showing locations of "Dutchmen" and patterning of tile prior to tile installation. Unapproved locations of "Dutchmen" may result in the removal and replacement of tile.
- B. Office Samples: Submit 2 samples of each type, color, pattern, and texture of specified tile mounted and grouted prior to tile installation.
- C. Manufacturer's Data Sheets: Submit Manufacturer's data sheets for the following.
  - 1. Anti-fracture membrane.
  - 2. Mortars.
  - 3. Grouts.
  - 4. Additives.
- D. Product Data: Submit manufacturer's information indicating the location where tile was manufactured and where the primary raw materials were extracted, if known. If the product contains recycled materials, submit manufacturer's data indicating the percentage by weight of post-consumer recycled content and post-industrial recycled content. Submit product data and MSDS sheets for all adhesives indicating compliance with VOC limits of the South Coast Air Quality Management District Rule #1168. Submit product data and MSDS sheets for all sealers indicating compliance with VOC and chemical component limits of Green Seal requirements.

- E. Submit product preparation instructions and recommendations, storage and handling requirements and installation methods.
- F. Submit finish schedule including color information, gloss and model number for each type and color of tile specified.

#### 1.4 QUALITY ASSURANCE

- A. Perform all work by experienced workmen skilled in the installation of ceramic tile in accordance with the recommendations and conforming to the Tile Council Specifications. Contractor shall have a minimum of five years commercial ceramic tile installation experience.
- B. Field Samples: Install 10 square feet of both floor and wall tile with joints grouted. The Architect will review placement and joint color. Acceptable field samples may be incorporated in the Work.
- C. Pre-Installation Conference: Notify the Architect, tile manufacturer's representative, and tile installer at least 48-hours before starting tile work. Arrange a mutually acceptable time for meeting at the job with all notified parties to review the specifications and job conditions. 100 square foot area of ceramic tile wall is to be used as preliminary sample for review. Sample area to be non grouted. Obtain the acceptance and approval of all parties on materials, details, and methods before beginning tile installation.

## 1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver all materials in manufacturer's unbroken packages and properly store to protect from contamination. Inspect all surfaces and conditions on which material is to be installed.

## 1.6 WARRANTY

A. Systems Warranty: Provide manufacturer's standard 25 Year Systems Warranty covering mortar and grout.

## **PART 2 - PRODUCTS**

- 2.1 TILE
  - A. Standard Specification: Manufacture tile to meet Standard Specification for Ceramic Tile, TCA 137.1.
  - B. Unglazed smooth Ceramic Mosaic Floor and Wall Tiles:
    - 1. Standard grade, cushion or all purpose edge, mounted to sheets, 2" x 2" x 1/4" size, porcelain, water absorption not to exceed 0.5%, smooth unglazed finish. Equal to Dal Tile Group 1 or 2 or accepted substitute.
  - C. Glazed smooth Wall Tile:
    - 1. Standard grade, cushion edge, matte glaze, 4-1/4" x 4-1/4" x 5/16" glazed interior wall tile by Dal Tile Group 1 or 2 or accepted substitute. Trim shapes of same material as field tile.

## 2.2 MORTAR MATERIALS

- A. Provide mortar and grout materials from same manufacturer.
- B. Floor and Wall Portland-Latex Thin Set Mortar: Bagged cementitious powder formulated for use as thin set mortar when mixed with specified additive.

- 1. Manufacturer: Laticrete #255 Thin Set Mortar or accepted substitute.
- 2. Additive: Gage with flexible latex additive. Laticrete #333 Super Flexible Additive or accepted substitute.
- 3. Color: Gray.
- C. Thin Set Mortar: Setting bed 1 to 1 parts Portland Cement/sand gauged with Laticrete No. 4237 Tile Setting Liquid or accepted substitute.
- D. Organic Adhesive: Comply with ANSI A136.1 for use on gypsum board wall substrates.
- E. Portland Cement: ASTM C150, Type I.
- F. Sand: ASTM C144.
- G. Water: Potable.
- H. Mortar: 1 part portland cement, 4 to 5 parts damp sand by volume.

# 2.3 GROUT MATERIALS

- A. Provide grout and mortar materials from same manufacturer.
- B. Wall Tile Grout: Sanded cement grout designed to be mixed with water. Formulated from a blend of high strength Portland cement, graded aggregates, polymers, and color-fast pigments.
  - 1. Manufacturer: Ardex
  - 2. Color: 014 Slate
  - 3. 3/16" wide joints.
- C. Floor Tile Grout: Stainless pigment free colorfast epoxy grout; factory proportioned kit of epoxy resin, hardener, and silica filler.
  - 1. Manufacturer: Ardex
  - 2. Color: 014 Slate
  - 3. 3/16" wide joints.

# 2.4 ACCESSORIES

- A. Anti-Fracture Membrane: 2 part system consisting of a liquid rubber and reinforcing fabric. Laticrete Blue 92 Anti-fracture Membrane or accepted substitute.
- B. Joint Tape: 2" wide coated fiberglass tape.
- C. Floor Sealer: Aqua Mix Penetrating Sealer by Aqua Mix Inc. or accepted substitute.
- D. Wall Sealer: Non-sheen, natural-look, water-based penetrating sealer formulated to provide maximum stain protection. Sealers Choice #15 Gold by Aqua Mix Inc. or accepted substitute. Must not exceed the VOC and chemical component limits of Green Seal requirements.
- E. Pre-fabricated Trim and Profiles:
  - 1. Edge Protection Profiles: Schluter "Schiene and Schiene Radius", solid brass, extruded aluminum, or roll-formed stainless steel edge protection profiles, 1/8" wide at top edge; height as indicated; with integral perforated anchoring leg with trapezoidal openings and grout spacer. Material and finish as required.

- 2. Transition Profiles: Schluter RENO series, "RENO-U", "RENO-TK", "RENO-UK", "RENO-V" and "RENO-T", solid brass or extruded aluminum transition strips; profile and height as indicated; integral perforated anchoring leg with trapezoidal openings. Material and finish as indicated.
- 3. Prefabricated Movement and Expansion Joints: Schluter DILEX series, "DILEX-BT", "DILEX-KSBT", "DILEX-KS", "DILEX-AKWS", "DILEX-EDP", "DILEX-BWB", "DILEX-BWS", "DILEX-BWA", "DILEX-AS" and "DILEX-EP", prefabricated solid brass, roll-formed stainless steel, extruded aluminum, or extruded rigid PVC profile, joined by a soft CPE movement joint material, thermoplastic rubber insert or metal interface. Profile includes integral perforated anchoring legs with trapezoidal openings. Height and color as required.

# PART 3 - EXECUTION

## 3.1 INSPECTION

- A. Examine Surface: Examine substrate surfaces and conditions under which Tile work is to be completed. Correct conditions detrimental to proper and timely completion of work. Verify surface of floor slab is within 1/8" in 10'-0" for thin set tile, 1/4" in 10'-0" for mortar bed tile, concrete substrate is free of curing agents and has a light broom finish.
- B. Starting Work: Do not proceed with Tile work until unsatisfactory conditions have been corrected. Start of Tile work will be considered acceptance of surfaces and conditions within each area.
- C. Cement board <sup>1</sup>/<sub>2</sub>" thick is required behind all tile work.

## 3.2 PREPARATION

- A. The Contractor shall supply broom clean floors in areas designated to receive ceramic tile. Any additional cleaning or sealing of the substrate or remaining existing mastic, necessary for floor preparation for the ceramic tile installation, shall be provided as work of this Section.
- B. Clean existing concrete floor surface as recommended in forward to ANSI A108.5 and ANSI A108.6.
- C. Coordinate with Drywall Subcontractor for the application of glass mesh mortar units on walls. Check for soundness of framing, adequate fastening, and fit of joints. Cover all horizontal and vertical joints with fiberglass tape embedding in a skim coat of mortar.
- D. Floors: Mix Portland Cement mortar and grout with latex admixture.

## 3.3 GENERAL INSTALLATION

- A. Instructions: Comply with the mortar and grout manufacturer's printed instructions.
- B. Joints: Lay tile in grid pattern with aligned joints. Adjust joints to minimize tile cutting. Provide uniform joints approximately 1/16" wide. Install sealant at joints between tile and plumbing fixtures.

## 3.4 FLOOR TILE INSTALLATION

- A. Clean and prep the concrete floor slab.
- B. Installation to comply with Tile Council of America "Cement Mortar, Bonded" Installation No. F112 consisting of Mortar bed bondcoat, mortar bed of nominal 1-1/4" thick, bond coat, and ceramic tile grouted for installation on concrete slab-on-grade construction.

- C. Tiled floor surfaces to slope to drain. Minimum slope 1/8" per foot, maximum 1/4" per foot.
- D. Protection: Protect floor tile installations per tile and grout manufacturer's recommendations.
- E. Floor Sealer: Clean the ceramic tile of excess grout and dirt. Apply sealer using a sponge, brush, sprayer or roller following the manufacturer's recommendations.

# 3.5 WALL TILE INSTALLATION

- A. Moisture Resistant Gypsum Board: Installation to comply with Tile Council of America "Gypsum Board Cementitious Bond Coat" Installation No. W243 consisting of cementitious bond coat and grouted ceramic tile.
- B. See the Drawings for the wall pattern design.

## 3.6 ADJUSTING AND CLEANING

- A. Sponge and wash tile diagonally across joints when setting and grouting is complete. Acid clean unglazed tile not less than 10 days after setting, wet tile before applying acid wash, carefully follow the manufacturer's instructions, protect all adjacent surfaces, and thoroughly flush with water when completed. Finally, polish with clean dry cloths and apply floor sealer following the manufacturer's installation method. There should be no surface residue.
- B. Replace cracked, chipped, broken, or unbonded tile.

## 3.7 COLOR SCHEDULE

- A. Remodeled restrooms: Match the following colors.
  - 1. Floor Tile: Dal Tile Keystones D208 Suede Gray Speckle
  - 2. Accent Tile #1: Dal-Tile Desert Gray X114 semi gloss
  - 3. Accent Tile #2: Dal Tile Biscuit K175 semi gloss
- B. Restroom C114 and 115: Match the following colors for patch areas.
  - 1. Field Tile: Dal-Tile Matte Biscuit K775.

# 3.8 EXTRA STOCK

A. Provide a quantity for each unique type or color equal to 5% installed, including grout. The minimum quantity is one full unopened carton.

## PART 1 - GENERAL

## 1.1 WORK INCLUDED

- A. Reinstall salvaged acoustical ceiling tiles, complete with suspension systems at locations indicated on the Drawings and as herein specified.
- B. Include the removal and reinstallation of existing panels and track system as required for work above the ceiling space.
- C. Install new acoustical layin ceiling tile and new acoustical glue up tile to match existing, if needed, on a unit price basis. Glue up tile is only located at the gym and dishwash area.

## 1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM A568: Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
  - 2. ASTM C635: Standard Specification for the Manufacturer, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
  - 3. ASTM C636: Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

## 1.3 SUBMITTALS

- A. Office Samples: Submit sample of ceiling panels and tiles to the Architect prior to ordering materials.
- B. Design Data: Submit diagram of ceiling horizontal and vertical loads on the ceiling suspension components. Indicated loads carried by the hanger wires, main runners, tees, wall angles, and diagonal bracing.
- C. Submit product preparation instructions and recommendations, storage and handling requirements and installation methods.

#### 1.4 QUALITY ASSURANCE

A. Regulatory Agency Requirements: Add concealed structural supporting members to ceiling suspension system to resist seismic loads as required by local building officials.

## PART 2 - PRODUCTS

## 2.1 SEISMIC RESTRAINT

- A. Suspended acoustical ceiling systems, with or without lighting fixtures or other ceiling mounted items shall comply with the requirements of ASTM C635 and ASTM C636.
- B. Provide three copies of Engineered Design calculations, drawings and documentation prepared by a Structural Engineer registered in the State of Oregon, showing compliance and classification of light, medium or heavy duty system. Include manufacturer's literature of ICBO Reports and identification of connection devices and approved loading capabilities.

- C. When using a standard 24" x 48" grid system in lieu of an Engineered Design, submit three copies of manufacturer's literature or ICBO Report indication as a light, medium or heavy duty system. Include fixture schedule and other ceiling supported equipment and their weight, with connection devices and approved loading capabilities.
- D. Ceiling areas of 144 square feet or less surrounded by walls that connect directly to the structure above shall be exempt from these standards.
- E. Light Duty systems to be used only where no loads other than ceiling acoustical materials weighing not more than 15 pounds per square foot are supported by the suspension system.
- F. Intermediate and Heavy Duty classification systems shall be used where suspension system is used to support lighting fixtures or other equipment.

# 2.2 MATERIALS

- A. All ratings in conformance with the Acoustical and Insulation Materials Association Bulletin, latest edition.
- B. Acoustical Tile (Match existing only): Mineral fiber, square edge tile 12" by 12" by 3/4", Class I flame spread rating. Minimum 2 coats factory applied washable white vinyl latex paint. NRC 0.60-0.70, STC range 35-39, light reflectance of LR-1, Armstrong Travertone Fissured, square edge K4C4 unless otherwise noted to match existing or accepted substitute.
- C. Acoustical Board (Match existing only): Mineral fiber 24" by 48" by 3/4" thick, Class 25 flame spread rating. Color white with light reflectance of LR-1, NRC 0.50-0.60, STC 35-39, to match the existing tile. Provide board on wall surface as detailed to match existing.
- D. Suspension System:
  - 1. Use 1" white main and cross tee bars on 2'x4' grid seismically braced to IBC standards. Existing buildings: reuse existing grid unless code requires replacement.
  - 2. Retaining Clips: BERC2 2" Beam End Retaining Clip, 0.034" thick, hot-dipped galvanized cold-rolled steel per ASTM A568 used to join main beam or cross tee to wall molding.
- E. Suspension Wires: Minimum 12-gage galvanized, soft annealed steel hanger wire.
- F. Ceiling Tile Adhesive: #137 by W. W. Henry, Ceiling Tile Adhesive by Miracle, or accepted substitute.
- G. Metal Edge for Direct Glue Tile: #402 by U.S. Gypsum or accepted substitute.
- H. Spare Materials: Furnish 1 full carton of acoustical panels and tiles or 5% overrun which ever is larger. Furnish from the same production run as that used in the installation. Deliver to the Owner for future repairs and maintenance.

## PART 3 - EXECUTION

# 3.1 INSTALLATION OF ACOUSTICAL CEILING SUSPENSION SYSTEMS

A. General: Grid location as indicated on reflected ceiling plan. Install in accordance with manufacturer's instructions and recommendations of Article 2, "Installation of Components", of ASTM C636.

- B. Main Runners: Install main runners at 48" on center with hanger wire support at not more than 48" on center. Wrap hanger wire at least 3 full turns.
- C. Tees and Moldings:
  - 1. Install cross tees at 24" on center and adjacent to recessed light fixtures not supported by main runners. Install flat splines or tee splines as recommended by manufacturer. Provide moldings where ceilings meet walls, partitions and other vertical elements.
  - 2. Secure terminal ends of the runners by attaching the BERC-2 clip to the wall molding and attaching the runners to the BERC-2 clip. The runners shall have zero clearance at the perimeter on two adjacent walls and with 3/8" (9.5 mm) clearance on the opposite walls. The clip is attached to the wall molding by sliding the locking lances over the hem of the vertical leg of the wall molding. BERC-2 clips installed in this manner are an acceptable means of preventing runners from spreading, in lieu of spacer bars required in CISCA 0-2, which is referenced in ASCE 7, Section 9.6.2.6.2.1, which is referenced in IBC Section 1621. Except for the use of the BERC-2 clip as noted above, installation of the ceiling system must be as prescribed by the applicable code. Maximum ceiling weight permitted is 1.20 pounds per square foot (5.86 kg/m2). This construction is equivalent to that required by CISCA 0-2, which is referenced in ASCE-7, Section 9.2.6.2.1, and which is referenced in IBC Section 1621.
- D. Fixture Loads Causing Excess Deflection: Independently support or supplementally support the grid within 6" of each corner. Such loads shall not cause rotation of runners more than 2° from vertical.
- E. Trapeze Type System: Provide where obstructions preclude direct attachment. Support all runners within 8" of wall or discontinuity.
- F. Positively attach light fixtures weighing less than 20 pounds to the suspension system. Fixtures weighing more than 20 pounds but less than 56 pounds shall include two 12-gage hangers from the fixture to the system hangers or the structure above. Support fixtures weighing more than 56 pounds directly from the structure. Support pendant hung fixtures independently from the structure above.
- G. Lateral Loads: Provide channel diagonal bracing of suspended ceiling system as required to meet lateral loads of the ceiling during seismic activity.

## 3.2 INSTALLATION OF ACOUSTICAL CEILING PANELS

- A. Room centerline to match the center of the tile or edge of the tile as indicated on the Drawings.
- B. Install ceiling panels in suspended grid system per the manufacturer's recommendations using clean hands or gloves.
- C. Install directional pattered tile with patterns running across the short direction of the room.
- D. Provide extra panels to protect recessed light fixtures as detailed for fire rated ceilings.

## 3.3 INSTALLATION OF ADHESIVE SYSTEM

- A. Room centerline to match center of tile or edge of tile or to match existing pattern as indicated on Drawings.
- B. Install ceiling tiles over wood stripping or gypsum board panels using fire rated adhesive. Apply in nondirectional pattern with finished surface in flat smooth plane. Insert fiber splines in kerfs at corners of units where required.

# 3.4 ADJUSTING AND CLEANING

- A. Adjust grid height as required maintaining ceiling system leveled to within 1/8" in 12 feet. Bending or kinking of hangers not permitted.
- B. Where required, locate hanger wire around mechanical, plumbing, fire sprinkler and electrical equipment.
- C. Clean exposed ceiling suspension members prior to installation of ceiling panels of tile.
- D. Remove and replace panels and tile improperly placed, broken, or damaged prior to Substantial Completion.
- E. Clean surfaces of panels and tile or remove and replace as directed prior to Substantial Completion.

# 3.5 EXTRA STOCK

A. Provide a quantity of each unique type or color equal to 5% of amount installed or at the minimum one full unopened carton.

## PART 1 - GENERAL

#### 1.1 WORK INCLUDED

- A. Interior Painting:
  - 1. Field finish exposed concrete, masonry, plaster, primed and galvanized steel, gypsum, unfinished and primed wood, plywood, and ceiling tiles in areas scheduled for field finishing.
  - 2. Field paint exposed fire protection, plumbing, HVAC, and electrical equipment not factory finished which is installed in areas scheduled for field finishing.
- B. Do Not Paint:
  - 1. Prefinished items, such as light fixtures, plumbing fixtures and finished door hardware.
  - 2. Finished metal such as anodized aluminum, stainless steel, finished brass or bronze.
  - 3. Moving parts of operating units, equipment identification, performance rating, name plates or code-required labels.
  - 4. Exterior insulation and finish system.
  - 5. Brick masonry.

## 1.2 REFERENCES

- A. Oregon Administrative Rules (OAR), Department of Human Services, Public Health Division: Chapter 333, Division 70 Renovation, Repair and Painting Activities Involving Lead-Based Paint.
- B. Code of Federal Regulations: 40 CFR: Protection of the Environment.

## 1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's literature on each coating proposed for this Project. Obtain approval of coatings prior to ordering. Include the manufacturer's recommended minimum dry film thickness for each coating system. Indicate where the material is to be used.
- B. Office Samples:
  - 1. Submit Samples: For the Architect's review of color and gloss.
  - 2. Resubmit Samples: As requested until required color and gloss is achieved.
  - 3. Opaque Finish: Provide three 8" x 8" minimum size samples of each color and gloss.
  - 4. Transparent Finish: On actual wood surfaces provide three 4" x 8" minimum size samples for natural and stained wood finish.
- C. Submit product preparation instructions and recommendations, storage and handling requirements and installation methods.
- D. Submit finish schedule including color information, gloss and model number for each type and color of paint specified. Provide two verification samples for each finish product specified, minimum size 6" square, representing actual product, color, sheen and pattern.
- E. Contractor shall provide start date for painting in 3 week look ahead construction schedule. Contractor shall provide notice to BSD representative at least 24 hours before applying paint. If painting is being applied in stages, similar schedule notification will be required for the start of each stage. Notification is to allow Owner inspections of wall substrates prior to any primer being applied and to allow additional inspections between primer and finish coats.

## 1.4 QUALITY ASSURANCE

- A. Painter: Provide local subcontractor experienced in painting commercial buildings. Painting subcontractor must have 5 years' experience in projects of similar size.
- B. Field Samples:
  - 1. On actual building components, duplicate finishes on acceptable office samples.
  - 2. Provide wall and ceiling colors and finishes on minimum 50 square feet of in-place surfaces.
  - 3. Provide trim and equipment colors and finishes on minimum 10 lineal feet of in-placesurfaces.
  - 4. The Architect will approve for color, texture and sheen only.
- C. Fire Protection: Provide sufficient fire extinguishers of a type suitable for the control of fire originating in paint materials. Remove and dispose of, or safely store, all waste, empty containers and oily cloths off of the premises daily.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to each site in new, original and unopened containers bearing manufacturer's name, trade name, and label analysis.
- B. Storage: Store coatings in ventilated spaces with containers closed.
- C. Handling: Keep dust and open flame from coating materials while mixing and painting.

## 1.6 QUALITY ASSURANCE

- A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturers absolute limits.
- B. Coordinate work with other operations and installation of finish materials to avoid damage to installed materials. Do not apply coatings materials until moisture or dust producing work or other appearance or performance impairing construction activities have been completed.

## PART 2 - PRODUCTS

# 2.1 ACCEPTABLE MANUFACTURERS

- A. Miller Paint Co.
- B. Rodda Paint Co. / Cloverdale Paint Co. (Specification Standard)
- C. Sherwin Williams Co., Professional Coatings Division.
- D. Kelly Moore
- E. Or accepted substitute.

# 2.2 INTERIOR MATERIALS

- A. Products listed below are approved for use in the Project. Other products may be used when approved by the Architect in writing.
- B. Gypsum Drywall Walls (Paint at all areas except restrooms):
  - 1. Primer: Rodda 503601 Master Painter UL VOC Drywall Primer.
  - 2. Second and Third Coats: Rodda 523601 Master Painter UL VOC Satin Latex.
- C. Gypsum Drywall Ceilings (Paint at all areas except restrooms):
  - 1. Primer: Rodda 503601 Master Painter UL VOC Drywall Primer.
  - 2. Second and Third Coats: Rodda 523601 Master Painter UL VOC Satin Latex.
- D. Gypsum Drywall Walls and Ceiling (Epoxy at restrooms):
  - 1. Primer: Rodda 503601 Master Painter UL VOC Drywall Primer.
  - 2. Second and Third Coats: Rodda: Cloverdale 70503 Ecologic WB Epoxy Semi-Gloss.

# **PART 3 - EXECUTION**

- 3.1 INSPECTION
  - A. Examination of Surfaces: Examine areas and conditions under which painting work is to be applied. Correct conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected.
  - B. Contaminated Surfaces: Do not paint over dirt, rust, blistered paint, grease, wet substrates, or surface conditions detrimental to the formation of a durable paint film.
  - C. Work Start: Start of painting work will be interpreted as the Applicator's acceptance of surfaces and conditions within any particular area.

#### 3.2 PREPARATION

- A. Cleaning: Comply with coating the manufacturer's instructions for preparation and cleaning of each substrate.
- B. Protection:
  - 1. Cover and protect adjacent finished surfaces.
  - 2. Remove hardware, machined surfaces, cover plates, lighting fixtures and prefinished items in place and not scheduled for field finishing, or provide surface applied protection. Reinstall removed items after finishing adjacent surfaces.
  - 3. Post "WET PAINT" signs during application and curing of all coatings that may be accessed by other trades or the public.
  - 4. Contractor shall take special safety precautions against hazards from toxic and flammable materials. Keep open flame, electrical and static spark and other ignition sources away from flammable vapors and materials at all times. Place paint and solvent contaminated cloths and materials subject to spontaneous combustion in sealed non flammable containers and remove from site every day.

- C. Priming:
  - 1. Seal wood required to be job painted. Prime edges, ends, face, undersides and backsides of millwork and exterior painted wood.
  - 2. Provide finish coats that are compatible with prime paints used. Provide barrier coats over incompatible primers where required. Notify the Architect in writing of anticipated problems using specified coatings with substrates primed by others.
  - 3. Apply prime coat or first coat to material that is scheduled or required to be painted or finished.
  - 4. Touch up shop primed surfaces scratched or chipped prior to field finishing.
- D. Repair cracks, indentations, surface irregularities and abrasions. Do not start work until surfaces to be finished are in proper condition to produce finished surfaces of uniform satisfactory appearance.
  - Ensure substrates have moisture content within tolerances allowed by coating manufacturer. Where exceeding the following values, promptly notify BSD rep and obtain direction before beginning work. Concrete and Masonry: 13 percent. Cure minimum 28 days. Exterior Wood: 17 percent. Interior Wood: 15 percent. Interior Finish Detail Woodwork, including trim and casework: 10 percent. Plaster and Gypsum: 15 percent. Concrete Slab on grade: Perform calcium chloride test over 24 hour period or other test acceptable to manufacturer. Verify acceptable moisture transmission and ph levels.
  - 2. Stains & Marks: Remove completely, if possible, using materials and methods recommended by coating manufacturer; cover stains and marks which cannot be completely with isolating primer or sealer recommended by coating manufacturer to prevent bleed through.
  - 3. Remove mildew, algae and fungus using materials and methods recommended by coating manufacturer.
  - 4. Remove dust and loose particulate matter from surfaces to receive coatings immediately prior to coating application.
  - 5. Protect adjacent surfaces not indicated to receive coatings.
- E. Caulk to be installed after the application of primer. Use elastomeric and polyurethane paintable caulk. Use non sagging polyurethane for expansion joints and elastomeric around windows and doors. Use non sagging polyurethane caulk and foam backer rod for expansion joints. The backer rod needs to be slightly thicker than the expansion joint. Backer rod must be <sup>1</sup>/<sub>2</sub> to <sup>3</sup>/<sub>4</sub> of an inch below the surface; caulking to fill until level with surface.
- F. Paint applied over existing painted finish in good condition. If presence of lead in existing coatings is suspected, cease surface preparation and notify BSD rep immediately.
  - 1. Wall finish: Etch or sand, prime if needed. Fill all holes, caulk gaps between any adjacent painted substrates. Remove surface irregularities to produce uniform substrate for coating application; apply one coat of primer of type recommended by coating manufacturer for maximum coating adhesion.
- G. Surface Preparation of Specific Substrates:
  - 1. Concrete and Concrete Masonry: Clean surfaces free of loose particles and sand. Remove contaminants which could impair coating performance or appearance. Verify moisture transmission and ph levels are incompliance with coating manufacturer's recommendations. Concrete floors: mechanically abrade surface to achieve 80-100 grit medium sandpaper texture.
  - 2. Gypsum Board & Plaster: Repair cracks, holes and other surface defects, as required to create smooth surface and maintain proper surface adhesion. Apply joint compound for gypsum board or patching plaster for plaster and sand to produce surface flush with adjacent undamaged surface. Allow a full cure prior to coating application as recommended by the
patching compound manufacturer's recommendations.

- 3. Aluminum Mill finish: IF PAINT IS REQUIRED: Clean and etch surfaces with a phosphoric acid water solution or water based industrial cleaner. Scuff sand smooth surfaces to create profile for adhesion. Flush with clean water and allow to dry, before applying primer coat. Test adhesion of primer to ensure performance.
- 4. Metals Ferrous, Unprimed: Remove rust or scale, if present, by wire brush, power tool or sandblasting. Remove grease, oil and other contaminants which could impair coating performance or appearance by solvent cleaning. Clean welds, bolts and nuts with phosphoric acid solution; spot prime repaired welds with specified primer.
- 5. Metals Ferrous, Shop Primed: Remove loose primer and rust, if present, by scraping and sanding, feathering edges of cleaned areas to produce uniform flat surface; solvent clean surfaces and spot prime bare metal with specified primer, feathering edges to produce uniform flat surface.
- 6. Metals Galvanized Steel: Clean with a water based industrial strength cleaner, apply Glava Prep adhesion promoter followed by a clean water rinse; or wipe down surfaces using clean, lint free cloths saturated with xylene or lacquer thinner; followed by wiping the surface dry using clean lint free cloths. Test adhesion of primer to ensure performance.
- 7. Metals Stainless Steel: Clean surfaces with pressurized steam, pressurized water or waterbased industrial cleaner. Test adhesion of primer to ensure performance.
- 8. Wood: Seal knots, pitch streaks and sap areas with sealer recommended by coating manufacturer; fill nail recesses and cracks with filler recommended by coating manufacturer. Sand surfaces smooth. Apply primer coat to back of wood trim and paneling.
- 9. Wood Doors: Seal door tops and bottoms prior to finishing.
- 10. Wood Field Glazed Frames and Sash: Prime or seal glazing channels prior to glazing.
- 11. Existing Coatings Repaint: Paint applied over existing painted finish in good condition. If presence of lead in existing coatings is suspected, cease surface preparation and notify Architect immediately.
- 12. Wall Finish: Etch or sand, prime if needed, fill all holes, caulk gaps between any adjacent painted substrates.
- 13. Remove surface irregularities by scraping or sanding to produce uniform substrate for coating application; apply one coat primer of type recommended by coating manufacturer or maximum coating adhesion.
- 14. Doors and other areas requiring semi-gloss finish: 100% Acrylic.
- H. Existing Lead Base Paint: For renovations, repairs and painting (RRP) in "Child-Occupied Facilities" (where kids under the age of 6 regularly spend time and built before 1978), the General Contractor shall follow all Federal, State and local rules (including OSHA and US EPA rules and Oregon Administrative Rules Chapter 333, Division 70) associated with lead-based paints (LBP).
  - 1. The Contractor is responsible for the identification of LBP hazards and providing engineering controls for trigger activities that disturb LBP.
  - 2. Any time painted surfaces are disturbed, the work must be performed by a certified firm with a trained and certified "renovator" in accordance with 40 CFR (including Part 745.82 Lead).
  - 3. Post the areas of the building that will be affected with appropriate signage warning of the potential hazard.

# 3.3 APPLICATION

# A. Methods and Coverage:

- 1. Apply painting and finishing materials in accordance with the manufacturer's directions. Use techniques best suited for the material and surfaces to which applied.
- 2. For opaque finishes, apply additional coats when undercoats, stains or other conditions show through final paint coat, until paint film is of uniform finish, color and appearance.
- 3. Where recommended by manufacturer, sand lightly between succeeding enamel or clear coats.
- 4. Apply each material at not less than the manufacturer's recommended spreading rate, to

provide a total dry film thickness of not less than amount recommended by coating manufacturer.

- 5. Match approved office and field samples for color, texture and sheen.
- 6. Paint exposed surfaces behind movable equipment and furniture same as adjacent surfaces.
- 7. Paint surfaces behind permanently fixed equipment or furniture with prime coat only.
- 8. Remove dust and other foreign materials from substrate immediately prior to applying each coat.
- 9. Where coating application abuts other materials or other coating color, terminate coating with a clean sharp termination line without coating overlap.
- 10. Reprepare and recoat unsatisfactory finishes; refinish entire area to corners or other natural terminations.
- 11. Repair coatings damaged by subsequent construction activities to achieve flat, uniform surface without surface defects visible from 5 feet. Where repairs cannot be made to Architect's acceptance, reapply finish coating to nearest adjacent change of surface plane, in both horizontal and vertical directions.
- 12. Notify BSD representative prior to applying subsequent coats. Coats will only be considered in determining number of coats applied if BSD representative has been notified.
- 13. Low gloss finish to be used at walls at classrooms, offices, corridors and custodial rooms. Eggshell is acceptable at classrooms as well.
- 14. Semi-gloss finish is to be used at walls at kitchens, cafeterias, student and adult restrooms.
- 15. Low gloss finish is to be used at ceilings at restrooms and custodial rooms.
- B. Equipment Surfaces:
  - 1. Paint interior surfaces of ducts where visible through registers or grilles, flat black.
  - 2. Except where accent colors are scheduled, paint mechanical and electrical work in finished areas including exposed ducts, piping, conduit, louvers, and grilles to match adjacent surfaces except when factory finished to color matching adjacent surface.
  - 3. Paint exterior exposed equipment where noted on the Drawings.
- C. Existing Surfaces: Existing walls to be repainted are to be cleaned, removing all scaled and loose paint. Wall areas that have been patched are to be primed and painted as specified for new work. The existing painted surfaces, after cleaning and spot priming as necessary, are to receive 2 finish coats of paint.
- D. Workmanship: Tint undercoats slightly darker than finish coat to aid Inspector in verifying coverage of each coat. Assume all responsibility for paint coats applied over surfaces and undercoats that have not been inspected and approved by Architect. Apply any additional coats of paint, as directed by Architect where surface preparation and undercoats have not been approved before painting. Make finished work match approved samples.
- E. Drywall and Plaster Surfaces: Paint shall not be applied to any surface until it is thoroughly dry and cured. Prime surfaces that show hot spots or alkali in order to prevent such blemishes from showing through the paint. Brush off all loose particles or crystals that may have formed.
- F. Colors: Refer to the Color Schedule included at the end of this Section. Colors have been selected from color chips in the Architect's office. Match the colors to these chips. Job mixing and tinting will not be allowed.

#### 3.4 ADJUSTING AND CLEANING

- A. Remove, refinish or repaint work not in compliance with specified requirements. Recoat work not meeting minimum dry film thickness.
- B. Correct any painting related damage by cleaning, repairing or replacing and refinishing as directed.

- C. Repaint lines between accent colors as directed to obtain clean straight lines.
- D. Remove paint splatters from plastic laminate, resilient flooring, anodized aluminum, glass and similar finished surfaced.
- E. Touch up factory finished surfaces damaged during construction.
- F. Reinstall items that have been removed to protect from coating application.
- G. Remove protective materials.
- H. Protect completed coating applications from damage by subsequent construction activities.

#### 3.5 EXTRA STOCK

- A. Deliver one gallon of each finish coating material, in sealed unopened original manufacturer's container, clearly marked with color and finish identification. Remove all other opened containers and dispose of in compliance with regulations.
- B. Deliver extra stock in 1- or 5-gallon unopened containers. Contractor to provide an as built finish schedule. Update schedule to include product numbers, formula and location for each finish used.
- C. Keep list of stock delivered to Owner and submit with Closeout Manuals.

#### 3.6 COLOR SCHEDULE

- A. Boys and Girls 2 walls and ceiling: Match existing
- B. Boys and Girls 3 walls and ceiling: Match Miller No. 0022 White Kitten
- C. Boys and Girls 4 walls and ceiling: Match Miller No. 0022 White Kitten
- D. Boys and Girls 5 walls and ceiling: Match existing
- E. Classroom walls at A wing: Match existing
- F. Staff restrooms at A wing: Match existing
- G. Classroom walls at B wing: Match existing
- H. Staff restroom B119: Match existing
- I. Workroom B104: Match existing
- J. Workroom B107: Match existing
- K. Classroom walls at C wing: Match existing
- L. Restroom C105: Match existing
- M. Restroom C109: Match existing
- N. Restroom C118: Match existing

- O. Plywood panel at drinking fountain in C hall: Match existing wainscot color
- P. South wall of Kitchen: Match existing
- Q. Storage C112: Match existing
- R. Health C106: Match existing
- S. Principal C104: Match existing
- T. Classroom walls at M wing: Match existing
- U. Staff restroom M309: Match existing

# PLASTIC TOILET COMPARTMENTS

#### PART 1 - GENERAL

#### 1.1 WORK INCLUDED

A. Provide solid plastic toilet compartments and screens as indicated on the Drawings and as specified herein.

#### 1.2 SUBMITTALS

- A. Shop Drawings: Submit for review prior to fabrication. Show plans, details of construction, hardware, fittings, and fastenings.
- B. Office Samples: Submit manufacturer's standard colors for the Architect's selection.
- C. Certifications: Submit the manufacturer's written certification indicating compliance with applicable building codes governing the Project as it applies to the use of "plastic in a commercial building".

#### 1.3 CODES AND STANDARDS

- A. Fabricate and assemble compartments, hardware, and accessories to meet requirements of the Americans with Disabilities Act (ADA) and per Chapter 11, Accessibility, of the 2010 Oregon Structural Specialty Code (OSSC).
  - 1. Latching Hardware: Operable with one hand and shall not require tight grasping, pinching or twisting of the wrist.
  - 2. The force required to activate operable parts shall be 5 pounds maximum.
  - 3. Operable parts of hardware shall be 34" minimum and 48" maximum above the finish floor or ground.
  - 4. The door to the accessible toilet compartment shall be self closing.
  - 5. The door to the accessible toilet compartment shall not swing into the minimum required compartment area.
  - 6. Locate accessible toilet compartment doors in the front partition or in the side wall of partition farthest from the water closet. Where the door is located in the front partition, the door opening shall be 4" maximum from the side wall of partition farthest from the water closet.
- B. Materials and fabrication shall comply with applicable codes governing the Project.

# 1.4 PRODUCT HANDLING

A. Ship all panels, doors, and pilasters to the Site with a special protective covering.

# 1.5 WARRANTY

A. Provide the manufacturer's standard 15-year warranty against breakage, corrosion, and delaminating.

## PART 2 - PRODUCTS

- 2.1 ACCEPTABLE MANUFACTURERS
  - A. AMPCO.
  - B. Scranton Products.

# PLASTIC TOILET COMPARTMENTS

- C. Bradley. (Specification Base)
- D. Or accepted substitute.

#### 2.2 MATERIALS

A. Solid Plastic Compartments and Screens: Floor and ceiling mounted, with non-corrosive doors, panels, and pilasters. Fabricate doors, panels, and pilasters from solid recycled high-density polyethylene (HDPE) plastic containing a minimum of 50% recycled material manufactured under high pressure forming a single component section which is waterproof, non-absorbent and has a self-lubricating surface that resists marking with pens, pencils, or other writing utensils.

# B. Solid Plastic Compartment and Screen Characteristics:

- 1. Dual component compression molded high density polyethylene (HDPE) of solid virgin resin materials in colors that extend throughout the surface; the panels, doors, and pilasters shall have a recycled material (HDPE) as the core material.
- 2. Doors, Panels, and Pilasters: 1" thick with all edges machined to a radius of 0.250". All exposed surfaces free of saw marks.
- 3. Color: As selected by the Architect from the manufacturer's standard color selections. (Poly-Mar HD or Poly-Marble HD). Match Bradley Starry Night S225.
- C. Hardware System: As standard with the manufacturer.
  - 1. Hinge System: The manufacturer's integral hinge system. Pilaster to be machined to accept door and hinge mechanism. Hinge mechanism shall consist of a 2-piece 1/2" diameter nylon pin with "cam action" and a 3/16" stainless steel pin inserted into the lower portion of pilaster and door. Insert a 1-piece 1/2" diameter x 4" long nylon pin into the top portion of the pilaster and door. Door closures to be factory set to accommodate all conditions and allow for a positive opening and closing action free of impediment.
  - 2. Door Pull:
    - a. Non-Handicap Compartment Doors: Each door shall be supplied with one coat hook/bumper and door pull made of chrome plated zamak.
    - b. Accessible Compartment Doors: Supply each door with one coat hook/bumper and door pull made of chrome plated zamak. Supply each door with a second door pull on the other side of the door near the door latch.
  - 3. Door Strikes and Keepers: Heavy-duty aluminum extrusions (6364-T5 Alloy) with clear anodized finish with wrap around flange surface mounted and thru-bolted to door with one-way sex bolts. Provide with 6" long strike.
  - 4. Door Latch Housing: Fabricated from heavy aluminum extrusion (6364-T5 Alloy) with clear anodized finish, surface mounted and thru-bolted to door with one-way sex bolts. Provide heavy aluminum slide bolt and button with "Tough-Coat Black" finish.
  - 5. Pilaster Shoes: Solid plastic, anchored to finished floor with plastic anchors and No. 14 x 1-1/2" stainless steel phillips head screws.
  - 6. Wall Brackets: Full length (solid color). Use brackets for all panels to pilaster, pilasters to wall, and panel to wall connections. Thru-bolt wall brackets to panels and pilasters with one-way sex bolts. Attachment of brackets to adjacent wall construction wall be made using No. 14 x 1-1/2" stainless steel at 12" intervals alternately spaced between anchor connections.
  - 7. Headrail: Heavy aluminum extrusion (6364-T5 Alloy) with mill finish in anti-grip configuration. Fasten handrail to tops of pilasters and headrail brackets by thru-bolting with one-way stainless steel sex bolts. No cadium plated sex bolts allowed.
  - 8. Headrail Brackets: 18-gauge stainless steel.

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# PLASTIC TOILET COMPARTMENTS

# 2.3 FABRICATION

- A. Dividing Panels: 55" high and mounted 14" above finished floor.
- B. Doors: 55" high and mounted 14" above finished floor.
- C. Door Widths:
  - 1. At Accessible Stalls: 3 feet wide.
  - 2. At Other Stalls: 2 feet wide.
- D. Pilasters: 82" high, mounted within a 1-piece plastic shoe with one-way theft-proof, stainless steel sex bolts.
- E. Aluminum Edging Strips: Fasten to the bottom edge of all doors and panels using vandal proof stainless steel fasteners.

# PART 3 - EXECUTION

# 3.1 INSTALLATION

- A. General: Erect in accordance with the manufacturer's standard recommendations and the following:
  - 1. Erect all parts in a substantial manner, straight, level, and plumb.
  - 2. No visible evidence of drilling, cutting, or patching allowed in the finished work.
  - 3. Provide uniform top to bottom clearance at vertical edges not to exceed 1/4".
  - 4. Clean finished surfaces after installation and leave free of imperfections.
  - 5. Perform the installation using authorized factory installers.
- B. Compartments: Install compartments rigid, straight, plumb, and level in accordance with the manufacturer's printed instructions. Set units with not more than 1/2" between pilasters and panels and not more than 1" between panels and walls.
- C. Hardware Adjustments: Adjust and lubricate hardware for proper operation after installation. Set hinges on in-swing doors to hold doors open approximately 30° from the closed position when unlatched.

# 3.2 ADJUSTING AND CLEANING

- A. Perform final adjustments to leveling devices and door hardware.
- B. Clean exposed surfaces and touch up minor finish imperfections using materials and methods recommended by the compartment manufacturer.
- C. Replace damaged products which cannot be satisfactorily field repaired as directed by the Architect.

# TOILET ACCESSORIES

## PART 1 - GENERAL

#### 1.1 WORK INCLUDED

- A. Provide accessory fixtures specified and shown on the Drawings. Supply in type, size, number, and kind necessary to complete the work. Examine the Drawings for locations and special installation details.
- B. Beaverton School District will provide all toilet accessories to Contractor for installation except for mirror and grab bars.

#### 1.2 SUBMITTALS

A. Product Data: Submit one copy of manufacturer's product data for each type of accessory. Indicate mounting method and finishes.

# 1.3 SCHEDULING

A. Install accessory items after painting and toilet partition work is completed within each work area.

# **PART 2 - PRODUCTS**

#### 2.1 ACCEPTABLE MANUFACTURERS

- A. Bobrick (Specification Base)
- B. Bradley
- C. McKinney
- D. ASI
- E. Or accepted substitute.

#### 2.2 ACCESSORIES

- A. Mirrors: Glass mirrors with stainless steel frames. Standard sizes as shown on the Drawings. Bobrick 290 Series. Provide special sizes as shown on the Drawings as required.
- B. Soap Dispenser: Owner furnished Contractor installed.
- C. Paper Towel Dispensers: Owner furnished Contractor installed.
- D. Toilet Paper Dispensers: Owner furnished Contractor installed.
- E. Toilet Seat Cover Dispensers: Owner furnished Contractor installed.
- F. Grab Bars:
  - 1. Type 1: Side Wall Horizontal: 18-gage, type 304 stainless steel; 1-1/2" diameter by 42" long; satin finish; concealed mounting. Bobrick #B6806 x 42.
  - 2. Type 2: Side Wall Vertical: 18-gage, type 304 stainless steel; 1-1/2" diameter by 18" long; satin finish; concealed mounting. Bobrick #B6806-18.
  - 3. Type 3: Back Wall: 18-gage, Type 304 stainless steel; 1-1/2" diameter by 36" long; satin finish; concealed mounting. Bobrick #B6806 x 36.

# TOILET ACCESSORIES

# G. Grab Bars:

- 1. Type 1: Side Wall Horizontal: 18-gage, type 304 stainless steel; 1-1/4" diameter by 42" long; satin finish; concealed mounting. Bobrick #B5806 x 42.
- 2. Type 2: Side Wall Vertical: 18-gage, type 304 stainless steel; 1-1/4" diameter by 18" long; satin finish; concealed mounting. Bobrick #B5806-18.
- 3. Type 3: Back Wall: 18-gage, Type 304 stainless steel; 1-1/4" diameter by 36" long; satin finish; concealed mounting. Bobrick #B5806 x 36.
- H. Sanitary Napkin Receptacles: Surface mounted on toilet partition. 1.0 gal capacity. Bobrick #B270.

## **PART 3 - EXECUTION**

#### 3.1 PREPARATION

A. Verify that walls and surfaces to which accessories are to be mounted are reinforced or provided with backing or blocking for solid anchorage. Provide additional support where required. Provide fasteners long enough to penetrate into solid anchorage. Fastening with toggle bolts, molly screws, or similar fittings not permitted.

# 3.2 INSTALLATION

- A. Install toilet accessory units in accordance with the manufacturer's instructions, using vandal-resistant fasteners appropriate to the substrate and recommended by the manufacturer of the unit.
- B. Install units plumb and level, firmly anchored in locations indicated on the Drawings and as directed by Architect. Mount accessories at heights recommended by manufacturer or as indicated on the Drawings. Verify required installation variations with the Architect prior to proceeding with the Work.

## 3.3 ADJUSTING AND CLEANING

- A. Bent, dented, or racked items are not acceptable. Field repairs are not permitted. Remove and replace damaged or improperly placed accessories.
- B. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly.
- C. Clean and polish all exposed surfaces after removing protective coatings. Refinish scratched or abraded finishes equal to original finish and indistinguishable from adjacent surfaces.

# 3.4 ACCESSORIES SCHEDULE

- A. Girls 4-A121:
  - 1. Mirror: 2 required; size as indicated on the Drawings.
  - 2. Soap Dispensers: 2 required.
  - 3. Paper Towel Dispenser: 1 required.
  - 4. Toilet Paper Dispenser:5 required.
  - 5. Sanitary Napkin Receptacle: 5 required.
- B. Boys 4-A119:
  - 1. Mirror: 2 required; size as indicated on the Drawings.
  - 2. Soap Dispensers: 2 required.
  - 3. Paper Towel Dispenser: 1 required.
  - 4. Toilet Paper Dispenser:3 required.

# **TOILET ACCESSORIES**

- C. Girls 3-B116:
  - 1. Mirror: 2 required; size as indicated on the Drawings.
  - 2. Soap Dispensers: 2 required.
  - 3. Paper Towel Dispenser: 1 required.
  - 4. Toilet Paper Dispenser:4 required.
  - 5. Sanitary Napkin Disposal: 4 required.
  - 6. Grab Bars: Type 1 1 required; Type 2 1 required; Type 3 1 required.
- D. Boys 3-B117:
  - 1. Mirror: 2 required; size as indicated on the Drawings.
  - 2. Soap Dispensers: 2 required.
  - 3. Paper Towel Dispenser: 1 required.
  - 4. Toilet Paper Dispenser:2 required.
  - 5. Grab Bars: Type 1 1 required; Type 2 1 required; Type 3 1 required.

#### CORNER GUARDS

# PART 1 - GENERAL

- 1.1 WORK INCLUDED
  - Provide wall and corner guards on all "outside" corners in traffic areas as well as at restroom openings. Minimum height 4'-0". In kitchens and service/delivery areas, minimum height of 6'-0" (maximum 8'-0").

#### 1.2 SUBMITTALS

- A. Submit manufacturer's catalog sheets for review by the Architect prior to installation. Include sample of color selections.
- B. Submit layout drawing indicating location of corner guards and wall guards for approval prior to ordering. Include corner details and end cap details. Copies of the Architectural Drawings will not be accepted.

## **PART 2 - PRODUCTS**

#### 2.1 ACCEPTABLE MANUFACTURERS

- A. A.R. Nelson Co., Inc.
- B. Balco Inc.
- C. Construction Specialties, Inc. (Specification Base)
- D. Institutional Products Corporation.
- E. Koroseal.
- F. MM Systems Corporation.
- G. Pawling Corporation.
- H. Or accepted substitute.

#### 2.2 MATERIALS

- A. Corner Guards: Corner guards shall be stainless steel. Plastic is unacceptable. Sharp edges must be avoided.
- B. Include all required internal, external, and interrupted end caps with attachment plates and concealed fasteners.

# PART 3 - EXECUTION

- 3.1 INSTALLATION
  - A. Verify that surfaces to which corner guards are applied have been reinforced or provided with backing or blocking required for solid anchorage. Install with counter sunk screws. Fastening with toggle bolts, molly screws, or similar fasteners is not permitted. Corner protectors must be mechanically fastened to all prefinished paneling and sheet rock corners. Provide eased edges.

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# CORNER GUARDS

- B. Furnish miscellaneous specialty items at proper time for inclusion in the construction and install in accordance with manufacturer's instructions and recommendations.
- C. Do not remove any protective finish coatings or cover until final clean-up.

#### PART 1 - GENERAL

#### 1.1 OTHER REQUIREMENTS

A. The Bidding, General and Supplementary of this project manual and specific sections as noted apply to the work specified in Plumbing Division 22 which encompasses Sections 22 00 00 through 22 42 00. This Section 22 00 00 applies to all sections of Division 22 Plumbing.

#### 1.2 SCOPE

- A. It is the intent of these specifications and the accompanying drawings to describe complete plumbing systems installations for all building areas, new and renovation.
- B. Furnish and install all material, labor and equipment in accordance with these documents.
- C. Include all incidental items and work not specifically shown or specified but required by good practice in a complete system.
- D. The drawings and specifications are complementary. What is called for in one shall be called for in both.
- E. The drawings are diagrammatic but should be followed as closely as possible. Where required by jobsite conditions, relocate and provide fittings, etc., as required. Provide an allowance in the contract bid to furnish additional pipe and fittings required for coordination with structure and other construction trades.

## 1.3 DEFINITIONS

- A. Or approved equal: Requires approval prior to bid date.
- B. Indicated:
  - 1. The term "indicated" is a cross reference to details, notes, or schedules on the drawings, other paragraphs or schedules in the specifications, and similar means of recording requirements in the Contract Documents.
  - 2. Where terms such as "shown," "noted," "scheduled," and "specified" are used instead of "indicated," it is for the purpose of helping the reader locate the cross reference, and no limitation of location is intended except as specifically noted.
- C. Directed, Requested, Etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by the Engineer," "requested by the Engineer," etc. However, no such implied meaning will be interpreted to extend the Engineer's responsibility into the Contractor's area of construction supervision.
- D. Site or Project Site: The space available to the Contractor for the performance of the work, either exclusively or in conjunction with others performing the work as part of the project. The extent of the project site is shown on the plumbing drawings and is not identical with the description of the land upon which the project is to be built.
- E. Approved:
  - 1. Where used in conjunction with the Architect'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.
  - 2. In no case will "approval" by the Architect be interpreted as a release of the Contractor from responsibilities to fulfill requirements of the Contract Documents.

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# **BASIC PLUMBING REQUIREMENTS**

F. Provide: The term "provide" means to furnish and install, complete and ready for the intended use.

## 1.4 STANDARDS AND CODES

A. Provide all equipment and material and perform all work in accordance with all local, state and national codes and regulations.

# B. For work on this project, comply with appropriate standards published by the following:

1.	American Gas Association	AGA
2.	American National Standards Institute	ANSI
3.	Acoustical Society of AmericaASA	
4.	American Society of Mechanical Engineers	ASME
5.	American Society for Testing and Materials	ASTM
6.	National Fire Protection Association	NFPA
7.	Underwriters' Laboratories UL	
8.	International Building Code (w/State of Oregon Amendments)	UBC
9.	International Mechanical Code (w/State of Oregon Amendments -	
	Oregon Mechanical Specialty Code)	UMC
10.	Uniform Plumbing Code (w/State of Oregon Amendments -	
	Plumbing Specialty Code)	UPC

# 1.5 APPROVAL OF EQUIPMENT AND MATERIALS

- A. Manufacturer's trade names, catalog numbers and material specifications used in this specification are intended to establish the quality of equipment or materials expected. Materials and manufacturers not listed require approval prior to the bid date.
- B. Approval of substitute equipment or materials will be based upon performance, quality and other factors deemed important by the Architect. The Contractor will be responsible for making all changes in this and other associated work required as a result of the substitution. Additional or modified structural calculations and roof penetrations required to accommodate the substitution will be the responsibility of the contractor.

# 1.6 SUBMITTALS

- A. Transmit submittals for review as noted in the architectural specifications.
- B. Furnish performance data and technical information on all materials and equipment to be used on the project.
- C. Review of submittals or shop drawings by the Architect does not relieve the Contractor from the requirements of the Contract Documents unless specific approval has been requested for a given deviation.

# 1.7 QUALITY ASSURANCE

- A. Maintain the highest standards of workmanship throughout the project.
- B. Use the latest editions of applicable and specifically referenced standards.
- C. Inspect all material and equipment upon arrival at the site and return any which is not in new condition.

# PART 2 - PRODUCTS

Not Used

# PART 3 - EXECUTION

# 3.1 COORDINATION

- A. Cooperate with other trades to assure that construction proceeds in an orderly and timely manner. Contract cost increases due to improperly sequenced work with other trades will not be allowed.
- B. Study the new and existing architectural, structural, electrical, shop and any specialty drawings as appropriate and specifications to determine required coordination.
- C. Prepare detailed shop drawings where necessary to assure proper fit and necessary clearance.
- D. Refer to electrical drawings to verify voltage and phase of plumbing equipment.

# 3.2 PERMITS, FEES AND INSPECTIONS

- A. Obtain all required permits and pay for all fees and connection charges.
- B. Schedule any required inspections.

#### 3.3 MATERIALS AND WORKMANSHIP

- A. Furnish all materials and equipment in new condition, free from defects and of size, make, type and quality specified. Installation shall be in a neat and workmanlike manner.
- B. When two or more items of the same kind, type or class are required, use items of a single manufacturer.

#### 3.4 MEASUREMENTS

A. Take all measurements from reference datums established by the plumbing contractor.

#### 3.5 DELIVERY, HANDLING AND STORAGE

- A. Receive all material and equipment at the jobsite or shop.
- B. Use proper and sufficient equipment to handle all products employed in the project.
- C. Where storage of material or equipment is necessary, it shall be a clean and weatherproof area. Seal any openings and cover the product to assure that there will be no corrosion or foreign matter introduced. Assure that it will be in new condition when placed in service.

#### 3.6 EQUIPMENT INSTALLATION, BRACING AND SUPPORT

- A. Install all equipment in strict accordance with the manufacturer's instructions unless otherwise indicated.
- B. The drawings in general are based upon one of the specific manufacturers listed for a particular equipment item. The other specified manufacturers and additional approved manufacturers of equipment may require deviations from the drawings to properly install the particular equipment in accordance with the manufacturer's recommendations and to provide the system results required. Provide all work necessary in the base bid price to install this equipment.
- C. Where the installation shown or specified is contrary to the manufacturer's instructions, advise the Architect in writing of the differences before proceeding with the installation.
- D. Anchorage to Floors, Roofs, Etc., Sway Bracing and Seismic Restraints:

- 1. Provide supports for all apparatus as specified, detailed, as required by the manufacturers of specific equipment and the project governing code authorities. Anchor all roof and base/floor mounted equipment with size and spacing of anchor bolts or other attachment means as recommended by the respective equipment manufacturer.
- 2. Provide supports for all apparatus as specified, detailed, as required by the manufacturers of specific equipment and the project governing code authorities. Anchor all roof and base/floor mounted equipment with size and spacing of anchor bolts or other attachment means as recommended by the respective equipment manufacturer. Provide seismic restraints on all mechanical equipment in conformance with the 2014 Oregon Structural Specialty Code Section 1613 Earthquake Loads. Costs for seismic calculations are to be included in the bid price.
- 3. Provide deferred submittals directly to the governing code jurisdiction for anchorage to floors, roofs, etc., sway bracing and seismic restraints. Submittals to show locations and sufficient support details as required by the governing code jurisdiction.
- 4. Maintain a copy of the manufacturer's installation instructions at the jobsite for all equipment.

# 3.7 SLEEVES AND INSERTS

- A. Provide sleeves at all locations where piping and ductwork passes through building construction.
- B. Sleeves for interior walls and floors shall be 22-gauge galvanized or heavier as required. Sleeves for exterior walls shall be cast iron, wall thickness as required.
  - 1. Wall sleeves shall be installed in all exterior walls and all interior masonry or fire-rated walls in a manner that preserves the fire-rated or watertight integrity of the wall.
  - 2. Interior wall sleeves for uninsulated pipe shall allow minimum 1/4-inch clearance all around pipe for pipe movement. Allow 1-inch clearance around pipe at building expansion joints.
  - 3. Interior wall sleeves for insulated piping shall be selected to encompass the pipe and insulation and allow minimum 1/4-inch clearance around insulation for pipe movement. Allow 1-inch clearance around pipe and insulation at building expansion joints.
  - 4. Floor sleeves shall extend 4-inches above the floor and shall be sealed watertight. Floor sleeves shall be oversized to allow 1/2-inch minimum space all around pipe or pipe and insulation where applicable. Seal space between pipe and sleeve with Dow Corning Fire Stop System, 3M brand CP25 or approved equal. Sealant must be between pipe and sleeve. Sealant between insulation and sleeve is not acceptable. Install firestop materials in complete accordance with the manufacturer's instructions and in compliance to applicable UL listings.
- C. Seal space between pipe and sleeve with Dow Corning Fire Stop System, 3M Brand CP25 or approved equal where piping penetrates firewall or floors. Sealant must be between pipe and sleeve; sealant between insulation and sleeve is not acceptable. Install firestop materials in complete accordance with the manufacturer's instructions and in compliance to applicable UL listings.
- D. Utilize Linkseals or similar closures on core-drilled penetrations through below grade walls. Repair existing below grade waterproofing systems as applicable.

# 3.8 FLOOR, WALL AND CEILING PLATES

- A. Provide escutcheon plates where all exposed piping passes through finished walls, floors and ceilings, including accessible cabinet spaces.
- B. Floor plates: deep recessed, cast brass, chrome plated.
- C. Wall and ceiling plates: spun aluminum, chrome plated.
- D. Secure plates to pipe or structure. Plates shall not penetrate insulation vapor barriers. Size plates to sufficiently cover pipe sleeves and openings in finish materials.

## 3.9 ACCESS DOORS AND PANELS

- A. Manufacturers: Cesco, Milcor, Elmdor. Cesco used as basis of selection.
- B. Non-rated panels: Style W, SR-1, SR-2, P, PX as required for wall or ceiling construction, 12 inch x 16 inch or larger as required for ease of access.
- C. Fire-rated panels: Style FB, U.L. listed for 1-1/2 hr for fire rated stud and masonry wall systems.
- D. Provide access panels where shown on the drawings or as required for proper access to mechanical appurtenances. Coordinate the installation of access panels is with the specific building construction penetrated. Coordinate access panel installation with Manufacturer's instructions.
- E. Below 8 feet, accessible to students, key building access panel standard. Above 8 feet accessible to students to be flat screw driver latch.
- F. Locate and size access doors to facilitate equipment service and optimize the safety of the maintenance personnel. Minimum access door size to be 18"x 18".

# 3.10 PROTECTION

- A. Protect all work, material and equipment from loss or damage until the Owner accepts the project.
- B. As the work progresses, keep all equipment covered and cap all piping that may temporarily be left unconnected.
- C. Notify all other trades of any required precautions necessary to protect the work.

## 3.11 ACCESSIBILITY

- A. Provide convenient access by location or access panel to all equipment requiring periodic service.
- 3.12 ELECTRICAL WORK
  - A. Materials and work to be provided as a part of this Plumbing Division 22 are:
    - 1. Equipment control wiring.
    - 2. Interlock wiring.
    - 3. Motor starters.
  - B. Wherever possible, provide all interconnect wiring within or on a piece of equipment with the equipment unless shown or specified otherwise. An electrician licensed to perform this type of work shall perform all field wiring.

#### 3.13 RELATED WORK

- A. The following work and materials are specified elsewhere:
  - 1. Pipe chases, equipment pads and foundations, trenches, painting, air louvers, louvered penthouse and access panels except as otherwise specified in this division.
  - 2. Framed openings, wood grounds and nailing strips, masonry, concrete and other architectural and structural elements.
- B. The following work and materials are specified in Electrical Division:
  - 1. Power wiring.
  - 2. Disconnect switches.
  - 3. Furnishing and installation of disconnect switches.

4. Installation of magnetic starters.

#### 3.14 CLEANING

- A. Maintain premises and public properties free from accumulations of waste, debris and rubbish during construction.
- B. Clean all plumbing equipment of dust, grease, iron cuttings, unnecessary stamps or shipping labels, etc.
- C. Touch up factory-painted surfaces, as necessary, with paint of matching color.

## 3.15 RECORD DRAWINGS

- A. Maintain one set of construction drawings at the jobsite for the sole purpose of recording work of the plumbing contract, as actually installed. Upon request, the Architect will make the original tracings available to the plumbing contractor for printing the drawings.
- B. Contractor to provide to owner floor plan showing locations and size of all shutoff valves and backflow preventors.
- C. Record all piping by dimensions from gridlines, below grade, above floor, etc. Show location of all access panels, cleanouts, rough-in for future, etc.
- D. Make record drawings available to the Architect for review or reproduction during construction.
- E. Deliver record drawings to the Architect promptly upon completion of the project.

# 3.16 OPERATION AND MAINTENANCE MANUALS:

- A. Transmit submittals for review as noted in the architectural specifications. Operation and Maintenance Manuals shall include the following:
- B. Directories:
  - 1. Supplier Directory: Alphabetical list of principal subcontractors and suppliers of equipment giving names, addresses and telephone numbers.
  - 2. Equipment Directory: List of plumbing equipment installed such as, pumps, water heaters, plumbing fixtures, etc., giving drawing reference numbers, location, area served, manufacturer with model number and supplier.
- C. Manufacturer's Literature:
  - 1. Show name, address and phone number of the nearest service facility authorized by the manufacturer.
  - 2. Include illustrations, diagrams, and instructions for installation, startup, operation, inspections, maintenance, parts list, data sheets and other necessary materials.
  - 3. Include complete electrical, schematic and connection diagrams for each equipment item.
  - 4. Include the name, address and phone number of contractor(s) who furnished and who installed equipment and systems.
  - 5. Where the literature covers more than one model, check off neatly in ink correct model number and data for the model number including all specified options.
  - 6. In those instances where the equipment, its mode of control, or both, is job assembled for special functions, then provide written operating and maintenance instructions prepared by the assembler on 8-1/2" x 11" sheets.
- D. Maintenance Instructions:

- 1. Where instructions for maintenance are not included in the manufacturer's literature, provide supplemental data to enable proper maintenance of the equipment installed.
- 2. Include specific lubrication methods and recommended frequencies along with procedures and precautions for inspection and routine service.
- E. Copy of Written Guarantee.
- F. Recommended Spare Parts Stock.

## 3.17 OWNER MEETING

- A. Schedule a meeting between the Contractor's representative and the Owner for the purpose of reviewing operation and maintenance of the building mechanical systems. The Contractor's representative shall be well qualified and knowledgeable of the systems in this facility.
- B. The meeting shall be scheduled to allow the Owner and appropriate subcontractors and equipment suppliers to attend.
- C. The meeting shall be scheduled promptly upon completion of the project and approval of the Operation and Maintenance Manuals.
- D. The Contractor shall review the Operation and Maintenance Manuals and record drawings in detail with the Owner.

#### 3.18 CUTTING AND PATCHING

- A. Cut work as required for installation and patch to match original conditions as directed and approved by Architect. Do not cut structural portion without Architect's approval.
- B. When masonry construction must be penetrated, provide a steel pipe sleeve in opening and grout in place in a neat manner. Leave grout surface to match existing finish.
- C. Prior to cutting any existing work, locate all concealed utilities to eliminate any possible service interruption or damage.

# 3.19 FIRESTOPPING PENETRATIONS IN FIRE-RATED WALL/FLOOR ASSEMBLIES

- A. Contractors shall provide proper sizing when providing sleeves or core-drilled holes to accommodate the through penetrating items. All voids between sleeve or core-drilled hole and pipe passing through, shall be firestopped to meet the requirements of ASTM E-814.
- B. Fire stop penetrations in accordance with the U.L. listed assemblies provided by the manufacturers of the products used.

#### 3.20 CONTRACT COST DATA

A. Furnish to the Architect a cost breakdown of the Plumbing Contract with major systems and equipment broken out with itemized costs.

# 3.21 CHANGE ORDERS

A. All supplemental cost proposals by the Contractor shall be accompanied with a complete itemized breakdown of labor and materials cost without exception.

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# **BASIC PLUMBING REQUIREMENTS**

B. Contractor's estimating sheets for the supplemental cost proposals shall be made available to the Architect. Labor must be separated and allocated for each item of work.

# 3.22 VERIFICATION OF EXISTING CONDITIONS

- A. Verify field conditions and measurements prior to the manufacture or order of materials and equipment.
- B. Produce shop drawings with details as required to verify proper installation of materials & equipment in conformance with applicable codes and the manufacturer's requirements.

# 3.23 SYSTEMS WIRING

		FURNISHED POWER			
	ITEM	BY	INSTALL BY	WIRING	CONTROL WIRING
1.	Division 22 Equipment Motors	Div. 22	Div. 22	Div. 26	Div. 22
2.	Motor Starters, Contactors and Overload Heaters – Integral	Div. 22	Div. 26	Div. 26	Div. 22
3.	Motor Control Centers	Div. 26	Div. 26	Div. 26	Div. 22
4.	Fused & Unfused Disconnect Switches	Div. 26	Div. 26	Div. 26	
5.	Manual Operation Switches	Div. 26	Div. 26	Div. 26	Div. 26
6.	Control Relays & Transformers	Div. 22	Div. 22	Div. 22	Div. 22
7.	Energy Management Control Panels	Div. 22	Div. 22	Div. 22	Div. 22
8.	Motorized Solenoid Valves	Div. 22	Div. 22	Div. 22	Div. 22

# GENERAL DUTY VALVES FOR PLUMBING PIPING

#### PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Work included: Providing of all required valves, cocks and faucets.

# 1.2 SUBMITTALS

- A. Provide submittals in accordance with Section 22-00-00.
- B. Submittals shall include manufacturer's catalog or technical data showing performance, dimensions, materials of construction and recommended methods of installation.

#### 1.3 OPERATION AND MAINTENANCE DATA

- A. Provide O&M data in accordance with Section 22-00-00.
- B. O&M data will include manufacturer's literature and Maintenance instructions.

# PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
  - A. Gate Valves, Ball Valves and Drain Valves: Hammond, Stockham, Nibco, Milwaukee or approved equal. Hammond used as basis of selection.

#### 2.2 DESCRIPTION

- A. All valves used in potable water applications are to be third party certified by a state recognized certifying agency to comply with 2014 Federal Lead free act.
- B. Gate Valve (Domestic Water Service): Figure UP 647, Class 125, 200 PSI non-shock cold water rated solder type bronze body gate valve with solid wedge disc, integral seat, threaded bonnet, non-rising stem, iron hand wheel.
- C. Ball Valves (Domestic Water Service): Ball valves for domestic water service shall be lead free Figure UPBA300/300S 150 SWP / 600 WOG, 400 PSI non-shock cold water rated 3-piece bronze body ball valve with full port, blow out proof stem, RTFE seats and PTFE packing, free floating chrome plated brass ball.
- D. Drain Valves: Hose end valve, 150 WWP, adjustable packing nut and stuffing box, Buna-N seats, iron handwheel. Provide cap & chain.
- E. Horizontal Swing Check Valves: Figure UP943, 125 lb. screwed, swing check valve with renewable Teflon composition disc.
- F. Vertical/Spring and Silent Check Valves: Acceptable Manufacturers: Metra-Flex or TRW Mission Duo Check II, ASA 150 Class, semi-steel or cast iron body, bronze trim.

#### PART 3 - EXECUTION

#### 3.1 INSTALLATION

A. 2" and smaller valves to be ball valves. 2-1/2" and greater to be flanged, ductile iron or bronze body gate valves.

# GENERAL DUTY VALVES FOR PLUMBING PIPING

- B. Provide valves at connections to equipment, where shown on the drawings or as required.
- C. Install all valves with stem horizontal or above, accessible and same size as connected piping.
- D. Provide separate support for valves where necessary.
- E. Install check valves in horizontal position only.
- F. Butterfly valves are not permitted.
- G. Plumbing contractor is to provide schedule of Backflow Devices in an excel spreadsheet. The information shall also be included in the O&M manual and correlated with the drawings. The information in the documents shall include the following..
  - 1. Type
  - 2. Manufacturer
  - 3. Size
  - 4. Model
  - 5. Serial Number
  - 6. Location at the site.

# HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

#### PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Work included: Providing of all required hangers and supports for piping, and equipment.

# 1.2 SUBMITTALS

- A. Provide submittals in accordance with Section 22-00-00.
- B. Submittals shall include:
  - 1. Manufacturer's technical literature for all products used indicating service for each type of hanger.
  - 2. Include proposed pre-manufactured piping and duct vibration isolation products.
  - 3. Submit literature or describe duct-supporting method.

# PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. M-CO, Grinnell, Super Strut. M-CO used for selection.
- B. Vibration Isolators:
  - 1. Type of isolator, base, and minimum static deflection shall be as required for each specific equipment application as recommended by isolator or equipment manufacturer but subject to minimum requirements indicated herein.
  - 2. Uniform Loading: Select and locate isolators to produce uniform loading and deflection even when equipment weight is not evenly distributed.
  - 3. Mason Industries products used as basis of selection.

#### 2.2 DESCRIPTION

- A. Pipe Attachments:
  - 1. Non-insulated ferrous pipe (1/2 to 1-1/2 inch): Figure 100.
  - 2. Non-insulated ferrous pipe (2 inch and larger): Figure 400.
  - 3. Non-insulated copper pipe: Figure 101.
  - 4. Insulated pipe: Figures 1031 and 4031.
  - 5. Riser clamp, ferrous pipe: Figure 510.
  - 6. Riser clamp, plastic DWV: Figure 515.
- B. Upper Attachments: Attachment to wood structures where weights permit shall be Figure 325 or 328.
- C. Structural Attachments: Provide all necessary structural attachments such as concrete anchors, beam clamps, hanger flanges and brackets. Hangers shall not be suspended from other piping, equipment, etc.
- D. Miscellaneous items such as hanger rod, rod couplings, turnbuckles, etc. shall be standard figure numbers of the same manufacturer as the attachments.
- E. All-threaded rods for pipe supports shall be no less than 3/8" diameter.
- F. All floor mounted equipment to be placed on a 4-inch high concrete housekeeping pad.
- G. Rooftop pipe supports:
  - 1. B-line DBR series or equal.

# HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

- 2. Rubber block supports: DBP Series 6"Wx4"Tx4.8L
  - a. Accessories fastened directly into rubber material with weather resistant type 12 lag screws.
  - b. 14 ga galv. Channel.
  - c. Roller supports.
- 3. Electro-plated steel brackets, axle & hardware.

# PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Provide hangers and supports in accordance with the instructions furnished by the manufacturers of these devices.
- B. For horizontal pipe lines install pipe hangers with maximum hanger spacing and maximum hanger rods as recommended in Table 6 of the 2000 edition of the ASHRAE Guide and Data Book, Systems and Equipment Chapter 41: Where concentrated loads of valves, fittings, etc. occur, closer spacing will be necessary and shall be based on the weight to be supported and the maximum recommended loads for the hanger components. Cast iron soil pipe shall be supported at every joint.
- C. Horizontal banks of piping for plumbing piping only, i.e. domestic hot and cold water, may be supported on a common steel channel strut member spaced not more than the shortest allowable span required on the individual pipe. Piping to be maintained at these relative lateral positions using clamps, slips or free to roll axially or slide using a Figure 125 insulated protector at all points of support for insulated lines.
- D. Provide additional structural members where required to support piping.
- E. Provide hangers and support devices in accordance with the equipment manufacturer's instructions for all equipment.
- F. Anchorage to Floors, Roofs, Etc., Sway Bracing and Seismic Restraints:
  - 1. The contractor is responsible to determine the means and methods of equipment installation and support.
  - 2. Provide supports for all apparatus as specified, detailed, as required by the manufacturers of specific equipment and the project governing code authorities. Anchor all roof and base/floor mounted equipment with size and spacing of anchor bolts or other attachment means as recommended by the respective equipment manufacturer
  - 3. Always consult roofing manufacturer for roof membrane compression capacities.
  - 4. Gas pipe spacing subject to local gas authorities.
  - 5. Use properly sized pipe clamps to suit pipe size(s).
  - 6. Provide seismic restraints on all mechanical equipment in conformance with the 2014 Oregon Structural Specialty Code Section 1613 "Earthquake Loads". Costs for seismic calculations are to be included in the bid price.
  - 7. Provide deferred submittals directly to the governing code jurisdiction for anchorage to floors, roofs, etc., sway bracing and seismic restraints. Submittals to show locations and sufficient support details as required by the governing code jurisdiction.
  - 8. Provide supplementary drawings and calculations as required by governing code jurisdictions noting seismic support data/calculations as required for permit purposes.
- G. Copper piping will be isolated from hangers and supports for cold water services and services which required a vapor barrier. Hot water service may be in contact with copper plated or plastic-coated hangers.

# HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

## VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT

#### PART 1 - GENERAL

## 1.1 DESCRIPTION

A. Work included: Providing of all seismic restraints and vibration isolation for plumbing equipment.

# 1.2 QUALITY ASSURANCE

- A. Equipment: All plumbing equipment mounted on vibration isolators shall be provided with seismic restraints capable of resisting a horizontal force of 100 percent of the weight of the equipment furnished.
- B. Piping: Refer to specification section 22 05 29, Hangers and Supports for Plumbing Piping and Equipment.

## 1.3 SUBMITTALS

- A. Provide submittals in accordance with Section 22 00 00.
- B. Submittals shall include:
  - 1. Manufacturer's technical literature for all products used including weights, dimensions and standard connections.
  - 2. Indicate service for each type of hanger.

# PART 2 - PRODUCTS

#### 2.1 GENERAL REQUIREMENTS

- A. Type of isolator, base, and minimum static deflection shall be as required for each specific equipment application as recommended by isolator or equipment manufacturer but subject to minimum requirements indicated herein.
- B. Uniform Loading: Select and locate isolators to produce uniform loading and deflection even when equipment weight is not evenly distributed.
- C. Mason Industries products used as basis of selection.

#### 2.2 VIBRATION ISOLATORS

- A. Piping Systems:
  - 1. Provide isolation by either floor mount or hangers with 3/4-inch deflection.
  - 2. Provide oversized wall penetrations, line with neoprene and seal with resilient caulk or firestop material as appropriate.
  - 3. Isolate domestic water piping from structure with Holdrite. Attach to one side of double stud wall.

#### PART 3 - EXECUTION

- 3.1 INSTALLATION
  - A. Provide vibration isolation above for the noted plumbing systems. Install all vibration isolation devices in accordance with manufacturer's installation instructions. Provide additional support members, unistrut bracing, etc as required for proper installation of isolation devices.

# VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT

- B. Inspection and Adjustments: Check for vibration and noise transmission through connections and floor. Adjust, repair, or replace isolators as required to reduce vibration and noise transmissions to specified levels.
- C. On all sides of suspended equipment, provide bracing for rigid supports and provide restraints for resiliently supported equipment. The slack cable restraint method, Mason Industries, or equal, is acceptable.

## 3.2 ADJUSTING

- A. Adjust vibration isolators after equipment is at operating weight.
- B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- C. Adjust active height of spring isolators.
- D. Adjust seismic restraints to permit free movement of equipment within normal mode of operation.
- E. Torque anchor bolts according to equipment manufacturer's recommendations to resist seismic forces.

# IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

# PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Work included: Providing of all required identification systems for equipment and piping.

# 1.2 SUBMITTALS

- A. Provide submittals in accordance with Section 22 01 00.
- B. Submittals shall include:
  - 1. List of proposed equipment and valve tags.
  - 2. Product information on piping markers.

# PART 2 - PRODUCTS

# 2.1 MANUFACTURERS

A. W. H. Brady Co. or Seton.

## 2.2 DESCRIPTION

- A. Equipment Identification: Equipment identification tags shall be three-ply, white center, black face plastic plates with 1/2" high letters for major and 1/4" high letters for minor equipment.
- B. Piping Markers:
  - 1. All vinyl self-sticking labels.
  - 2. Markers shall comply with the district standard for width, size of letters, background colors, etc. in compliance with ANSI A13.1 Markers to comply with the following color convention:

Service	<u>Color</u>
Steam	Aluminum
Hot Water Heating	Tan
Cooling Water	White
Chilled Water	Green
Domestic Cold Water	Blue
Domestic Hot Water	Gold
Natural gas	Yellow
Compressed Air	Black
Fire Service Water	Red
Waste and Vent	Brown

- 3. Labels shall indicate "supply", return" or "recirculation" as applicable to the piping system.
- C. Valve Tags: Tags shall be not less than one inch in diameter, 0.64 brass. Information included on the tag will be:
  - 1. Valve Type.
  - 2. Service Line (i.e. Hot Water).
  - 3. Sequential number associated with the project.
- D. Utility Markers: Brady Identoline plastic tape, 6 inch.
- E. Ceiling Markers: Standard label tape type.

## **IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT**

## **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Provide each piece of roof equipment with a manufacturer's standard nameplate indicating manufacturer's name, model number, capacities and characteristics.
- B. In addition, provide each piece of equipment with a plastic tag indicating its designation on this project and the area served. Mount this tag with screws, where possible, in a clearly visible location.
- C. Affix piping markers to pipe or insulation in locations that make them clearly visible. Secure markers with two wraps of "Scotch Reinforced Tape" at each end.
- D. Locate markers at intervals of 15 to no more than 50 feet allowing visual identification of a line from any point along that line and as follows: Within 12 inches of each valve, where a pipe passes through a wall, direction of flow on each leg of a "T" and on lower quarters of the line on horizontal runs where view is not obstructed.
- E. Provide arrow markers to indicate direction of flow away from each pipe identification marker.
- F. Affix valve tags to valves using brass chain.
  - 1. Provide an approved copy of the valve schedule in each Operation and Maintenance Manual.
  - 2. Furnish one copy of the schedule framed under glass to the owner's representative
  - 3. Information will include:
    - a. Valve locations by plan room number.
    - b. Function of the valve (i.e. equipment isolated).
    - c. Service Line (i.e. Hot Water).
- G. Provide plastic tape utility markers over all buried piping. Provide identification on tape. Install over the entire length of the underground piping utilities. Install plastic tape along both sides and the centerline of the trenches, at the elevation of approximately 12 inches above the top of utility.
- H. Provide ceiling labels for all equipment located above drop or hard ceilings. The markers shall indicate the equipment symbol associated with the contract documents and the type of equipment. Locate the labels per the following:
  - 1. Lay-in Ceiling Locate the label on the ceiling grid member closest to the equipment location.
  - 2. Hard Ceiling Locate the label on the access panel servicing the unit or closest access point.
- I. Provide valve chart indicating valve tag number, service, location and normal operation position of valve.
- J. Valve chart location: Boiler room office wall, framed with glazed cover.

## **TESTING OF PLUMBING**

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Work Included: Pressure testing of piping.
- 1.2 OPERATION AND MAINTENANCE DATA
  - A. Provide O&M data in accordance with Section 22 00 00.
  - B. O&M data shall include certificate of completion, inspection and test by authority having jurisdiction on required piping systems.
- 1.3 QUALITY ASSURANCE
  - A. Code Compliance: Perform required tests in the presence of the authority having jurisdiction.

# **PART 2 - PRODUCTS**

- 2.1 DESCRIPTION
  - A. The Contractor shall furnish instruments, gauges, meters and necessary connection points for performance of the tests.

## **PART 3 - EXECUTION**

- 3.1 GENERAL
  - A. Lead: Domestic Water Plumbing System shall be tested for lead by a BSD approved third party environmental consultant. If test results detect more than 1 ppb of lead, contractor shall be responsible to provide either mitigation and retesting until required results are achieved or flush tests showing the source of lead is outside the scope of the project.
  - B. Piping: Test prior to concealment, insulation being applied, and connection to equipment, fixtures, or specialties. Conduct tests with all valves but those used to isolate the test section 10% closed.
  - C. Leaks: Repair all leaks or replace defective pipe or fittings and retest until stipulated results are achieved.
  - D. Notification: Advise the Architect 48 hours in advance of each test. Failure to so notify will require test to be rescheduled.
  - E. Testing Equipment: Provide all necessary pumps, gauges, connections similar items required to perform the tests.

# 3.2 TESTING REQUIREMENTS

A. Sanitary Systems: Test entire system or sections of system by closing all openings in piping except the highest opening and filling system with water to the point of overflow. If the system is tested in sections, plug each opening except the highest opening of the section under test and fill each section with water, but none with less than 6 feet head of water above the maximum estimated ground water level. Keep the water in system, or in portions under test, for 24 hours before testing begins. Test for six (6) hours with a maximum of 0.3 gallon per hour per inch diameter per 100 feet run of loss allowed. Locate and repair leaks. The maximum pressure on the lowest system invert is not to exceed 16 feet of head.

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# **TESTING OF PLUMBING**

B. Piping - General: Test all piping as noted below, with no leaks or loss in pressure for the time indicated. Repair or replace defective piping until tests are completed successfully.

System	Pressure	Medium	Duration
Domestic Water Systems	150 psig	water	4 hours
Misc. Piping	1.5x normal oper. pressure	nitrogen or water as appropriate	4 hours

# PLUMBING INSULATION

## PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Work included: Providing of all required insulation for equipment.

## 1.2 SUBMITTALS

- A. Provide submittals in accordance with Section 22 00 00.
- B. Submittals shall include:
  - 1. Data to show compliance with flame and smoke rating.
  - 2. Manufacturer's catalog or technical data showing performance, dimensions, materials of construction and recommended methods of installation.

## 1.3 QUALITY ASSURANCE

A. Insulation materials and accessories such as adhesives, cement, etc. shall have composite fire and smoke hazard ratings, as tested by procedures indicated in NFPA 255 and U.L. 723, not to exceed a flame spread index of 25 and a smoke developed index of 50. Products or their shipping cartons shall have identification of the flame spread and smoke developed index.

## PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
  - A. Schuller, Knauf, Owens-Corning, Certain-teed, or approved equal. Schuller used as basis of selection.

# 2.2 DESCRIPTION

- A. Domestic Water Insulation
  - 1. Manville Micro-Lok AP-T molded fiberglass.
  - 2. Pipe fittings: Zeston one-piece premolded PVC covers with fiberglass blanket insulation.
  - 3. Foam filled elbows are not acceptable.

# **PART 3 - EXECUTION**

- 3.1 INSTALLATION
  - A. Piping:
    - 1. Domestic Cold Water: Provide 1/2-inch minimum pipe insulation on domestic cold water piping.
    - 2. Domestic Hot Water and Hot Water Return:
      - a. Provide 1-inch pipe insulation on domestic hot water and domestic hot water return less than or equal to 2 inches diameter.
      - b. Provide 1-1/2 inch pipe insulation on domestic hot water and domestic hot water return greater than 2 inches.
    - 3. Insulate fittings on piping utilizing preformed pipe covering.
    - 4. Insulate all valve bodies, fittings, unions, flanges and equipment with insulation equal to the attached service piping.
    - 5. Seal all insulation to maintain a vapor barrier.
    - 6. Provide 1-inch pipe insulation on horizontal storm/overflow storm drain piping and roof/overflow roof drain bodies. Seal all insulation to maintain a vapor barrier.
## FACILITY WATER DISTRIBUTION

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Work included: Providing of all required pipes and pipe fittings.
- B. All pipes, fittings, pumps, valves, faucets, etc. which serve domestic water systems shall be lead-free.

#### 1.2 OPERATION AND MAINTENANCE DATA

- A. Submit certificates of inspections and tests to owner.
- 1.3 QUALITY ASSURANCE
  - A. Piping material and installation to meet requirements of the local plumbing, fire and building codes and serving utility requirements.
  - B. Pipe Cleaning: Should any pipe be plugged, the piping shall be disconnected, cleaned and reconnected without additional cost to Owner.
  - C. Damage to the building or systems resulting from failure to properly clean the system shall be corrected without additional expense to the Owner.

## PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
  - A. Pipe and fittings: Standard product of manufacturer.
  - B. Flexible connectors: Anaconda, Aeroquip or approved equal.
  - C. Seismic/expansion joint flex piping: Unisource, Metraflex, Mason. For other manufacturers, submit substitution request.

#### 2.2 DESCRIPTION

- A. Copper Pipe Plumbing:
  - 1. Pipe: Hard drawn copper type "L" above grade and hard drawn copper type "K" below grade, ASTM B88.
  - 2. Fittings: Wrought copper solder type.
  - 3. Solder
    - a. Above ground: 2" and smaller Lead free, 95-5, tin silver and flux.
    - b. Below ground: 2 1/2" and larger Lead free, brazing alloy and flux.
- B. Cross Linked Polyethylene (PEX) Domestic Water Tubing and Fittings:Allowed for 2" and smaller domestic waeter distribution piping
  - 1. Pipe and Fittings: Wirsbo Aquapex for potable water distribution conforming to ASTM F 876-93/ASTM F 877-93 and certified to NSF standards 14 and 61.
  - 2. Wirsbo Propex brass manifolds and fittings.
  - 3. All pipe, manifolds and fittings to be of same manufacturer.
- C. Ductile Iron Water Pipe: 3" and large.

## FACILITY WATER DISTRIBUTION

- 1. Pipe: Ductile iron, conforming to AWWA C151/A21.51-91, 150 psi, cement lined and outside coated with bitumastic enamel.
- 2. Fittings: Mechanical joint, conforming to AWWA C110/a21.10-93, 250 psi.

## **PART 3 - EXECUTION**

## 3.1 PREPARATION - MEASUREMENTS, LINES AND LEVELS

A. Check dimensions at the building site and establish lines and levels for the work specified in this Division.

# 3.2 PIPING INSTALLATION

- A. Install water distribution system sized in conformance with the drawings.
- B. Install unions in all non-flanged piping connections to apparatus and adjacent to all screwed control valves, traps, and appurtenances requiring removal for servicing, so located that piping may be disconnected without disturbing the general system.
- C. Provide easily accessible shut off valves on each branch of piping, to facilitate maintenance and repair without shutting down supply to large sections of the building.
- D. Install all piping as to vent and drain.
- E. Support all piping independently at apparatus so that the equipment shall not carry its weight.
- F. Dielectric Fittings: Provide dielectric couplings, unions or flanges between dissimilar metals. Additionally, provide dielectric couplings as required to isolate cathodically protected piping and equipment. Fittings shall be suitable for the pressure and temperature to be encountered.
- G. Domestic water piping joints
  - 1. Above ground:
    - a. 2" and smaller soldered.
    - b. 2-1/2" and larger and all below grade installations brazed.
  - 2. Below ground: Brazed.
- H. Screwed Joints: Ream pipe ends. Apply dope or tape to male threads only. Brass joints shall be made with Teflon tape only. Make up fitting with not over two threads showing beyond the fitting end. Make junctions of galvanized pipe to cast iron with tapped spigots or half couplings screwed to the end of galvanized pipe to form a spigot end.
- I. Solder Type Joints:
  - 1. Clean the copper tubing and fittings thoroughly with steel wool before applying the flux. The copper tubing shall have all burrs removed, be reamed to full bore, and be true and round for all joints.
  - 2. Apply heat uniformly to secure penetration of the filler material. Leave full bead around the entire circumference of the joint to show proper penetration and sealing.
  - 3. Flux shall not be used for copper-to-copper joints. Flux shall be used for joining copper to brass or bronze. In those cases where flux is used, particular care shall be exercised in applying the flux to avoid leaving any excess inside the completed joints.
- J. Provide flexible connectors at all piping connections to mechanical equipment.
- K. Provide seismic bracing and support per SMACNA "Seismic Restraint Manual Guidelines for Mechanical Systems", see drawings for Seismic Hazard Level.

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# FACILITY WATER DISTRIBUTION

- L. Provide expansion loops/fittings as noted on the drawings and where piping passes through building expansion/seismic joints. Install the loops in accordance with the manufacturers instructions. Provide hangers and guides as recommended.
- M. Flush piping system of all construction dirt.
- N. Chlorination: Disinfect the domestic hot and cold water piping as follows:
  - 1. Fill systems with a solution of 50 ppm available chlorine for four hours
  - 2. During this time, open and close all valves at least twice.
  - 3. Flush the system with water until the residual chlorine content is not more than 1 ppm.
  - 4. Post flush; test 36 hours later for taste and smell. Flush until free of odor and taste.
- O. Test piping system per Section 22 05 93.

#### 3.3 SPECIALTIES INSTALLATION

A. Install all piping specialties where shown on the drawings and in accordance with manufacturer's recommendations.

## DOMESTIC WATER PIPING SPECIALTIES

#### PART 1 - GENERAL

#### 1.1 DESCRIPTION

A. This section prescribes the requirements for materials and methods of installation of piping specialties for piping systems where indicated required by code or as good practice dictates.

#### 1.2 SUBMITTALS

- A. Catalog or technical data on automatic flow control valves for proposed manufacturer.
- B. Operating and maintenance data.

## PART 2 - PRODUCTS

- 2.1 UNIONS
  - A. Type: 150 malleable iron, brass to iron seat, ground joint, black or galvanized to match pipe. 200-psi wog bronze, ground joint, solder type for copper tubing. Where dissimilar metals join, dielectric unions, couplings or flanges shall be installed.

#### **PART 3 - EXECUTION**

- 3.1 INSTALLATION GENERAL
  - A. Provide unions at all mechanical equipment connections as required allowing equipment removal from piping without destruction or cutting of piping or pipe joints.

## FACILITY SANITARY SEWERS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Work included: Providing of all required sanitary waste and vent systems' piping, and utility connections for all services specified or shown on the drawings or required by demolition.

#### 1.2 QUALITY ASSURANCE

A. Piping material and installation to meet requirements of the local plumbing, mechanical, building codes and serving utility requirements.

#### 1.3 OPERATION AND MAINTENANCE DATA

A. Submit certificates of inspections and tests to owner.

#### 1.4 QUALITY ASSURANCE

- A. Piping material and installation to meet requirements of the local plumbing, fire and building codes and serving utility requirements.
- B. Pipe Cleaning: Should any pipe be plugged, the piping shall be disconnected, cleaned and reconnected without additional cost to Owner.
- C. Damage to the building or systems resulting from failure to properly clean the system shall be corrected without additional expense to the Owner.

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Pipe and fittings: Standard product of manufacturer.
- B. Flexible connectors: Anaconda, Aeroquip or approved equal.

#### 2.2 PIPE AND PIPE FITTINGS

- A. DESCRIPTION
  - 1. General: The following generally describes piping materials for plumbing and mechanical systems.
  - 2. Sanitary Waste Systems: Cast iron pipe above grade and below grade to five feet beyond building lines and below grade where depth of bury is less than 24 inches.
  - 3. Vent Systems: Cast iron.
  - 4. Miscellaneous Condensate and Indirect Drains: Type "L" hard drawn copper tubing for plumbing service.

## 2.3 MATERIAL DESCRIPTION:

- A. Cast Iron Pipe:
  - 1. Pipe: Hubless cast iron soil pipe, CISPI 30-90 / ASTM A888.
  - 2. Fittings:
    - a. Hubless cast iron fittings CISPI 30-901 or cast iron hub and spigot fittings ASTM A74.
    - b. Underground couplings Clamp-all Corporation, Husky SD4000 or approved equal.

## FACILITY SANITARY SEWERS

- c. Aboveground couplings couplings meeting CISPI designation 301-85 except rain drain couplings in systems greater than 25 feet of water column (use Husky SD4000.) Use Husky or equivalent when joints are exposed.
- d. Couplings to steel or plastic pipe Fernco "lowflex" or approved equal.
- B. Copper Pipe Plumbing:
  - 1. Pipe: Hard drawn copper type "L" above grade and hard drawn copper type "K" below grade, ASTM B88.
  - 2. Fittings: Wrought copper solder type.
  - 3. Solder
    - a. Above ground: 2" and smaller Lead free, 95-5, tin silver and flux.
    - b. Below ground: 2 1/2" and larger Lead free, brazing alloy and flux.
- C. Vent Flash Hoods: Stoneman Series 1550 cast iron flash hood.

# PART 3 - EXECUTION

## 3.1 PREPARATION - MEASUREMENTS, LINES AND LEVELS

A. Check dimensions at the building site and establish lines and levels for the work specified in this Division.

# 3.2 PIPING INSTALLATION

- A. Install unions in all non-flanged piping connections to apparatus and adjacent to all screwed control valves, traps, and appurtenances requiring removal for servicing, so located that piping may be disconnected without disturbing the general system.
- B. Install all piping as to vent and drain.
- C. Cleanouts in underground or acid waste systems shall be line size for mains up to 4" diameter. For mains having a diameter of greater than 4", cleanouts shall be 4" diameter.
- D. Support all piping independently at apparatus so that the equipment shall not carry its weight.
- E. Dielectric Fittings: Provide dielectric couplings, unions or flanges between dissimilar metals. Additionally, provide dielectric couplings as required to isolate cathodically protected piping and equipment. Fittings shall be suitable for the pressure and temperature to be encountered.
- F. Screwed Joints: Ream pipe ends. Apply dope or tape to male threads only. Brass joints shall be made with Teflon tape only. Make up fitting with not over two threads showing beyond the fitting end. Make junctions of galvanized pipe to cast iron with tapped spigots or half couplings screwed to the end of galvanized pipe to form a spigot end.
- G. Solder Type Joints:
  - 1. Clean the copper tubing and fittings thoroughly with steel wool before applying the flux. The copper tubing shall have all burrs removed, be reamed to full bore, and be true and round for all joints.
  - 2. Apply heat uniformly to secure penetration of the filler material. Leave full bead around the entire circumference of the joint to show proper penetration and sealing.
- H. Flux shall be used for copper-to-copper joints. Flux shall be used for joining copper to brass or bronze. In those cases where flux is used, particular care shall be exercised in applying the flux to avoid leaving any excess inside the completed joints.

## FACILITY SANITARY SEWERS

- I. Provide flexible connectors at all piping connections to mechanical equipment.
- J. Waste and Vent Systems
  - 1. Install waste, storm, overflow storm and vent piping system sized in conformance with the drawings.
  - 2. Grade horizontal waste runs 1/4 inch per foot where possible. Piping 3" and greater may be run at 1/8 inch per foot minimum when approved by the Administrative Authority.
  - 3. Make all changes in direction with appropriate fittings.
  - 4. Collect vents together in ceiling space and extend through roof for minimum penetrations.
  - 5. Flash and counterflash all vents through the roof.
  - 6. Verify exact location of all fixtures from architectural drawings.
  - 7. Test piping system per Section 22 05 93.
- K. Miscellaneous Condensate and Drain Systems:
  - 1. Install condensate system sized in conformance with the drawings.
  - 2. Slope lines in direction of flow.
  - 3. Install indirect waste fittings as shown on the Drawings, providing access as required by code.
  - 4. Indirect drains in kitchen area are to spill to floor sinks above the flood level of the floor sink and in location that allows removal of grate and does not create splashing during discharge.
  - 5. Test piping system per Section 22 05 93.
- L. Provide Stoneman Cast Iron Vandal Vent Flash Hood on Vent through roof termination of all vent piping.
- 3.3 FIRESTOPPING PENETRATIONS IN FIRE-RATED WALL/FLOOR ASSEMBLIES
  - A. Contractors shall provide proper sizing when providing sleeves or core-drilled holes to accommodate their through penetrating items. All voids between sleeve or core-drilled hole and pipe passing through, shall be firestopped to meet the requirements of ASTM E-814.

## GAS PIPING

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Work included
  - 1. Providing of all required gas pipe systems.
  - 2. Pressure testing of piping.

#### 1.2 SUBMITTALS

- A. Provide submittals in accordance with Section 22 00 00.
- B. Submittals shall include:
  - 1. Manufacturer's technical literature for all products used.
  - 2. List of selected flow control valves with pressure ranges and flow indicated.

## 1.3 OPERATION AND MAINTENANCE DATA

- A. Provide O&M data in accordance with Section 22 00 00.
- B. O&M data shall include:
  - 1. Manufacturer's literature.
  - 2. Maintenance instructions.

#### 1.4 QUALITY ASSURANCE

A. Piping material, installation and testing to meet requirements of the local plumbing, fire and building codes and serving utility requirements. Perform required pipe tests in the presence of the authority having jurisdiction.

## PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
  - A. Pipe and fittings: Standard product of manufacturer.
  - B. Unions: Standard product of manufacturer.
  - C. Flexible gas connectors: Standard product of manufacturer.

## 2.2 DESCRIPTION

- A. Natural Gas Piping Above Ground: Black steel pipe inside building construction, black steel pipe painted with rust inhibiting paint outside building construction.
  - 1. Pipe: Schedule 40 black steel pipe conforming to ASTM A120-82 or A53-93a.
  - 2. Fittings: 150 psi screwed malleable iron for 2" and smaller, Schedule 40 weld fittings conforming to ASTM A234 for 2-1/2" and larger.
- B. Pressure testing of piping: Instruments, gauges, meters and necessary connection points for performance of the tests shall be furnished by the Contractor.
- C. Unions: 150 malleable iron, brass to iron seat, ground joint, black or galvanized to match pipe. 200-psi wog bronze, ground joint, solder type for copper tubing. Where dissimilar metals join, dielectric unions, couplings or flanges shall be installed.

## GAS PIPING

D. Flexible gas connectors: Flexible gas piping components shall have been tested and certified as meeting requirements on ANSI LC-1b. System components shall bear permanent certification identification by the Producet Research Committee of the International Association of Plumbing and Mechanical Officials (IAPMO). Connectors shall be in compliance with applicable codes and regulations and as recommended by the manufacturer of the connector and the equipment being served.

#### **PART 3 - EXECUTION**

#### 3.1 PREPARATION - MEASUREMENTS, LINES AND LEVELS

A. Check dimension at the building site and establish lines and levels for the work specified in this Division.

#### 3.2 INSTALLATION

- A. Natural Gas Systems:
  - 1. Install natural gas system sized in conformance with the drawings.
  - 2. Provide branch shutoff valves and pressure regulators.
  - 3. Test piping system per this section.
  - 4. Clean the piping of grease and construction debris.
  - 5. Paint the piping with a primer/rust inhibiting paint suitable for use in the specific application.
- B. Pressure testing of piping:
  - 1. Piping: Test prior to concealment, insulation being applied, and connection to equipment, fixtures, or specialties. Conduct tests with all valves but those used to isolate the test section 10% closed.
  - 2. Leaks: Repair all leaks or replace defective pipe or fittings and retest until stipulated results are achieved.
  - 3. Notification: Advise the Architect 48 hours in advance of each test. Failure to so notify will require test to be rescheduled.
  - 4. Testing Equipment: Provide all necessary pumps, gauges, connections similar items required to perform the tests.
- C. Provide shutoff valves at equipment connections.
- D. Install unions in all non-flanged piping connections to apparatus and adjacent to all screwed control valves, traps, and appurtenances requiring removal for servicing, so located that piping may be disconnected without disturbing the general system.
- E. Support all piping independently at apparatus so that the equipment shall not carry its weight.
- F. Screwed Joints: Ream pipe ends. Apply dope or tape to male threads only. Brass joints shall be made with Teflon tape only. Make up fitting with not over two threads showing beyond the fitting end. Make junctions of galvanized pipe to cast iron with tapped spigots or half couplings screwed to the end of galvanized pipe to form a spigot end.
- G. Provide reducers as required for changes in pipe size, equipment connections and valves.
- H. Install unions in all non-flanged piping connections to apparatus and adjacent to all screwed control valves, traps, and appurtenances requiring removal for servicing, so located that piping may be disconnected without disturbing the general system.
- I. Provide seismic bracing and support per SMACNA "Seismic Restraint Manual Guidelines for Mechanical Systems", Seismic Zone 4.

## GAS PIPING

#### 3.3 TESTING REQUIREMENTS

A. Piping - General: Test all piping as noted below, with no leaks or loss in pressure for the time indicated. Repair or replace defective piping until tests are completed successfully.

System	Test Pressure	Test Medium	Test Duration	
Natural gas				
piping	60 psig	air	4 hours	

#### 3.4 FIRESTOPPING PENETRATIONS IN FIRE-RATED WALL/FLOOR ASSEMBLIES

A. Contractors shall provide proper sizing when providing sleeves or core-drilled holes to accommodate their through penetrating items. All voids between sleeve or core-drilled hole and pipe passing through, shall be firestopped to meet the requirements of ASTM E-814, in accordance with Section 22 00 00 - Sleeves and Inserts.

## ELECTRIC DOMESTIC WATER HEATERS

#### PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Work included: Providing domestic commercial electric domestic water heater, expansion tank and related appurtenances.

#### 1.2 SUBMITTALS

- A. Provide submittals in accordance with Section 22 00 00.
- B. Submittals shall include: Manufacturer's catalog or technical data showing performance, dimensions, materials of construction. and recommended methods of installation.

## 1.3 OPERATION AND MAINTENANCE DATA

- A. Provide O&M data in accordance with Section 22 00 00.
- B. O&M data shall include:
  - 1. Manufacturer's literature.
  - 2. Maintenance instructions.

#### PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
  - A. Water Heaters: A.O. Smith, Rheem/Rhuud, Bradford White. or approved equal.

## 2.2 DESCRIPTION

- A. Electric Water Heater (WH-2):
  - 1. A.O. Smith ECLN-40 200 used as basis of design.
  - 2. Glass lined tank with 3-year warranty, 150 psi working pressure rating.
  - 3. Adjustable limit control.
  - 4. Equip heater with magnesium anodes.
  - 5. Baked enamel jacket, insulation to comply with applicable energy codes.
  - 6. ASME rated temperature and pressure relief valve and drain valve.
  - 7. Comply with State of Oregon Energy Code, Table 13-I.
  - 8. See Drawings for size and capacity.
- B. Electric Water Heater (WH-3):
  - 1. A.O. Smith DEL or Den electric used as basis of design.
  - 2. Glass lined tank with 3-year warranty, 150 psi working pressure rating.
  - 3. Adjustable limit control.
  - 4. Equip heater with magnesium anodes.
  - 5. Baked enamel jacket, insulation to comply with applicable energy codes.
  - 6. ASME rated temperature and pressure relief valve and drain valve.
  - 7. Comply with State of Oregon Energy Code, Table 13-I.

See Drawings for size and capacity

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# ELECTRIC DOMESTIC WATER HEATERS

## PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Install plumbing equipment where shown and make piping connections. Installation to be per manufacturers instructions.
- B. Provide expansion tank.
- C. Pipe pressure/temperature relief valve to over service sink or floor drain.
- D. Provide seismic bracing for water heaters as required by local jurisdiction.

## FUEL FIRED DOMESTIC WATER HEATERS

#### PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Work included: Providing domestic commercial fuel-fired domestic water heaters, expansion tank and related appurtenances.

#### 1.2 SUBMITTALS

- A. Provide submittals in accordance with Section 22 00 00.
- B. Submittals shall include: Manufacturer's catalog or technical data showing performance, dimensions, materials of construction. and recommended methods of installation.

## 1.3 OPERATION AND MAINTENANCE DATA

- A. Provide O&M data in accordance with Section 22-00-00.
- B. O&M data shall include:
  - 1. Manufacturer's literature.
  - 2. Maintenance instructions.

#### **PART 2 - PRODUCTS**

- 2.1 MANUFACTURERS
  - A. Tankless Gas Water heater: Rinnai or approved equal.
  - B. Expansion Tank: Amtrol, Bell & Gossett, Watts or approved equal.
- 2.2 DESCRIPTION: See 'Plumbing Equipment Schedule' on drawings and below.
  - A. Gasl water heater: Rinnai Tankless Gas Fired Water heater
    - 1. Gas pressure regulator and automatic gas shut-off device. AGA and CSA certified.
    - 2. Electronic controls.
    - 3. ASME rated temperature and pressure relief valve and drain valve.
    - 4. Solid wall CPVC vent pipe, with horizontal venting capability. Route in fire rated shaft through room above.
    - 5. See Drawings for size and capacity.
  - B. Expansion Tank (ET-1): Diaphragm type, pre-charged, steel outer shell with polypropylene liner. Amtrol Model ST-5 commercial model used as basis of design. See drawings for size and capacity..

## **PART 3 - EXECUTION**

- 3.1 INSTALLATION
  - A. Install plumbing equipment where shown and make piping connections. Installation to be per manufacturers instructions.
  - B. Provide complete flue and combustion air piping and connections per water heater manufacture's installation instructions. Use solid wall CPVC pipe and fittings.
  - C. Pipe pressure/temperature relief valve to over floor sink or floor drain.

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# FUEL FIRED DOMESTIC WATER HEATERS

- D. Provide seismic bracing for water heater as required by local jurisdiction. Provide supplemental drawings and data to governing code jurisdiction as required.
- E. Provide drain pan for water heaters when required by code or installed on floor above first floor or when called out on drawings. Pipe pressure/temperature relief valve to over floor drain or service sink or as called out on drawings.
- F. Provide hot water circulation pump and mixing valves where shown on drawings. See specification section 22 42 00.

## PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Work included: Providing of all plumbing fixtures, fixture trim, cleanouts and appurtenances as shown or required.
  - B. Product Certification: Provide only products certified for use in the State of Oregon.

#### 1.2 SUBMITTALS

- A. Provide submittals in accordance with Section 22 00 00.
- B. Submittals shall include manufacturer's catalog literature for all products used.

## 1.3 OPERATION AND MAINTENANCE DATA

- A. Provide O&M data in accordance with Section 22 00 00.
- B. O&M data shall include:
  - 1. Manufacturer's literature.
    - 2. Maintenance instructions.

## PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Vitreous China Plumbing Fixtures: American Standard or Kohler
- B. Stainless Steel Sinks: Elkay or Just.
- C. Flush Valves: Sloan.
- D. Toilet Seats: Bemis, Olsonite, Church or Beneke.
- E. Fixture Trim: Chicago only
- F. Hose Bibbs: Chicago only
- G. Valve Boxes: Guy Grey or IPS.
- H. Drinking Fountains: Elkay or Sunroc.
- I. Floor Drains: Jay R. Smith, Wade, Watts Ancon or Zurn.
- J. Cleanouts: Jay R. Smith, Wade, Watts Ancon or Zurn.

# 2.2 DESCRIPTION

- A. Water Closet (WC-1):
  - 1. Kohler "Wellcome" Model K-4350, white vitreous china, floor mounted, ADA compliant, 14-3/4 high rim, flush valve, 1.28 or 1.5 gallon flush, elongated bowl, siphon jet action, with water saving trim.

- 2. Sloan "Royal" model 111, diaphragm type, 1.5 gpf, flush valve, dual filtered by-pass, chloramine resistant rubber compounds, vandal resistant cap, ADA compliant handle, sweat solder adapter, cast set screw wall flange.
- 3. Church No. 9500SSCT, elongated white extra heavy duty plastic open front seat less cover with stainless steel hinge post and self-sustaining concealed check hinge.
- B. Water Closet (WC-2):
  - 1. Kohler "Highline" Fig. K-4405, white vitreous china, floor mounted, ADA compliant, 17 high rim, flush valve, 1.28 or 1.5 gallon flush, elongated bowl, siphon jet action, with water saving trim.
  - 2. Sloan "Royal" model 111, diaphragm type, 1.5 gpf, flush valve, dual filtered by-pass, chloramine resistant rubber compounds, vandal resistant cap, ADA compliant handle, sweat solder adapter, cast set screw wall flange.
  - 3. Church No. 9500SSCT, elongated white extra heavy duty plastic open front seat less cover with stainless steel hinge post and self-sustaining concealed check hinge.
- C. Water Closet (WC-3):
  - 1. Sloan "Royal" model 111, diaphragm type, 1.5 gpf, flush valve, dual filtered by-pass, chloramine resistant rubber compounds, vandal resistant cap, ADA compliant handle, sweat solder adapter, cast set screw wall flange
- D. Water Closet (WC-4):
  - 1. Replace tank flushing hardware with model appropriate fittings.
- E. Urinal (U-1):
  - 1. Kohler "Dexter" K-5016-ET, white vitreous china, wall hung, top spud, siphon jet action, with water saving trim.
  - 2. Sloan "Royal" model 186-1, diaphragm type, 1.0 gpf, flush valve, chloramine resistant rubber compounds, dual filtered by-pass, vandal resistant cap, sweat solder adapter, cast set screw wall flange.
  - 3. Floor mounted wall carrier with wall hangers, set for standard mounting height, refer to Architectural drawings.
- F. Urinal (U-2):
  - 1. Kohler "Dexter" K-5016-ET, white vitreous china, wall hung, top spud, siphon jet action, with water saving trim.
  - 2. Sloan "Royal" model 186-1, diaphragm type, 1.0 gpf, flush valve, chloramine resistant rubber compounds, dual filtered by-pass, vandal resistant cap, sweat solder adapter, cast set screw wall flange.
  - 3. Floor mounted wall carrier with wall hangers, set for ADA mounting height, refer to Architectural drawings.

- G. Urinal (U-3):
  - 1. Sloan "Royal" model 186-1, diaphragm type, 1.0 gpf, flush valve, chloramine resistant rubber compounds, dual filtered by-pass, vandal resistant cap, sweat solder adapter, cast set screw wall flange..
- H. Lavatory (L-1):
  - 1. Kohler "Greenwich" model K-2032, overall dimensions 20-3/4" x 18-1/4", wall hung with model 64839 hanger, white vitreous china lavatory with front overflow, faucet ledge drilled for 4" centers.
  - 2. Chicago model 802-VE2805-665CP, deck mounted chrome plated brass faucet, 4" integral spout
  - 3. Pre-formed manufactured insulation kit for trap, waste and water supplies.
  - 4. Provide point of use hot water tempering valve.
  - 5. Chrome Plated brass grid drain.
  - 6. Provide floor mounted wall carrier. Refer to Architectural drawings for ADA mounting height.
- I. Lavatory (L-2):.
  - 1. Chicago model 802-VE2805-665CP, deck mounted chrome plated brass faucet, 4" integral spout...
- J. Sink (S-1):
  - 1. Chicago Model 50-CP, deck mounted chrome plated brass faucet, cast swing gooseneck spout, ADA wrist blade lever handles, vandal resistant, 2.2 gpm flow restricting aerator.
  - 2. Chicago 748-665CP, Chrome plated, lead-free bubbler.
- K. Sink (S-2):
  - 1. Chicago 923-613XKCAB, Pre-rinse faucet and fittings.
- L. Sink (S-3):
  - 1. Chicago 802-317CP 2-hole, 4"centers, with wrist-blade paddle handles.
- M. Sink (S-4):
  - 1. Elkay ADA 18 gauge, single bowl to match size of removed sink (18"x 23"x 6-1/2" deep field verify).
  - 2. Chicago 1100-CP, 2-hole, 4"centers, with wrist-blade paddle handles and gooseneck spout.
- N. Sink (S-5):
  1. Chicago 1100-CP, 2-hole, 4"centers, with wrist-blade paddle handles and gooseneck spout.
- O. Sink (S-6):
  1. Chicago 2302-1BCP 2-hole, Side valve with lever handle and gooseneck spout.
- P. Emergency Eyewash (EW-1): Haws 8904 pull out Emergency Eyewash. Provide Haws 9201EF tempering valve under counter for eyewashes. Supply Eye wash with 80 degree F water from tempering valve.
- Q. Can Wash (CW-1): Jay R Smith 3380 valve box.

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## **COMMERCIAL PLUMBING FIXTURES**

- R. Drinking Fountain (DF-1):
  - 1. Elkay EZH2O Bottle filling station & Bi Level ADA Cooler Model LZSTL8WSLK: Bi-level ADA, 8 GPM 50 degree F chilled gallons per hour based on 80 degree F inlet. Sensor activated bottle filler, lead free design. Provide with cane skirt.
  - 2. Floor mounted wall carrier, mount at standard or wheel chair height at each location as shown on architectural plan.
  - 3. Aqua Pure AP101T water filter.
- S. Drinking Fountain (DF-2):
  - 1. Elkay EZH2O Bottle filling station & Bi Level ADA Cooler Model LZSTL8WSLK: Bi-level ADA, 8 GPM 50 degree F chilled gallons per hour based on 80 degree F .inlet. Sensor activated bottle filler, lead free design. Provide with cane skirt.
  - 2. Floor mounted wall carrier, mount at standard or wheel chair height at each location as shown on architectural plan.
  - 3. Aqua Pure AP101T water filter.
- T. Drinking Fountain (DF-3):
  - 1. Elkay Model EDFP217FPK Bi-Level ADA compliant, 19 gauge stainless steel, vandal resistant wall mount, freeze resistant, stainless steel back panel, lead free design, provide with cane skirt.
- U. Hose Bibb (HB-1) Chicago 952-CP, loose key handle..
- V. Cleanout: J.R. Smith, Fig. 4021-U, nickel bronze top with vandal proof screws for floor and bronze plug, Fig. 4556-NB cleanout tees with bronze plug, nickel bronze frame with stainless steel cover for walls, Fig. 4243-U cleanout for exterior planting and paved areas, cast iron with bronze plug.
- W. Support Rims: Stainless steel rims, if sink not furnished with integral rim.
- X. Supplies and Stops: Flexible supplies with IPS stops with brass stems to wall with canopy flanges and all exposed surfaces chrome plated.
- Y. Traps:
  - 1. Exposed Traps: 17-gauge chrome plated tubing adjustable P-trap with slip bushing.
  - 2. Concealed or Below Grade: Coated cast iron P-trap, recessed screw joint or to match cast iron pipe.
  - 3. Support Rims: Stainless steel rims, if sink not furnished with integral rim.

# PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Provide plumbing fixture trim where applicable on fixture.
- B. Plumbing Fixtures:
  - 1. Plumbing Fixtures Mounting Heights: All fixtures standard rough-in catalogued heights unless specified or shown otherwise on the architectural drawings.
  - 2. Cleanout:
    - a. Where required for purposes intended.
    - b. Cover set flush with finished surface.
    - c. Urinal cleanouts to be below fixture on centerline.
- C. Drawings are diagrammatic and may not show all required cleanouts and fittings. Provide additional required items at no additional cost.

# **ELECTRICAL GENERAL PROVISIONS**

# PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The General and Supplemental Conditions apply to this Division, including but not limited to:
  - 1. Drawings and Specifications.
  - 2. Public ordinances, permits. Including but not limited to electrical and fire alarm permits.
  - 3. Payments and fees required by governing authorities for work included in this Division.
  - 4. Change orders.
- B. Division 1, General Requirements apply to this Division, including but not limited to:
  - 1. Drawings and Specifications.
  - 2. Public ordinances, permits. Including but not limited to electrical and fire alarm permits.
  - 3. Payments and fees required by governing authorities for work included in this Division.
  - 4. Change orders.
  - 5. Summary of Work.
  - 6. Coordination.
  - 7. Cutting and Patching.
  - 8. Alternates,.
  - 9. Submittals, including Shop Drawings, Product Data and Samples.
  - 10. Construction Facilities and Temporary Controls.
  - 11. Materials and Equipment
  - 12. Substitution and Product Options.
  - 13. Contract Closeout:
    - a. Project Record Documents.
    - b. Operating and Maintenance Data.
    - c. Systems Demonstrations.

# 1.2 CONTRACT DOCUMENTS

A. The Electrical Drawings and Specifications are complementary and what is called for by one shall be as binding as if called for by both. Items shown on the Drawings are not necessarily included in the Specifications. All directives and instructions to furnish, provide, install, complete, test and methods described in these Specifications and Drawings shall be interpreted as directives to the Electrical Contractor unless clearly specified otherwise. It is the intent of these specifications and the accompanying drawings to describe complete and functional electrical systems. If errors or discrepancies are discovered, notify the Architect immediately.

## 1.3 SITE VISITATION

A. The contractor shall visit the site prior to bidding to familiarize himself with existing conditions and all other factors which may affect the execution of the work.

## 1.4 CODES, ORDINANCES AND REGULATIONS

- A. The completed installation shall conform to all applicable Federal, State and Local Codes, Ordinances and Regulations.
- B. Obtain all necessary permits and inspections required by the governing authorities having jurisdiction over this work.
- C. Furnish to the Architect a certificate of approval from the inspection authority at the completion of the work, prior to the application for final payment.

# ELECTRICAL GENERAL PROVISIONS

## 1.5 SCOPE OF WORK

- A. The work covered by this Specification shall include furnishing all labor, materials, equipment and services to construct and install the complete electrical system as shown on the Drawings and specified herein. Verify all conditions on the job site and lay out work accordingly.
- B. The contractor will, in conjunction with an owner representative, test the existing intercom, paging, clock and fire alarm systems prior to any work being started. The electrical contractor will document any discrepancies with the systems. Any failures with the system after the test and during construction that have not been documented will be the responsibility of the electrical contractor. The contractor will repair the system and make it fully operational at their own expense.
- C. The work shall include, but is not necessarily limited to, the following systems:
  - 1. Complete lighting system as indicated on drawings.
  - 2. Demolition of existing electrical located in wall and ceiling assemblies scheduled for removal and as indicated on Architectural drawings. Maintain electrical continuity serving existing electrical equipment to remain. Extend and relocate conduit and wiring around areas of work as required, field verify exact requirements. Bring any items of uncertainty to the attention of the Architect prior to initiation of work.
- D. The following equipment and work will be furnished under other Divisions of Work:
  - 1. Telephone, data and television wiring and equipment. (Note: coordinate with above scope.)
  - 2. Mechanical equipment motors and heaters, unless otherwise noted on drawings.
  - 3. Equipment control wiring beyond the provisions shown on the Electrical Drawings.

## 1.6 MECHANICAL WIRING

A. Refer to 26 00 00-3.9 for the delineation of work and responsibilities between Division 23 and Division 26.

#### 1.7 WARRANTY

- A. Provide a written one-year warranty covering the work done under this Division as required by the General Conditions.
- B. Systems and Apparatus:
  - 1. Free of defects of material and workmanship and in accord with the Contract Documents.
  - 2. Built and installed to deliver its full rated capacity at the efficiency for which it was designed.
  - 3. Operate at full capacity without objectionable noise or vibration.

## 1.8 SUBMITTALS

- A. Refer to Division 1 requirements.
- B. All submittals will be submitted via e-Builder.
- C. Submit all electrical data per Division 1 requirements, indexed by section number, covering all items of equipment and systems. Submit all electrical items at one time.
- D. The installation and Record Drawings called for under submittals shall show all outlets, devices, terminal cabinets, conduits, wiring and connections required for the complete system described. Prints of these drawings shall be submitted prior to starting installation. The Contractor submitted drawings, when approved, will then form the basis for installation.
- E. Submittals will not be reviewed unless equipment is specifically indicated.

# **ELECTRICAL GENERAL PROVISIONS**

## PART 2 - PRODUCTS

- 2.1 APPROVALS AND SUBSTITUTIONS
  - A. Refer to Division 1 requirements.
- 2.2 MATERIAL APPROVALS AND SHOP DRAWINGS
  - A. Refer to Division 1 requirements.
  - B. All submittals will be submitted via e-Builder.
  - C. Submit all electrical data per Division 1 requirements, indexed by Section number, covering all items of equipment and systems. Include wiring diagrams where called for.
  - D. Review and recommendations by the Architect or Engineer are not to be construed as change authorizations. If discrepancies between the shop drawings submitted and the Contract Documents are discovered either prior to or after the data is processed, the Contract Documents will govern. Shop drawing review will not occur without contract cost data as outline below.

#### PART 3 - EXECUTION

## 3.1 CONTRACT COST DATA

A. Furnish to the Architect a cost breakdown of the Electrical Contract.

## 3.2 CHANGE ORDERS

- A. Refer to Division 1 requirements.
- 3.3 OPERATING AND MAINTENANCE DATA
  - A. The Contractor shall provide Warranty, Maintenance and operating instructions manual in conformance to the requirements of Section 017800.
- 3.4 ELECTRONIC INFORMATION
  - A. Electronic record information in AutoCAD format will be provided to the electrical contractor upon request.
  - B. All electrical subcontractors will make their request for the construction documents through the electrical contractor.

#### 3.5 RECORD INFORMATION

- A. Maintain one set of construction documents marked up (red-lined) on a daily basis as the work progresses, showing all changes, deviations, change orders, omissions, or other variations from the contract drawings.
- B. Record all conduits, stubups and equipment by dimensions from gridlines, below grade, above floor, etc. Show location of all access panels, rough-in for future, etc.
- C. Make record documents available to the Architect for review or printing during construction.

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# ELECTRICAL GENERAL PROVISIONS

- D. On acceptance of the contractor record drawings by the Architect, the contractor will transfer the record information in AutoCAD format to the electronic AutoCAD drawing files. Refer to 26 00 00-3.4(A) for obtaining documents and applicable charges.
- E. Create copy of electrical, "red lined" Record Sets and submit directly to OWNER'S Representative at Substantial Completion.

#### 3.6 PROTECTION OF WORK

- A. Protect all electrical work and equipment installed under this Division against damage by other trades, weather conditions or any other causes. Equipment found damaged or in other than new condition will be rejected as defective.
- B. Switchgear, transformers, panels, light fixtures and all electrical equipment shall be kept covered or closed to exclude dust, dirt and splashes of plaster, cement or paint and shall be free of all such contamination before acceptance. All equipment is to be stored off of the ground to protect from moisture and condensation. Enclosures and trims shall be in new condition, free of rust, scratches and other finish defects. Properly refinish in a manner acceptable to the Architect, if damaged.

#### 3.7 MAINTENANCE OF SERVICE

- A. Electrical service shall be maintained to all functioning portions of the building throughout construction, except as noted below, during all normal working hours of the building occupants. Outages to occupied areas shall be kept to a minimum and be prearranged with the Architect or Owner's Representative. This Contractor will be liable for any damages resulting from unscheduled outages or for those not confined to the pre-arranged times.
- B. Signal and communication systems and equipment shall be kept in operation wherever these serve occupied or functional portions of the building. Outages of these facilities shall be treated the same as electrical power outages.
- C. Telephone services where required during the construction work will be maintained by the telephone company. This work shall be coordinated with the telephone company in such a manner that service, as required by the building occupants, can be readily installed and maintained.
- D. Include all costs for temporary facilities, overtime labor and necessary provisions to maintain electrical services in the initial bid proposal. Temporary wiring and facilities, if used, shall be removed and the site left clean before final acceptance.

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# **ELECTRICAL GENERAL PROVISIONS**

## 3.8 MECHANICAL WIRING – DELINEATION OF RESPONSIBILITY

A. The following schedule is intended to summarize the division of work and responsibilities between Division 23 and Division 26. Not all items listed are applicable to this project.

	ITEM	FURNISHED BY	INSTALL BY	POWER WIRING	CONTROL WIRING
1.	Division 23 Equipment Motors	Div. 23	Div. 23	Div. 26	Div. 23
2.	Motor Starters, Contactors and Overload Heaters – Integral	Div. 23	Div. 26	Div. 26	Div. 23
3.	Motor Control Centers	Div. 26	Div. 26	Div. 26	Div. 23
4.	Fused & Unfused Disconnect Switches	Div. 26	Div. 26	Div. 26	
5.	Manual Operation Switches	Div. 26	Div. 26	Div. 26	Div. 26
6.	Control Relays & Transformers	Div. 23	Div. 23	Div. 23	Div. 23
7.	Energy Management Control Panels	Div. 23	Div. 23	Div. 23	Div. 23
8.	Motorized Solenoid Valves	Div. 23	Div. 23	Div. 23	Div. 23
9.	Duct Mounted smoke Detectors	Div. 23	Div. 23	Div. 26	Div. 23 – Equipment Shutdown Div. 26 – Fire Alarm
10.	Fire/Smoke and Smoke Dampers	Div. 23	Div. 23	Div. 26	Div. 26
11.	Boiler Kill Switch	Div. 23	Div. 26	Div. 26	Div. 23

# **BASIC MATERIALS AND METHODS**

## PART 1 - GENERAL

## 1.1 COORDINATION OF WORK

- A. Conduct work in a manner to cooperate with all other trades for proper installation of all items of equipment. Consult the Drawings of all other trades or crafts to avoid conflicts with cabinets, counters, equipment, structural members, etc. In general, the architectural drawings govern but conflicts shall be resolved with the Architect prior to rough-in.
- B. Verify the physical dimension of each item of electrical equipment to fit the available space. Coordination of the equipment to fit into the available space and the access routes through the construction shall be the Contractor's responsibility.
- C. Coordinate rough-in and wiring requirements for all mechanical equipment with mechanical contractor and equipment supplier. Make installation in accordance with rough-in and wiring diagrams provided by equipment supplier for Contractor's use. Report immediately to architect any deviation between contract documents and actual equipment requirements.
- D. Coordinate all aspects of the electrical, telephone and other utility services with the appropriate serving utility. No additional compensation will be allowed the Contractor for connection fees or additional work or equipment not covered in the Drawings or Specifications which are a result of policies of the serving utility.
- E. Coordinate underground work with other contractors working on the site. Particular coordination shall be performed with contractors installing storm sewer, sanitary sewer, water and irrigation lines, to avoid conflicts. Common trenches may be used with other trades, providing clearances required by codes and ordinances are maintained.

#### 1.2 ELECTRICAL DRAWINGS

- A. The Electrical Drawings accompanying these Specifications are design drawings and generally are diagrammatic indicating approximate locations of outlets and wiring. They do not show every offset, bend, junction box, etc., which may be required for installation to complete the system. Minor deviations in methods, circuiting and branch circuit distribution or arrangements to suit construction conditions are permissible.
- B. The intent of the branch circuiting and control shown shall not be changed nor homeruns combined without the approval of the Architect. Feeder runs shall not be combined or changed.
- C. Installation of multiwire branch circuits (separate circuits sharing a neutral) is not permitted.
- D. Cross or hash marks on conduit runs indicate quantity of No. 12 copper branch circuit conductors, in addition to a grounding conductor, unless otherwise noted. Where such marks do not appear, provide minimum of two conductors with ground, minimum No. 12, size as required for loads and/or equipment being served. Contractor is responsible to assure that the maximum voltage drop on any circuit does not exceed 5% at the load. The contractor shall review panel schedule to verify wire/conduit size required.
- E. Conduit sizes shown or listed on the drawings are for reference only. It is the responsibility of the contractor to provide and install conduit sized per current NEC requirements.

# **BASIC MATERIALS AND METHODS**

## PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Electrical products installed in this project shall be listed by a recognized testing laboratory or approved in writing by the local inspection authority as required by governing codes and ordinances.
- B. Materials shall be new, of the best quality. The materials shall be manufactured in accordance with NEMA, ANSI, UL or other applicable standards.

## PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Provide a completely properly operating system for each item of equipment called for under this work. Installations shall be in accord with the equipment manufacturer's instructions, the best industry practices and the contract documents. Where a conflict in these guides appear, the Architect shall be requested to provide proper clarification before work is roughed in and his decision will be final. Work installed without such clarification shall be removed and corrected by the Contractor at no cost to the Owner.
- B. Make installation in a neat, finished and safe manner, according to the latest published NECA Standard of Installation under competent supervision.
- C. Installation of multiwire branch circuits (separate circuits sharing a neutral) is not permitted.

#### 3.2 EXCAVATION AND BACKFILL

- A. Perform all necessary excavation and backfill for the installation of electrical work in compliance with Division 31.
- B. For direct burial cable or non-metallic conduit, a minimum 3-inch cover of sand or clean earth fill shall be placed all around the cable or conduit on a leveled trench bottom. Lay all steel conduit on a smooth level trench bottom, so that contact is made for its entire length. Water shall not be present in the trench when electrical conduit is being laid.
- C. Place backfill in layers not exceeding 8-inches deep and compact to 95% of maximum density at optimum moisture to preclude settlement.
  - 1. Interior: Bank sand or pea gravel.
  - 2. Exterior: Excavated material with final 8-inches clean soil.
- D. Following backfilling, grade all trenches to the level of surrounding soil. All excess soil shall be disposed of at the site as directed.
- E. Provide 6-inch wide vinyl tape marked "ELECTRICAL" in backfill, 12-inches below finished grade, above all conduit runs.
- F. Coordinate patching of all asphalt or concrete surfaces disturbed by this work with General Contractor.

#### 3.3 NOISE CONTROL

A. Outlet boxes at opposite sides of partitions shall not be placed back-to-back nor straight through boxes be employed, except where specifically permitted on the Drawings by note, to minimize transmission of noise between occupied spaces.

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# BASIC MATERIALS AND METHODS

- B. Contactors, transformers, starters and similar noise producing devices shall not be placed on walls which are common to occupied spaces unless specifically called for on the Drawings. Where such devices must be mounted on walls, common to occupied spaces, they shall be shock mounted or isolated in such a manner as to effectively prevent the transmission of their inherent noise to the occupied space.
- C. Ballasts, contactors, starters, transformers and like equipment which are found to be noticeably noisier than other similar equipment on the project will be deemed defective and shall be replaced.

#### 3.4 EQUIPMENT CONNECTIONS

- A. Provide complete electrical connections for all items of equipment requiring such connections, including incidental wiring, materials, devices and labor necessary for a finished working installation.
- B. Verify the location and method for connecting to each item of equipment prior to roughing-in. Check the voltage and phase of each item of equipment before connecting.
- C. Make motor connections for the proper direction of rotation. Minimum size flex for mechanical equipment shall be 1/2-inch except at small control devices where 3/8-inch may be used. Exposed motor wiring shall be jacketed metallic flex with 6-inches minimum slack loop. Pump motors shall not be test run until liquid is in the system.
- D. Control devices and wiring relating to the HVAC systems will be furnished and installed under Division
   23 (previously Division 15) except for provisions or items specifically shown on the Electrical Drawings or specified herein.
- E. Furnish all code required disconnects under this work, whether specifically shown or not.

## 3.5 EQUIPMENT SUPPORT

- A. Anchoring and bracing to the building structural elements in accord with all codes and regulations regarding seismic design conditions. The contractor is responsible to determine the means and methods of equipment installation and support. Seismic restraints for electrical and communication equipment shall bear the seal and signature of a structural engineer registered in the state of Oregon, and shall be submitted to the Architect prior to fabrication. Calculations are to be included for all connections to the structure, considering localized effects.
- B. Each fastening device and support for electrical equipment, fixtures, panels, outlets and cabinets shall be capable of supporting not less than four times the ultimate weight of the object or objects fastened or suspended from the building structure.
- C. Properly and adequately support fixtures installed under this work from the building structure. Supports shall provide proper alignment and leveling of fixtures. Flexible connections where permitted to exposed fixtures shall be neat and straight, without excess slack, attached to the support device.
- D. Support all junction boxes, pull boxes or other conduit terminating housings located above the suspended ceiling from the floor above, roof or penthouse floor structure to prevent sagging or swaying.
- E. Conduits:
  - 1. Support suspended conduits 1-inch and larger from the overhead structural system with metal ring or trapeze hangers with threaded steel rod having a safety factor of 4.
  - 2. Conduit installed in poured concrete shall be anchored to the reinforcing steel with No. 14 black iron wire.

# **BASIC MATERIALS AND METHODS**

## 3.6 ALIGNMENT

- A. Install panels, cabinets and equipment level and plumb, parallel with structural building lines. Switchgear panels and all electrical enclosures shall fit neatly without gaps, openings or distortion. Properly and neatly close all unused openings with approved devices.
- B. Fit surface panels, devices and outlets with neat, appropriate trims, plates or covers, without overhanging edges, protruding corners or raw edges, to leave a finished appearance.

## 3.7 CUTTING AND PATCHING

A. Include cutting, patching and restoration of finishes necessary for this work. Surfaces damaged by this work and spaces around conduits passing through floors and walls shall be neatly patched and finished to match the adjacent construction, including painting or other finishes. Clean up and remove all dirt and debris. This work shall all be performed to the satisfaction of the Architect.

# **CONDUCTORS AND CONNECTORS**

## PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. Work Included:
  - 1. Deliver conductors to the job site in cartons, protective covers or on reels.
  - 2. Conductors for special systems shall be as recommended by the equipment manufacturer except as noted.

## 1.2 SUBMITTALS

- A. Shop Drawings.
- B. Product Data.

#### **PART 2 - PRODUCTS**

- 2.1 CONDUCTORS 600 V
  - A. Type:
    - 1. No. 12 AWG minimum size unless noted otherwise.
    - 2. No. 8 and larger, stranded, Class B.
  - B. Stranding: Copper, concentric or compressed
  - C. Insulation: THHN, THWN, XHHW unless noted or specified otherwise.
  - D. Through wiring in fluorescent fixtures shall be rated for 90 degree C.
  - E. Manufacturers: G.E., Hatfield, Anaconda, Rome or equal.

#### 2.2 CORD DROPS AND PORTABLE CORDS

A. Copper type "S" or "SO" heavy duty, rubber insulated unless otherwise noted.

# 2.3 CONNECTORS

- Branch Circuit Conductor Splices: Live spring type, Scotch-Lok, Ideal Wing Nut or self-stripping type, 3M Series 560.
- B. Cable Splices: Compression tool applied sleeves, Kearney, Burndy or equal with 600V heat shrink insulation.
- C. Lugs: Conductors no. 6 and larger, except on molded case circuit breakers, two hole, long barrel pressure tool set Thomas & Betts No. 54,000 series, Burndy "Hydent", Anderson Electric VCEL, or approved.

## PART 3 - EXECUTION

#### 3.1 CONDUCTORS

A. Pulling compounds may be used with the residue cleaned from the conductors and raceway entrances after the pull is made.

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# CONDUCTORS AND CONNECTORS

- B. Pulleys or blocks shall be used for alignment of the conductors when pulling. Pulling shall be in accordance with manufacturer's specifications regarding pulling tensions, bending radii of the cable and compounds.
- C. Conductors entering terminal or junction boxes mounted on hermetically sealed refrigeration compressor motors shall be copper.
- D. Make up and insulate wiring promptly after installation of conductors. Wire shall not be pulled in until all bushings are installed and raceways terminations are completed. Wire shall not be pulled into conduit embedded in concrete until after the concrete is poured and forms are stripped.
- E. Conductor sizes shown on the Drawings are for copper only.

## 3.2 CONNECTORS

- A. Control and special systems wires shall be terminated with a tool applied spade flared lug when terminating at a screw connection.
- B. All screw and bolt type connectors shall be made up tight and retightened after an eight hour period.
- C. All tool-applied compression connectors shall be applied per manufacturer's recommendations and physically checked for tightness.

#### 3.3 COLOR CODING

- A. Phase color code to be consistent at all feeder terminations, A-B-C left-to-right or A-B-C top-to-bottom.
- B. Switchlegs, travelers, etc. to be consistent with the phases to which connected or a color distinctive from that listed.
- C. Under 250 Volts Phase-to-Phase:
  - 1. Phase A Black
    - 2. Phase B Red (Wild leg in 240V Delta Orange)
    - 3. Phase C Blue
    - 4. Neutral White
    - 5. Ground Green
- D. Over 250 Volts Phase-to-Phase:
  - 1. Phase A Brown
  - 2. Phase B Orange
  - 3. Phase C Yellow
  - 4. Neutral Gray
  - 5. Ground Green
### **GROUNDING AND BONDING**

#### PART 1 - GENERAL

#### 1.1 DESCRIPTION

A. Work Included:
1. Provide equipment grounding conductor in all branch circuit, feeder and service raceways.

#### PART 2 - PRODUCTS

- 2.1 GROUND CONDUCTORS
  - A. Bare or green insulated copper.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. All grounding conductors shall be sized in accord with the National Electrical Code.
- B. All feeder and service raceways shall be grounded.
- C. All plug-in receptacles shall be bonded to the boxes, raceways and grounding conductor.
- D. Provide equipment grounding conductor in all branch circuit, feeder and service raceways.

#### PART 1 - GENERAL

#### 1.1 DESCRIPTION

- A. Work Included:
  - 1. Provide raceways and conduits of specified types for all electrical systems wiring, except where clearly shown or specified otherwise. All fittings, boxes, hangers and appurtenances shall be included.
  - 2. Size raceways and conduits as indicated on the Drawings. Where no size is indicated, conduit may be the minimum code permitted size for the quantity of type THHW conductors installed. Minimum size is 3/4".

#### 1.2 SUBMITTALS

- A. Shop Drawings.
- B. Product Data.
- C. Operational Instructions and Maintenance Data.

#### PART 2 - PRODUCTS

- 2.1 METALLIC CONDUITS
  - A. GRC: Threaded rigid heavy wall galvanized steel.
  - B. IMC: Threaded intermediate galvanized steel.
  - C. EMT: Zinc coated steel electrical metallic tubing.
  - D. ARC: Threaded rigid heavy wall aluminum.
  - E. Flex: Flexible metal with and without polyvinyl chloride jacket.
  - F. Liquidtight flexible conduit: Zinc steel core with smooth gray abrasion-resistant, liquid-tight PVC cover with integral ground wire wound in steel core.
  - G. MC (Metal Clad) cable. Note: MC cable may only be used in specific circumstances as outlined in Part 3 of this section. Refer to Part 3 of this section for uses permitted.
    - 1. MATERIALS
    - a. Cable shall be steel jacketed interlocking armor with internal fully insulated green grounding conductor. Cable shall contain multi-conductor thermoplastic insulated type THHN color coded solid or stranded copper conductors and shall be U.L. approved for the intended application.
    - b. Connections, terminations and fasteners shall be U.L. approved for the application, and designed specifically for use with the cable used, and shall have insulated throats to protect the wire.
    - 2. APPROVED MANUFACTURERS
      - a. MC Cable: AFC/A Nortek Company, Type Mc-Lite, HC-90; Alflex, Armorlite.
      - b. Tools: Cable manufacturer approved type with controlled depth rotary cutter.

#### 2.2 NON-METALLIC CONDUITS

A. Rigid non-metallic conduit: Type II PVC schedule 40, suitable for use with 90 degrees C rated wire. Conduit shall conform to UL Standard 651 and carry appropriate UL listing for above and below ground use.

#### 2.3 SURFACE RACEWAYS

- A. Acceptable manufacturer(s): Wiremold, Panduit or as noted on drawings.
- B. Type, size with quantity and spacing of outlets as shown on drawings. Provide with snap-on cover, connectors, fittings and incidental items required for a complete installation. Raceway shall be in continuous length as indicated on drawings.

#### 2.4 WIREWAYS

- A. Troughs: Steel, painted, square in cross section, preformed knock-outs on standard spacing, hinged cover.
- B. Fittings: Tees, elbows, couplings as required for configuration shown on the Drawings.
- C. Supports: U-shaped, 1/4-inch by 1-1/2-inch steel strap, bent and prime painted.

#### 2.5 FITTINGS

- A. GRC, IMC AND ARC:
  - 1. The conduit itself must be threaded, threaded couplings attached by any means are not allowed.
  - 2. Threaded locknuts.
  - 3. Threaded bushings: 1-1/4 inch and larger shall be of the insulated, grounding type as required under Section 26 05 26.
  - 4. Expansion fittings: O-Z/Gedney Electrical Mfg. Co. type E expansion coupling with bonding jumper for up to four inches of movement.
- B. EMT:
  - 1. Connectors: Set screw for conduit termination, with insulated throat, suitable for conditions used.
  - 2. Couplings: Set screw type, concrete tight.
- C. Weatherproof Connectors: Threaded pipe connections with waterproofing compound.

#### 2.6 METALLIC BOXES

- A. Flush and Concealed Outlet Boxes: Galvanized stamped steel with screw ears, knock-out plugs, mounting holes, fixture studs if required, minimum size 4" square x 1.5" deep. RACO or equal.
- B. Surface Outlet Boxes: Galvanized stamped steel same as above for use on ceilings; cast steel or aluminum with threaded hubs for use on walls.
- C. Large Boxes: Boxes exceeding 4-11/16 inches square when required shall be welded steel construction with screw cover and painted, steel gauge as required by physical size, Hoffman, Circle AW or equal.
- D. Floor Boxes:
  - 1. Multi-Gang Box, Slab on Grade: Wiremold RFB4-CI series cast iron housing with S36CCTCAL series aluminum finish, steel flanged activation for use with matching carpet or tile insert. Rubber gasket protects interior from water and debris. Provide with two duplex receptacles and two data outlets.

- 2. Multi-Gang Box, Slab above Grade: Wiremold RFB4 series steel housing with S36CCTCAL series textured aluminum finish, steel flanged activation for use with matching carpet or tile insert. Rubber gasket protects interior from water and debris. Provide with two duplex receptacles and two data outlets.
- 3. Multi-Gang Box, Concrete Floor: Same as above, except use Wiremold S36BBTCAL series textured aluminum finish, steel flanged activation.
- 4. Single Gang Box: Wiremold 880S series with 817S series brass flange and 828GFI brass cover plate insert.
- 5. Provide floor boxes minimum 3-7/16 inches deep with 1-inch factory knockouts.

#### 2.7 NON-METALLIC BOXES

A. PVC, molded enclosures, threaded hubs.

#### 2.8 OTHERS

A. Any conduits, fittings, etc. specifically not mentioned above are not approved for use.

#### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Conceal all conduits in finished spaces and elsewhere so far as practicable. Concealed conduits shall run in a direct line with long sweep bends and offsets. GRC and IMC embedded in concrete below grade or in damp locations shall be made water-tight by painting the entire male thread with Rustoleum metal primer, or equal, before assembly.
- B. Route exposed conduit parallel or at right angles to structural building lines, and neatly offset into boxes. Conduits attached directly to building surfaces shall closely follow the surfaces. Conduit fittings shall be used to "saddle" under beams.
- C. Conduits, whether exposed or concealed, shall be securely supported and fastened at intervals of nominally every 8 feet and within 18 inches of each outlet, ell, fitting, panel, etc.
- D. Keep conduit and raceways closed with suitable plugs or caps during construction to prevent entrance of dirt, moisture, concrete or foreign objects. Raceways shall be clean and dry before installation of wire and at the time of acceptance.
- E. Pack spaces around conduits with oakum and seal to prevent entrance of moisture where conduits are installed in sleeves or block-outs penetrating moisture barriers.
- F. Where conduits penetrate fire rated concrete walls or floors, provide non-combustible caulking or putty 3M fire barrier material of thickness required to equal or exceed the fire rating of wall or floor.

#### 3.2 CONDUIT

- A. PVC may be used underground, under interior slabs or where scheduled or noted on the Drawings. Make connections with waterproof solvent cement. Provide GRC at 60 degree and larger bends and where penetrating slabs or elling up above grade in exterior locations. PVC conduit shall not be installed less than 30" under roadways or areas subject to heavy traffic. Provide a ground wire sized per code in all PVC conduits. Conductor quantities indicated in conduits do not include ground wires unless otherwise noted.
- B. EMT may be employed in all other dry protected locations.

- C. ARC may be used wherever EMT is acceptable, with no restriction on size.
- D. Flex is required where flexibility is necessary as at motors, transformers and recessed lighting fixtures, etc. Flex shall be jacketed type, except where concealed in dry locations and spaces such as ceiling cavities. Length of flex is not to exceed 24".
- E. Conduit stubbed from a concrete slab or wall to serve an outlet under a table or to supply a machine shall have a rigid conduit coupling flush with the surface of the slab. Provide plug where conduit is to be used in future.
- F. Conduits in above-grade slabs shall be located in the middle of the slab. The maximum size, spacing, and location of conduits in post-tensioned slabs shall be subject to approval by the structural engineer Conduits larger than one inch shall not be run in slabs.
- G. MC (Metal Clad) cable uses permitted:
  - 1. Whips on lighting circuits.
    - a. Where recessed lights are used, EMT should not be used, as it restricts maintenance access. In this case, MC or flex are preferred.
  - 2. Where specifically indicated for classroom branch circuits.
- H. MC (Metal Clad) cable installation :
  - 1. Support horizontal and vertical cable 6 feet on center (maximum) and within 6 inches of boxes with approved cable clamps.
  - 2. Support cable above accessible ceilings; do not rest cables on ceiling tiles. Attach cables with metal clips or plastic cable ties to support wires from structure on 6 foot centers maximum.
  - 3. Cable shall be cut with manufacturer approved devices.
  - 4. Splice conductors only in accessible junction boxes.
  - 5. Cable shall not be supported from, or come in contact with, mechanical ducts, water, sprinkler or gas piping; maintain 6 inch separation minimum.
  - 6. Provide junction box at all cable penetrations of wall, ceiling or floor surfaces for equipment connections; cable shall not be run directly through finished surfaces.
  - 7. Voltage drop: Conductors over 75 feet for 120 volt, and over 200 feet for 277 volt shall be No. 10 AWG minimum.
  - 8. Provide junction box at transition from concealed to exposed wiring. Exposed wiring shall conform to Section 26 05 33 Conduits, Raceways, Boxes and Fittings.
  - 9. Where cable penetrates fire-rated walls or floors, provide mechanical fire stop fitting with UL listed fire rating equal to wall or floor rating.
  - 10. Provide junction box at transition from interior to exterior wiring. Exterior wiring shall conform to Section 26 05 33 Conduits, Raceways, Boxes and Fittings.

#### 3.3 RACEWAYS

- A. Surface metal raceway with snap-in cover may be used in finished spaces only as specified, or shown on Drawings.
- B. Surface metal wireways may be installed at locations to serve motor starters or other control devices where required by a multitude of wiring interconnections or physical layout.
- C. Expansion Joints:
  - 1. All conduits crossing expansion joints where cast in concrete shall be provided with expansiondeflection fittings, equivalent to OZ/Gedney AXDX, installed per manufacturers recommendations.
  - 2. All conduits three inches and larger where not cast in concrete shall be rigidly secured to the building structure on opposite sides of a building expansion joint with an expansion-deflection

fitting across the joint, equivalent to OZ/Gedney AXDX, installed per manufacturer's recommendations.

- 3. All conduits less than three inches where not cast in concrete shall be provided with junction boxes securely fastened on both sides of the expansion joint, connected together with 15 inches of slack (a minimum of 15 inches longer than the straight line length) flexible conduit with copper green ground bonding jumper. In lieu of this flexible conduit, an expansion-deflection fitting, as indicated for conduits three inch and larger, may be installed.
- D. Seismic Joints
  - 1. No conduits cast in concrete shall be allowed to cross a seismic joint.
  - 2. All conduits shall be provided with junction boxes securely fastened on both sides of the expansion joint, connected together with 15 inches of slack (a minimum of 15 inches longer than the straight line length) flexible conduit with copper green ground bonding jumper. Prior to installation, verify with Architect that the 15 inches is adequate for the designed movement, and if not, increase this length as required.

#### 3.4 SURFACE RACEWAYS

- A. The raceway system shall provide a complete enclosure that protects the wires installed therein against damage.
- B. There shall not be any openings that exceed 1/16 inch (1.59 mm) in width on surfaces that are accessible following installation of the system.

#### 3.5 FITTINGS

A. Metallic raceways and conduits shall be assembled continuous and secured to boxes, panels, etc., with appropriate fittings to maintain electrical continuity. All conduit joints shall be cut square, reamed smooth with all fittings drawn up tight.

#### 3.6 BOXES

- A. Outlet boxes shall be of code required size to accommodate all wires, fittings and devices. Provide multi-gang boxes as required to accept devices installed with no more than one device per gang. Equip all metallic boxes with grounding provisions.
- B. Flush wall switch and receptacle outlets used with conduit systems shall be 4 inches square, 1-1/2 inches or more deep, with one or two-gang plaster ring mounted vertically. Where three or more devices are at one location, use one piece multiple gang tile box or gang box with suitable device ring.
- C. Wall bracket and ceiling surface mounted lighting fixture outlets shall be 4-inch octagon, 1-1/2-inches deep with 3/8-inch fixture stud where required. Wall bracket outlets to have single gang opening where required to accommodate fixture canopy. Provide larger boxes or extension rings where quantity of wires installed requires more cubic capacity.
- D. Boxes for the special systems shall be suitable for the equipment installed. Coordinate size and type with the system supplier.
- E. Provide pull boxes where shown, or in conduit runs greater than 100 feet, or where required to limit the number of bends in any conduit to not more than three 90 degree bends or equivalent. Use galvanized boxes of code required size with removable covers installed so that covers will be accessible after work is completed. Do not locate pull boxes or junction boxes in finished areas unless specifically shown or special permission is obtained from Architect.

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# CONDUITS, RACEWAYS, BOXES AND FITTINGS

F. Boxes shall be flush with finished surfaces or not more than 1/8-inch below surface and be level and plumb. Long screws with spacers or shims for mounting devices will not be acceptable. No combustible material shall be exposed to wiring at outlets.

#### **IDENTIFICATION**

#### PART 1 - GENERAL

#### 1.1 WORK INCLUDED

A. Clearly and properly identify the complete electrical system to indicate the loads served or the function of each item of equipment connected under this work.

#### PART 2 - PRODUCTS

#### 2.1 LABELS

- A. Panels: Typed or pre-printed white permanent materials labels with adhesive backing, Specified Products, Inc. or equal.
- B. Switchgear, Panelboards and Transformers: "Lamicoid", 3-ply laminated plastic, black with white letters, Minimum <sup>1</sup>/<sub>4</sub>" letters.
- C. Equipment: Dymo-Tape, plastic tape with adhesive backing, field printed with proper tool.

#### PART 3 - EXECUTION

#### 3.1 BRANCH CIRCUIT PANELBOARDS

- A. Indicate panel number with laminated plastic labels. Indicate voltage phase and feeder source, feeder wire size, and feeder breaker or fuse size with white permanent labels on the inside of the panel door.
- B. Provide machine-printed panel directories with protective, clear transparent covers, accurately accounting for every breaker installed, including spares. Schedules shall use the actual room designations assigned by name or number near completion of the work and not the space designation on the Construction Drawings.

#### 3.2 EQUIPMENT

- A. Label all disconnect switches, motor starters, relays, contactors, time switches indicating voltage, amperage, circuit number and equipment served with white permanent labels.
- B. Label all transformers and busways with black and yellow 4-1/2 inch high pre-printed adhesive backed materials.

#### 3.3 SYSTEMS

- A. Complex control circuits may utilize any combination of colors with each conductor identified throughout, using wraparound numbers or letters. Use the number or letters shown where the Drawings or operation and maintenance data indicate wiring identification.
- B. Label the fire alarm and communication equipment zones, controls, indicators, etc. with machine printed labels or indicators appropriate for the equipment installed, as supplied or recommended by the equipment manufacturer.

#### WIRING DEVICES AND PLATES

#### PART 1 - GENERAL

#### 1.1 DESCRIPTION

A. Work Included: Provide wiring devices and plates or blank plates only for all outlet boxes shown.

#### 1.2 SUBMITTALS

- A. Shop Drawings.
- B. Product Data.
- C. Operation Instructions and Maintenance Data.
- D. Warranty.

#### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Wiring devices shall be specification grade with special devices as noted on the Drawings. Should the Drawings indicate a device other than those listed herein without reference to catalog number, such device shall be of same grade and manufacture as specified below. Furnish a matching cap for all special purpose devices that do not have the common 120 volt NEMA 5-15R or 5-20R configuration.
- B. Comparable grade devices to those listed as manufactured by Leviton and Pass & Seymour, are approved. All lighting switches and duplex receptacles installed shall be by the same manufacturer and have identical appearance characteristics, unless noted otherwise.

#### 2.2 PLATES

- A. Flush Finish Plates: .040-inch thick, type 302 stainless steel, brush finish, Leviton or Pass & Seymour or approved equal.
- B. Surface Covers: Galvanized or cadmium plated steel, 1/2-inch raised industrial type with openings appropriate for device installed.
- C. Weatherproof: Hubbell 5205 or approved equal cover mounted horizontally with hinges up.

#### 2.3 WALL SWITCHES

- A. Line voltage switches, 20 ampere, 120 volt, quiet type, Hubbell 1221 series, gray exposed finish.
- B. Switch with pilot, lighted clear toggle, Hubbell 1221-PL.
- C. Keyed security switches: Match existing.

#### 2.4 RECEPTACLES

- A. Duplex, 20 ampere, 3-wire, 2-pole grounding, NEMA 5-20R, Hubbell 5352 series or approved equal, gray exposed finish.
- B. Ground Fault Circuit Interrupting (GFCI/GFI): 20 ampere, 3-wire, 2-pole grounding, NEMA 5-20R, gray exposed finish, Hubbell GF5352 series or approved substitute.

#### WIRING DEVICES AND PLATES

- C. Tamperproof Duplex, 20 ampere, 3-wire, 2-pole grounding, NEMA 5-20R, Hubbell HBL8300SGGY series or approved equal, gray exposed finish.
- D. Special purpose receptacles, as noted on Drawings.

#### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Devices and finish plates to be installed plumb with building lines.
- B. Finish plates and devices not to be installed until final painting is complete. Scratched or splattered finish plates and devices will not be accepted.
- C. Wall-mounted receptacles shall be installed vertically at centerline height shown on the Drawings.
- D. Receptacles shall be tested for line to neutral, line to ground and neutral to ground faults. Correct any defective wiring.
- E. All special plugs provided with the receptacles shall be given to the Owner in their cartons and a letter stating the date and the Owner's representative that received the materials.

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# LIGHTING FIXTURES AND LAMPS

#### PART 1 - GENERAL

#### 1.1 DESCRIPTION

- A. Work Included:
  - 1. Provide all lighting outlets indicated on the Drawings with a fixture of type designated and appropriate for the location. Outlet symbols on the Drawings without a type designation shall have a fixture the same as those used in similar or like locations.
  - 2. Where a fixture type designation has been omitted and cannot be determined by the Contractor, request a clarification from the Architect and provide a suitable fixture type as directed at no additional cost.
  - 3. Coordinate installation of lighting fixtures with the ceiling installation and all other trades to provide a total system that is neat and orderly in appearance.
  - 4. Verify ceiling types with architectural specifications and drawings.
  - 5. Provide luminaires complete with lamps, ballasts, reflectors, diffusers, lenses, shielding, hangers, accessories and fittings.
  - 6. Store and handle so as not to subject materials to corrosion or mechanical damage from environment and/or construction.

#### 1.2 QUALITY ASSURANCE

- A. Luminaires shall be U.L. listed and be manufactured in accordance with appropriate U.L. and ANSI standards and shall bear U.L. label appropriate for intended use.
- B. The lighting designated for this project was based on fixture types and manufacturers as specified. If substitution of other than those specified is proposed for an alternate, provide the data and the operating fixtures both as specified and alleged equal. The Architect/Engineer reserves the right to request full photometric analysis of area affected by the proposed substitution prior to acceptance or denial.

#### 1.3 SUBMITTALS

- A. Shop Drawings.
- B. Product Data.
- C. Operation Instruction and Maintenance Data.

#### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Recessed fixtures shall have trims which fit neatly and tightly to the surfaces in which they are installed without leaks or gaps. Contractor to verify ceiling types at all locations and provide appropriate trim kit for each fixture. Where necessary, install heat resistant non-rubber gaskets to prevent light leaks or moisture from entering between fixture trim and the surface to which they are mounted.
- B. Fixtures installed under canopies, roof or open porches, and similar damp or wet locations shall be UL listed and labeled as suitable for damp or wet locations.
- 2.2 LUMINAIRE REQUIREMENTS, GENERAL
  - A. Recessed luminaires shall be IC-rated when installed at locations where insulation will come in direct contact with fixture. Contractor to verify ceiling assembly makeup at all fixture locations.

#### LIGHTING FIXTURES AND LAMPS

#### 2.3 DRIVERS, LED

- A. LED drivers shall be electronic-type, labeled as compliant with radio frequency interference (RFI) requirements of FCC Title 47 Part 15, and comply with NEMA SSL 1 "Electronic Drivers for LED Devices, Arrays, or Systems". LED drivers shall have a sound rating of "A", have a minimum efficiency of 85%, and be rated for a THD of less than 20 percent at all input voltages.
- B. Dimmable LED drivers shall be 0-10V type. Dimmable LED drivers shall be capable of dimming without LED strobing or flicker across their full dimming range.
- C. Drivers shall be rated for the ambient temperatures in which they are located. Outdoor fixtures shall be equipped with ballasts or drivers rated for reliable starting to 0 degrees F. Indoor fixtures located in areas with direct sunlight or above normal ambient temperatures shall have ballasts or drivers rated at 65 degrees C minimum.
- 2.4 LIGHTING LUMINAIRE SCHEDULE
  - A. See Drawings.

#### PART 3 - GENERAL

#### 3.1 INSTALLATION

- A. Determine ceiling types in each area and provide suitable mounting frames where required for recessed fixtures.
- B. Fixtures shall be left clean at the time of acceptance of the work with every lamp in operation. If fixtures are deemed dirty by the Architect at completion of the project, the Contractor shall clean them at no additional cost to the Owner.
- C. Fixtures shall be carefully aligned, leveled in straight lines, and located as shown on the architectural reflected ceiling plan. The final decision as to adequacy of support and alignment, shall be given by the Architect. The fixtures shall be supported by separate means from the building structure per applicable seismic requirements and not from the ceiling system, ductwork, piping or other systems.
- D. Fixtures shall be aimed or installed to provide the lighting pattern for which the fixture is designed.
- E. Fixtures recessed into fire-rated ceiling assemblies shall include system maintaining such rating around fixture.
- F. Fixtures located in Mechanical rooms and storage/utility rooms to be coordinated with duct work, piping and structural members. Adjust stems as required for proper illumination of the area.
- G. Set poles straight and plumb and grout around pole base as required.

#### 3.2 WIRING

A. Recessed fixtures served from a junction box above the ceiling may be connected with 3/8-inch flex, 2 No. 18. Provide 3 No. 18 wires where dual circuiting is called for. Provide ground continuity.

# APPENDIX

# **Pre-Renovation Hazardous**

# **Building Materials Survey Report**

Terra Linda Elementary School Re-Pipe Project 1998 NW 143rd Avenue Portland, OR 97229

Prepared for:

Beaverton School District 48J

General Information	1.1
Inspection Summary	1.2
Sample Inventories	2.1
Laboratory Data	Not Numbered
AHERA Certificates	Not Numbered



August 2019 Project No.: 23816.251 Phase No.: 001

4412 SW Corbett Avenue, Portland, OR 97239 503.248.1939 Main 866.727.0140 Fax 888.248.1939 Toll-Free

PBSUSA.COM

#### **GENERAL INFORMATION**

#### **BUILDING DATA**

Terra Linda Elementary School 1998 NW 143rd Avenue Portland, OR 97229

#### **SURVEY SCOPE**

#### **CLIENT DATA**

Beaverton School District 48J 16550 SW Merlo Road Beaverton, OR 97003

PBS Engineering and Environmental Inc. (PBS) has performed a limited asbestos survey of accessible building areas in accordance with OSHA in 29 CFR 1910.1001 and compiled a report with the following information:

- The type, location, and approximate quantity of suspect asbestos-containing materials
- Bulk sampling of selected suspect building materials
- Inspection summary
- Suspect polychlorinated biphenyl (PCB) light ballast inspection
- · Laboratory analytical data of bulk material sampled

With regard to asbestos, PBS endeavored to locate all the suspect asbestos-containing materials in the building; however, suspect asbestos-containing materials may be present and concealed within wall, ceiling, or floor spaces. If suspect materials are uncovered during demolition activities that are not identified in this report, testing should be performed prior to impact.

PBS has conducted a physical inspection of the building, compiled this report consistent with the survey scope, and certifies that the information is correct and accurate within the standards of professional quality and contractual obligations.

Rich Dufresne Project Manager/Prime Inspector Accreditation #: IMR-19-0264A

Rad & Home

Digitally signed by Rich Dufresne Date: 2019.08.13 14:25:22 -07'00'

Date

Signature

 $\ensuremath{\mathbb{C}}$  2019 PBS Engineering and Environmental Inc.



DATES	SURVEYED BY	ACTIVITY
7/23/2019	Rich Dufresne	Inspect and Sample

PBS has investigated accessible areas inside of the building to locate suspect asbestos-containing building materials (ACBM). Suspect materials may be present in concealed areas (e.g., behind walls and under carpet). The findings are listed below.

#### **ASBESTOS MATERIALS**

The following materials either tested positive, or, based on the experience of PBS field personnel, were not tested and should be considered asbestos-containing. Materials that had mixed results are considered positive. Materials not sampled may contain asbestos and should be tested to verify asbestos content prior to impact through demolition, renovation, etc. (+) Tested Positive, (M) Mixed Results, (P) Presumed Positive, (T) Previously Tested Positive.

<u>Result</u>	<u>Material (type)</u>	<u>Location</u>	<u>Approx. Quantity</u>
(+)	Hard Fittings/Fiberglass	Throughout Domestic Water Piping	350 EA
(+)	Black Sink Undercoating	A-Wing Workroom	1 EA
(+)	Sheet Floor Covering; Yellow Aggregate Pattern	Classrooms A108, A110, A112, A114, A116, A118, A120, A122	1,040 SF
(T)	Vinyl Floor Tile/Mastic	Various Locations Throughout	NOT QUANTIFIED
(+)	Caulk/HVAC Sealant	M-Wing HVAC Ducts	NOT QUANTIFIED
(M)	Joint Compound	A-Wing Walls	NOT QUANTIFIED



# MATERIALS THAT TESTED NEGATIVE FOR ASBESTOS

The following materials tested negative based on ASHARA sampling minimums and testing by NVLAP participating laboratories. Although no asbestos was detected, it is possible that further sampling could indicate asbestos content. It may be prudent to test prior to impact through demolition, renovation, etc.

<u>Material (type)</u>	Location
Lay-in Ceiling Tile; Various Types	Throughout
Glued-on Ceiling Tiles	A-Wing Restrooms
Ceiling Tile Mastic	A-Wing Restrooms
Gray Sink Undercoating	Main Office
White Sink Undercoatings	A-Wing Classrooms
Sheet Floor Covering; Gray Sand Pattern	M-Wing Custodial
Sheet Floor Covering; White Sand Pattern	A-Wing Staff Restroom
Covebase/Mastic	Throughout
Roofing Material Debris	Atop Ceilings Throughout
Gypsum Wallboard	Throughout
Wall and Ceiling Plaster	Throughout
Mastic on Casework	Classrooms
Ceramic Tile Grout	Restrooms
Mortar/Thin Set	Restrooms
Duct Felt Tape	HVAC Ducts Above Ceilings



# BACKGROUND

On July 23, 2019, PBS performed a pre-renovation hazardous building materials survey at Terra Linda Elementary School located at 1998 NW 143rd Avenue in Portland, Oregon.

The purpose of this survey was to identify regulated hazardous building materials that may be impacted by the planned domestic water re-pipe project. This investigation was limited to the portions of the school building and materials that may be encountered during the planned re-pipe project. Asbestos-containing building materials are known to exist in other portions of the school not included in the scope of this investigation.

This survey is intended to satisfy the Oregon Department of Environmental Quality (DEQ) requirements to perform an asbestos inspection prior to renovation or demolition activities under Oregon Administrative Rule (OAR) 340-248-0270 and Occupational Safety and Health Administration (OSHA) hazard communication.

This survey report is not suitable nor is it intended to be used as an asbestos abatement project design or an abatement bid document.

# **ASBESTOS SUMMARY**

PBS reviewed and utilized information from prior surveys and in the Beaverton School District's Verdant database. The findings from prior asbestos surveys are included in this report.

A PBS Asbestos Hazard Emergency Response Act (AHERA) accredited inspector inspected the facility to determine the presence, location, and approximate quantity of asbestos containing materials (ACM). Sixty-nine bulk samples of building materials, suspected of containing asbestos, were collected and submitted under chain of custody to Lab/Cor Portland Inc. of Portland, Oregon, for polarized light microscopy (PLM) analysis. The following materials were found to contain asbestos:

- Asbestos-containing hard fitting pipe insulation is present on the domestic water lines throughout the school. The asbestos-containing fittings are applied on fiberglass-insulated pipe runs. Although mixed laboratory results were received for this material, it should be considered asbestos-containing throughout the system.
- The stainless-steel sink located in the A-wing work room has an asbestos-containing undercoating. The undercoating is black in color and non-friable. Other sinks in the school with white and gray undercoatings tested negative for asbestos.
- Asbestos-containing sheet floor covering is present in several of the A-wing classrooms. The sheet floor covering is located at the casework and sinks.
- Asbestos-containing vinyl floor tile and associated black mastic exists in various locations throughout the school.
- Gray asbestos-containing HVAC sealant is present on ducts located above the ceilings in the M-wing.
- Joint compound on gypsum wallboard in the A-wing tested less than one-percent asbestos.

Materials containing <1% asbestos do not meet the definition of asbestos-containing materials requiring abatement by a licensed asbestos abatement contractor; however, Oregon OSHA does have certain training and handing requirements for individuals impacting these materials.



The asbestos-containing building materials listed above do not necessarily represent materials requiring abatement to facilitate the domestic water replacement project. Rather, they are the materials that were identified within, or immediately adjacent to the work items and work areas. While some of these materials will require abatement, some may be able to safely remain during the project.

Although the work under the pipe replacement project may not impact all of these asbestos-containing building materials, it is important to communicate the hazards to all individuals involved in the project in order to meet Oregon OSHA Hazard Communication requirements and avoid accidental damage to asbestos-containing materials during construction.

## **Asbestos Regulations**

Oregon DEQ, Environmental Protection Agency (EPA), and OSHA regulations require proper removal and handling of ACM by licensed and trained asbestos abatement contractors prior to building renovations or demolition.

The EPA, DEQ, and OSHA all define ACM as any material containing more than one percent asbestos. Although materials equal to or less than one percent are not considered by regulatory agencies to be an ACM, they still have some asbestos content, and Oregon OSHA has specific requirements for situations in which workers may encounter, disturb, or remove materials containing any level of asbestos. For the sake of hazard communication, these materials are included in the asbestos-containing materials section of this report.

In 1995, Oregon OSHA adopted 29 Code of Federal Regulations (CFR) Part 1926.1101 governing asbestos under OAR 437-003-1926.1101. The regulation has made significant changes in work procedures and how asbestos materials are managed. OSHA believes that the single biggest risk of asbestos exposure is to workers who unknowingly or improperly disturb ACM. Hazard communication, training, personal protection, work practices, exposure monitoring, and recordkeeping are all major components of the regulation.

DEQ's OAR 340, Division 248 also covers asbestos abatement requirements, removal notifications, licensing, and certifications for contractors.

For more information regarding the removal of asbestos-containing materials, please refer to the following:

- 1. Oregon Occupational Safety and Health Administration, OAR 437-003-1926.1101
- 2. Department of Environmental Quality, OAR-340, Division 248

# LEAD-BASED PAINT

It is not anticipated that the pipe replacement project will impact painted building components where leadcontaining paint may be present.

No lead paint hazards were identified at the school.



# РСВ

Fluorescent light fixtures that utilize mercury-containing lamp tubes are present throughout the school. The inspector disassembled representative light fixtures and found "No PCBs" labeling on the ballasts.

It is not likely that lighting will be effected by the pipe replacement project, although some ceiling removal may require removal of light fixtures.

Fluorescent mercury vapor light tubes are categorized as a universal waste. They should be carefully handled, packaged, and recycled or disposed of appropriately according to guidelines stipulated under 40 CFR 273.



<u>Code</u>	<u>Material</u>		Location	<u>Results</u>	Lab
23816.251-0001	Lay-in Ceiling Tile		M310; 2' by 4' pin perf		Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	compressed fibers, gray, with thin coating, off-white	No Asbestos Detected	
23816.251-0002	Sink Undercoating	I	M301; white sink undercoating		Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	loose particulate, off-white	No Asbestos Detected	
23816.251-0003	Lay-in Ceiling Tile		M wing foyer; 2' by 4' pin perf		Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	compressed fibers, gray, with thin coating, off-white	No Asbestos Detected	
23816.251-0004	Sheet Floor Coveri	na	M wing custodial: grav sand patt	ern	Lab Cor
		Layer:	<b>Description:</b>	Analysis:	
		Layer 1	vinyl, gray/white	No Asbestos Detected	
		Layer 2	fibrous backing, gray, with thin mastic, yellow/tan	No Asbestos Detected	
23816.251-0005	Gypsum Wallboard Compound	d/Joint	M wing custodial; wallboard with	joint compound	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	compact chalky material with paper, brown, with paint, off- white	No Asbestos Detected	
23816.251-0006	Sink Undercoating	I	Classroom M204; white sink und	ercoating	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	loose particulate, off-white	No Asbestos Detected	
23816.251-0007	Wall and Ceiling P	laster	A wing restrooms; wall plaster		Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	granular compact powder, gray	No Asbestos Detected	
23816.251-0008	Wall and Ceiling P	laster	A wing restrooms; wall plaster		Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	granular compact powder, off- white/gray	No Asbestos Detected	



<u>Code</u>	<u>Material</u>		<u>Location</u>	<u>Results</u>	<u>Lab</u>	
23816.251-0009	Ceramic Tile Grout		A wing restrooms; ceramic tile gr	out	Lab Cor	
		Layer:	Description:	Analysis:		
		Layer 1	hard compact powder, off- white	No Asbestos Detected		
23816.251-0010	Mortar		A wing restrooms; ceramic tile th	in set	Lab Cor	
		Layer:	Description:	Analysis:		
		Layer 1	granular compact powder, gray	No Asbestos Detected		
23816.251-0011	Glued-on Ceiling	Tiles	A wing restrooms; 12" ceiling tile		Lab Cor	
		Layer:	Description:	Analysis:		
		Layer 1	granular powder, off-white	No Asbestos Detected		
23816.251-0012	Glued-on Ceiling	Tiles	A wing restrooms; 12" ceiling tile		Lab Cor	
		Layer:	Description:	Analysis:		
		Layer 1	granular powder, off-white	No Asbestos Detected		
23816.251-0013	Mastic		A wing restrooms; brown ceiling	tile mastic	Lab Cor	
		Layer:	Description:	Analysis:		
		Layer 1	paper backing, brown	No Asbestos Detected		
		Layer 2	mastic, brown	No Asbestos Detected		
		Layer 3	compressed fibers, tan	No Asbestos Detected		
23816.251-0014	Joint Compound		A wing restrooms; joint compound on wallboard		Lab Cor	
	·	Layer:	Description:	Analysis:		
		Layer 1	fine compact powder, off-white with paint, off-white	No Asbestos Detected		
23816.251-0015	Gypsum Wallboar Compound	d/Joint	Classroom A116; wallboard with j	joint compound	Lab Cor	
		Layer:	Description:	Analysis:		
		Layer 1	fine compact powder, off-white with paint, off-white	<1% Chrysotile		
		Layer 2	compact chalky material with paper, brown	No Asbestos Detected		
23816.251-0016	Sheet Floor Cover	ing	A wing staff restroom; white sand	l pattern	Lab Cor	
		Layer:	Description:	Analysis:		
		Layer 1	vinyl, gray	No Asbestos Detected		
		Layer 2	fibrous backing, gray	No Asbestos Detected		
		Layer 3	mastic, yellow	No Asbestos Detected		



Code	<u>Material</u>		Location	<u>Results</u>	Lab
23816.251-0017	Leveling Compour	nd	A wing staff restroom; white floo	r compound	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	vinyl, white	No Asbestos Detected	
		Layer 2	mastic, yellow	No Asbestos Detected	
23816.251-0018	Covebase/Mastic		Classroom A110; 4" green		Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	rubbery material, gray with mastic, tan	No Asbestos Detected	
23816.251-0019	Mastic		Classroom A110; black mastic at	casework base	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	compressed fibers, black/tan	No Asbestos Detected	
23816.251-0020	Sink Undercoating	I	A wing work room; black sink un	dercoating	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	tar, black	4% Chrysotile	
23816.251-0021	Sheet Floor Covering		Classroom A110; yellow aggrega	te	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	mastic, orange	No Asbestos Detected	
		Layer 2	vinyl, tan	No Asbestos Detected	
		Layer 3	fibrous backing, gray	45% Chrysotile	
23816.251-0022	Lay-in Ceiling Tile		A wing commons; 2' by 4' pin pe	rf	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	compressed fibrous material, tan with paint, white	No Asbestos Detected	
23816.251-0023	Gypsum Wallboar Compound	d/Joint	A wing above ceilings; wallboard	with joint compound	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	fine compact powder, off-white	No Asbestos Detected	
		Layer 2	paper backing, off-white	No Asbestos Detected	
		Layer 3	compact chalky material with paper, white	No Asbestos Detected	
23816.251-0024	Hard Fittings/Fibe	rglass	A wing above ceilings; pipe fitting	g joint insulation	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	woven fibers, off-white	No Asbestos Detected	
		Layer 2	soft powder, off-white	5% Chrysotile	

<u>Code</u>	<u>Material</u>		<u>Location</u>	<u>Results</u>	<u>Lab</u>
23816.251-0025	Lay-in Ceiling Tile		Classroom A120; 2' by 4' pin perf		Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	compressed fibrous material, tan with paint, white	No Asbestos Detected	
23816.251-0026	Gypsum Wallboard Compound	d/Joint	A wing custodial; wallboard with	joint compound	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	fine compact powder, off-white	<1% Chrysotile	
		Layer 2	paper backing, off-white	No Asbestos Detected	
		Layer 3	compact chalky material with paper, white	No Asbestos Detected	
23816.251-0027	Hard Fittings/Fibe	rglass	A wing custodial; at water heater, with mud smear	fiberglass pipe insulation	Lab Cor
		Layer:	Description:	Analysis:	
23816.251-0028	Comments: Pa Asbestos Pipe Insu	art of progre	essive set, sample not analyzed A wing commons; above ceiling,	fiberglass pipe insulation	Lab Cor
			with mud smear		
		Layer:	Description:	Analysis:	
		Layer 1	mastic, off-white	No Asbestos Detected	
		Layer 2	flexible material, gray with foil, silver	No Asbestos Detected	
		Layer 3	fibrous material, yellow	No Asbestos Detected	
23816.251-0029	Lay-in Ceiling Tile		Classroom A110; 2' by 4' pin perf		Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	compressed fibrous material, tan with paint, white	No Asbestos Detected	
23816.251-0030	Hard Fittings/Fibe	rglass <b>Layer:</b>	A wing work room; pipe fitting jo <b>Description:</b>	int insulation <b>Analysis:</b>	Lab Cor
	Comments: Pa	art of progre	essive set, sample not analyzed		
23816.251-0031	Hard Fittings/Fibe	rglass <b>Layer:</b>	Classroom A118; pipe fitting joint <b>Description:</b>	insulation Analysis:	Lab Cor

**Comments:** Part of progressive set, sample not analyzed



<u>Code</u> 23816.251-0032	<u>Material</u> Hard Fittings/Fiber	rglass <b>Layer:</b> Layer 1 Layer 2	Location Classroom A100; pipe fitting joint Description: woven fibers, gray soft powder, gray	Results insulation Analysis: No Asbestos Detected 6% Chrysotile	<u>Lab</u> Lab Cor
23816.251-0033	Sink Undercoating	<b>Layer:</b> Layer 1	Main office; gray sink undercoatir <b>Description:</b> rubbery material, gray	ng <b>Analysis:</b> No Asbestos Detected	Lab Cor
23816.251-0034	Lay-in Ceiling Tile	<b>Layer:</b> Layer 1	Main office; 2' by 4' pin perf <b>Description:</b> compressed fibrous material, tan with paint, white	<b>Analysis:</b> No Asbestos Detected	Lab Cor
23816.251-0035	Material Debris	<b>Layer:</b> Layer 1	Main entry lobby; roofing debris o <b>Description:</b> fibrous debris, brown/black	on ceiling tile <b>Analysis:</b> No Asbestos Detected	Lab Cor
23816.251-0036	Material Debris	<b>Layer:</b> Layer 1	Main entry lobby; roofing debris o <b>Description:</b> loose debris, black	on ceiling tile <b>Analysis:</b> No Asbestos Detected	Lab Cor
23816.251-0037	Material Debris	<b>Layer:</b> Layer 1	Corridor; roofing debris on ceiling <b>Description:</b> fibrous material, brown/black	g tile <b>Analysis:</b> No Asbestos Detected	Lab Cor
23816.251-0038	Caulk	<b>Layer:</b> Layer 1	Corridor; gray duct sealant <b>Description:</b> rubbery material, gray	<b>Analysis:</b> No Asbestos Detected	Lab Cor
23816.251-0039	Lay-in Ceiling Tile	Layer:	Cafeteria; 2' by 4' pin perf <b>Description:</b>	Analysis:	Lab Cor
23816.251-0040	Comments: Pa Hard Fittings/Fiber	art of progre rglass <b>Layer:</b> Layer 1	essive set, sample not analyzed Cafeteria; pipe fitting joint insulat <b>Description:</b> soft powder, off-white	ion <b>Analysis:</b> 6% Chrysotile	Lab Cor



<u>Code</u>	<u>Material</u>		<u>Location</u>	<u>Results</u>	<u>Lab</u>
23816.251-0041	Caulk		Classroom M308; gray duct seala	nt	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	rubbery material, gray	4% Chrysotile	
23816.251-0042	Duct Felt Tape		Classroom M308; HVAC duct tap	e	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	woven sticky fibrous material, gray/off-white, with coating, silver	No Asbestos Detected	
23816.251-0043	Ceramic Tile Grout	t	Boys restroom; ceramic wall tile c	grout	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	loose particulate, off-white	No Asbestos Detected	
23816.251-0044	Ceramic Tile Grout	: Leven	Boys restroom; ceramic floor tile	grout	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	loose particulate, clear/gray	No Asbestos Detected	
23816.251-0045 Vinyl Floor Tile/Ma		astic	Custodial; 12" white with yellow r	nastic	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	vinyl, off-white	No Asbestos Detected	
		Layer 2	mastic, tan	No Asbestos Detected	
23816.251-0046	Covebase/Mastic		Custodial; 4" brown		Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	loose particulate, brown	No Asbestos Detected	
23816.251-0047	Gypsum Wallboard Compound	d/Joint	Custodial; wallboard with joint co	mpound	Lab Cor
	·	Layer:	Description:	Analysis:	
		Layer 1	loose chalky material with paper, white, with paint, off- white	No Asbestos Detected	
23816.251-0048	Lay-in Ceiling Tile		Kitchen; 2' by 4' pin perf		Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	compressed fibers, gray	No Asbestos Detected	
23816.251-0049	Material Debris		Kitchen; roofing debris on ceiling	tile	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	loose particulate, tan/black	No Asbestos Detected	



Bulk Sample Inventory Beaverton School District 48J

<u>Code</u>	<u>Material</u>		<u>Location</u>	<u>Results</u>	<u>Lab</u>
23816.251-0050	Hard Fittings/Fibe	rglass	Main water line; in storage room, insulation	8" pipe fitting joint	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	woven fibers, off-white	No Asbestos Detected	
		Layer 2	hard rubbery material, white	No Asbestos Detected	
		Layer 3	fine compact powder, gray	5% Chrysotile	
23816.251-0051	Hard Fittings/Fibe	rglass	Main water line; in storage room, insulation	8" pipe fitting joint	Lab Cor
		Layer:	Description:	Analysis:	
	<b>Comments:</b> P	art of progre	essive set, sample not analyzed		
23816.251-0052	Hard Fittings/Fibe	rglass	Main water line; in storage room, insulation	8" pipe fitting joint	Lab Cor
		Layer:	Description:	Analysis:	
	Comments: P	art of progre	essive set, sample not analyzed		
22010 201 0002 Wall and Calling Director		Classroom D110, wall plaster		Lab Car	
23816.251-0053	wall and Celling P	Layer:	Description:	Analysis:	Lad Cor
		Layer 1	hard compact powder, white	No Asbestos Detected	
23816 251-0054	Lav-in Ceiling Tile		Room B110: 2' by 4' pin perf		Lab Cor
25010.251 0051	Luy in cening the	Layer:	Description:	Analysis:	
		laver 1	coating white	No Ashestos Detected	
		Layer 2	compressed fibers, gray	No Asbestos Detected	
23816.251-0055	Hard Fittings/Fibe	rglass	Classroom B110; 3" pipe fitting jo	bint insulation	Lab Cor
		Layer 1	fine compact powder, gray	No Asbestos Detected	
23816.251-0056	Hard Fittings/Fibe	rglass <b>Laver:</b>	Classroom B106; 3" pipe fitting jo	pint insulation Analysis:	Lab Cor
		Lovor 1	woven fibers, grav	No Achieva Detected	
		Layer 7	fine compact nowder, gray	No Ashestos Detected	
		Layer 2	inte compact powder, gray	NO ASDESIOS DELECIEU	
23816.251-0057	Hard Fittings/Fibe	rglass <b>Layer:</b>	Storage 7; 3" pipe fitting joint ins <b>Description:</b>	ulation <b>Analysis:</b>	Lab Cor
		Layer 1	woven fibers, grav	No Asbestos Detected	
		Layer 2	fine compact powder, gray	No Asbestos Detected	



Bulk Sample Inventory Beaverton School District 48J

<u>Code</u>	<u>Material</u>		<u>Location</u>	<u>Results</u>	<u>Lab</u>
23816.251-0058	Lay-in Ceiling Tile		Library; 2' by 4' pin perf		Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	coating, white	No Asbestos Detected	
		Layer 2	compressed fibers, gray	No Asbestos Detected	
23816.251-0059	Lay-in Ceiling Tile		Music room; 2' by 4' pin perf		Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	coating, white	No Asbestos Detected	
		Layer 2	compressed fibers, gray	No Asbestos Detected	
23816.251-0060	Gypsum Wallboard Compound	d/Joint	Music room; wallboard with joint	compound	Lab Cor
	·	Layer:	Description:	Analysis:	
		Layer 1	hard compact powder, off- white	No Asbestos Detected	
		Layer 2	compact micaceous chalky powder, white	No Asbestos Detected	
23816.251-0061	Gypsum Wallboard Compound	l/Joint Music room; wallboard with joint compound		compound	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	hard compact powder, white	No Asbestos Detected	
		Layer 2	compact micaceous chalky powder, white	No Asbestos Detected	
23816.251-0062	Material Debris		Music room; roofing debris on ce	eiling tile	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	loose fibrous tar particulate, brown/black	No Asbestos Detected	
		Layer 2	fibrous material, gray with coating, white	No Asbestos Detected	
23816.251-0063	Material Debris		Corridor; roofing debris on ceilin	g tile	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	rocky tar, black	No Asbestos Detected	
		Layer 2	fibrous tar, black	No Asbestos Detected	
23816.251-0064	Lay-in Ceiling Tile		Cafeteria; random fissure pin per	f	Lab Cor
		Layer:	Description:	Analysis:	
		Layer 1	compressed fibers, gray, with thin coating, white	No Asbestos Detected	

<u>Code</u>	<u>Material</u>		<u>Location</u>	<u>Results</u>	<u>Lab</u>
23816.251-0065	Lay-in Ceiling Tile	Layer:	Cafeteria; linear fissure pin perf <b>Description:</b>	Analysis:	Lab Cor
		Layer 1	compressed fibers, gray, with thin coating, white	No Asbestos Detected	
23816.251-0066	Lay-in Ceiling Tile	Layer:	Cafeteria; linear fissure pin perf <b>Description:</b>	Analysis:	Lab Cor
		Layer 1	compressed fibers, gray, with thin coating, white	No Asbestos Detected	
23816.251-0067	Lay-in Ceiling Tile	Layer:	B hall; linear fissure pin perf <b>Description:</b>	Analysis:	Lab Cor
		Layer 1	compressed fibers, gray, with thin coating, white	No Asbestos Detected	
23816.251-0068	Lay-in Ceiling Tile	Layer:	B hall; coarse linear fissure <b>Description:</b>	Analysis:	Lab Cor
		Layer 1	compressed fibers, gray, with thin coating, white	No Asbestos Detected	
23816.251-0069	Lay-in Ceiling Tile	Layer:	A wing; linear fissure pin perf <b>Description:</b>	Analysis:	Lab Cor
		Layer 1	compressed fibers, gray, with thin coating, white	No Asbestos Detected	

LabCor Portland Inc 4321 SW Corbett Ave., Ste A Portland, OB 97239			BULK	SAMPLE AS	http://www.labcorpdx.net		
Fortian	u, OH 97239		Asbes	tos and Envir	onmental	Analysis	
Client: PBS Engir 4412 SW ( Portland, C	eering and Environm Corbett Avenue DR 97239	ental				Repo R	ort Number: 194182R02 eport Date: 07/30/2019
Job Number:	194182						<b>P.O. No:</b> n/a
Project Name:							
Project Number:	23816.251 Phase 00	01					
Project Notes:							
Client Sample ID:	23816.251-0001		Sample ID:	S1		Date Analyzed:	07/30/2019
Client Sample Des	cription:					Analyst:	Tim Cammann
Asbestos Mineral	Fibers Layer Percent:	Chrvsotile	Amosite	Crocidolite			Percent Asbestos:
Homogeneous		on jootilo	Amoono	Orobidolito			A5005105.
compressed fibe with thin coating white	ers, gray, 100 % , off-	-	-	-			NAD
Other Fibers	Fibrous	Mineral					
	Glass Cellulos	se Wool	Synthetic		Other		Matrix
	- 45 %	45 %	-		-	-	10 %
Client Sample ID:	23816.251-0002		Sample ID:	S2		Date Analyzed:	07/30/2019
Client Sample Des	cription:					Analyst:	Tim Cammann
Aspestos Mineral	Percent:	Chrysotile	Amosite	Crocidolite			Asbestos:
Homogeneous							
loose particulate white	e, off- 100 %	-	-	-			NAD
Other Fibers	Fibrous	Mineral			0.1		
	Glass Cellulos	se Wool	Synthetic		Other		Matrix
	- 65 %	-	-		-	-	35 %
Client Sample ID:	23816.251-0003		Sample ID:	S3		Date Analyzed:	07/30/2019
Client Sample Des	cription:					Analyst:	Tim Cammann
ASDESIOS MITIETAL	Percent:	Chrysotile	Amosite	Crocidolite			Asbestos:
Homogeneous							
compressed fibe with thin coating white	ers, gray, 100 % , off-	-	-	-			NAD
Other Fibers	Fibrous	Mineral					
	Glass Cellulos	se Wool	Synthetic		Other		Matrix
	- 45 %	45 %	-		-	-	10 %





LabCor Lab/Cor Portland, Inc.			BULK SAMPLE ASBESTOS ANALYSIS				Phone: (503) 224-5055 http://www.labcorpdx.net		
Portland, C	DR 972	239		Asbes	tos and Envir	onmental	Analysis		
Client: PBS Engineer 4412 SW Corl Portland, OR	ring and bett Ave 97239	l Environm enue	nental				Repo F	ort Number: 1941 Report Date: 07/30	82R02 )/2019
Job Number: 19 Project Name: Project Number: 23 Project Notes:	9 <b>4182</b> 816.25	1 Phase 0	001					<b>P.O. No:</b> n/a	
Client Sample ID: 23	3816.25	51-0004		Sample ID:	S4		Date Analyzed:	07/30/2019	
Client Sample Descrip	otion:						Analyst:	Tim Cammann	
Asbestos Mineral Fib	ers	Layer Percent:	Chrysotile	Amosite	Crocidolite				Percent Asbestos:
Layer 01									
vinyl, gray/white		75 %	-	-	-				NAD
fibrous backing, gra with thin mastic, yellow/tan	ay,	25 %	-	-	-				NAD
Other Fibers	Fibrou Glass	ıs s Cellulo	Mineral se Wool	Synthetic		Other		Mai	rix
Laver 01	-	-	-	-		-	-	10	0 %
Layer 02	2 %	65 %		-		-	-	3	3 %
Client Sample ID: 23	3816.25	51-0005		Sample ID:	S5		Date Analyzed:	07/30/2019	
<b>Client Sample Descrip</b>	otion:						Analyst:	Tim Cammann	
Asbestos Mineral Fib	ers	Layer Percent:	Chrysotile	Amosite	Crocidolite				Percent Asbestos:
Homogeneous									
compact chalky ma with paper, brown, v paint, off-white	terial with	100 %	-	-	-				NAD
Other Fibers	Fibrou	IS	Mineral						
	Glass 2 %	S Cellulo 6 %	se Wool -	Synthetic -		- Other	-	Ma 9	rix 2 %
Client Sample ID: 23	3816.25	51-0006		Sample ID:	S6		Date Analyzed:	07/30/2019	
<b>Client Sample Descrip</b>	otion:						Analyst:	Tim Cammann	
Asbestos Mineral Fib	ers	Layer Percent:	Chrysotile	Amosite	Crocidolite				Percent Asbestos:
Homogeneous									
loose particulate, of white	ff-	100 %	-	-	-				NAD
Other Fibers	Fibrou Glass Trace	us s Cellulo e 70 %	Mineral se Wool	Synthetic		Other -	_	Ma 3	rix ) %

LabCor Portland 4321 SW Corbett Ave., Ste A		BULK	SAMPLE AS	ANALYSIS	Phone: (503) 224-5055 http://www.labcorpdx.net		
Portland, OR 97239		Asbes	tos and Envir	onmental	Analysis		
Client: PBS Engineering and Environ 4412 SW Corbett Avenue Portland, OR 97239	mental				Rep F	ort Number: 194 Report Date: 07/3	182R02 0/2019
Job Number: 194182 Project Name: Project Number: 23816.251 Phase Project Notes:	0001					<b>P.O. No:</b> n/a	
Client Sample ID:         23816.251-0007           Client Sample Description:         Asbestos Mineral Fibers         Layer           Percent         Percent	: Chrysotile	Sample ID: Amosite	S7 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Tim Cammann	Percent Asbestos:
Homogeneous granular compact 100 % powder, gray	-	-	-				NAD
Other Fibers Fibrous Glass Cellul	Mineral lose Wool	Synthetic -		Other -	_	Ma 10	trix )0 %
Client Sample ID:         23816.251-0008           Client Sample Description:         Asbestos Mineral Fibers         Layer           Percent         Percent	: Chrysotile	Sample ID: Amosite	S8 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Tim Cammann	Percent Asbestos:
Homogeneous granular compact 100 % powder, off-white/gray	-	-	-				NAD
Other Fibers Fibrous Glass Cellu	Mineral ose Wool -	Synthetic -		Other -	-	Ma 1(	trix 00 %
Client Sample ID:         23816.251-0009           Client Sample Description:         Asbestos Mineral Fibers         Layer           Percent         Percent	: Chrysotile	Sample ID: Amosite	S9 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Tim Cammann	Percent Asbestos:
Homogeneous hard compact powder, 100 % off-white	-	-	-				NAD
Other Fibers Fibrous Glass Cellul	Mineral ose Wool -	Synthetic -		Other -	-	Ma 10	trix )0 %


LabCor Portland Inc. 4321 SW Corbett Ave., Ste A	BULK	SAMPLE AS	BESTOS A	NALYSIS	Phone: (503) 224-5055 http://www.labcorpdx.net
Portland, OR 97239	Asbes	tos and Envir	conmental A	nalysis	
Client: PBS Engineering and Environmental 4412 SW Corbett Avenue Portland, OR 97239				Repo F	ort Number: 194182R02 Report Date: 07/30/2019
Job Number: 194182 Project Name: Project Number: 23816.251 Phase 0001 Project Notes:					<b>P.O. No:</b> n/a
Client Sample ID:       23816.251-0010         Client Sample Description:       Asbestos Mineral Fibers         Asbestos Mineral Fibers       Layer         Percent:       Chrysotile	Sample ID: Amosite	S10 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Tim Cammann Percent Asbestos:
Homogeneous granular compact 100 % - powder, gray	-	-			NAD
Other Fibers Fibrous Mineral Glass Cellulose Wool	Synthetic -		Other -	-	Matrix 100 %
Client Sample ID: 23816.251-0011 Client Sample Description: Asbestos Mineral Fibers Percent: Chrysotile Homogeneous	Sample ID: Amosite	S11 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden Percent Asbestos:
granular powder, off- 100 % - white	-	-			NAD
Other Fibers         Fibrous         Mineral           Glass         Cellulose         Wool	Synthetic -		Other -	-	Matrix 100 %
Client Sample ID: 23816.251-0012 Client Sample Description: Asbestos Mineral Fibers Percent: Chrysotile	Sample ID: Amosite	S12 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden Percent Asbestos:
Homogeneous granular powder, off- 100 % - white	-	-			NAD
Other Fibers         Fibrous         Mineral           Glass         Cellulose         Wool	Synthetic -		Other -	-	Matrix 100 %





LabCor Portland 4321 SW	Cor P	ortland	d, Inc	BULK	SAMPLE AS	BESTOS	ANALYSIS	Phone: (503) 224-5055 http://www.labcorpdx.net
Portland,	, OR 9723	9		Asbes	tos and Envir	onmental	Analysis	
Client: PBS Engine 4412 SW Co Portland, OF	ering and l orbett Aver R 97239	Environmer 1ue	ntal				Rep	ort Number: 194182R02 Report Date: 07/30/2019
Job Number: 1 Project Name: Project Number: 2 Project Notes:	<b>194182</b> 23816.251	Phase 000	1					<b>P.O. No:</b> n/a
Client Sample ID: Client Sample Descr Asbestos Mineral Fi	23816.251 ription: i <u>bers</u>	-0013 Layer Percent: C	Chrysotile	Sample ID: Amosite	S13 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden Percent Asbestos:
Layer 01 paper backing, bro Layer 02	own	5 %	-	-	-			NAD
Layer 03 compressed fibers	s, tan	90 % 5 %	-	-	-			NAD
Other Fibers	Fibrous Glass	Cellulose	Mineral Wool	Synthetic		Other		Matrix
Layer 01 Layer 02 Layer 03	-	100 % - 100 %	-	-		- -	- - -	0 % 100 % 0 %
<u>Client Sample ID:</u> Client Sample Descr <u>Asbestos Mineral Fi</u>	23816.251 ription: i <u>bers</u>	-0014 Layer Percent: C	Chrysotile	Sample ID: Amosite	S14 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden Percent Asbestos:
Homogeneous fine compact pow white with paint, o	der, off- off-white	100 %	-	-	-			NAD
Other Fibers	Fibrous Glass -	Cellulose -	Mineral Wool -	Synthetic		Other -	-	Matrix 100 %
<u>Client Sample ID:</u> Client Sample Descr Asbestos Mineral Fi	23816.251 ription: ibers	<b>-0015</b> Layer		Sample ID:	S15		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden <b>Percent</b>
Laver 01		Percent: C	Chrysotile	Amosite	Crocidolite			Asbestos:
fine compact pow white with paint, o	der, off- off-white	35 %	Trace	-	-			< 1 %
compact chalky m	naterial	65 %	-	-	-			NAD
Other Fibers	Fibrous Glass	Cellulose	Mineral Wool	Synthetic		Other		Matrix
Layer 01 Layer 02	-	- 5 %	-	-		-	-	100 % 95 %



abCor Portland 4321 SV	/Cor P W Corbett A	ortlan ve., Ste A	d, Inc	. BULK	SAMPLE AS	BESTOS	ANALYSIS	Phone: (503) 224-5 http://www.labcorpd:	055 x.net
Portland	d, OR 9723	9		Asbest	tos and Envir	onmental	Analysis		
Client: PBS Engin 4412 SW C Portland, C	eering and Corbett Aver DR 97239	Environmer 1ue	ntal				Repo F	ort Number: 194182 Report Date: 07/30/2	2R02 019
Job Number: Project Name: Project Number:	<b>194182</b> 23816.251	Phase 000	1					<b>P.O. No:</b> n/a	
Project Notes:									
Client Sample ID:	23816.251	-0016		Sample ID:	S16		Date Analyzed:	07/30/2019	
Asbestos Mineral F	ription: Fibers	Layer Percent: C	Chrysotile	Amosite	Crocidolite		Analyst:	Stephanie Golden	Percent Asbestos:
Layer 01									
vinyl, gray		50 %	-	-	-				NAD
Layer 02		10.01							
fibrous backing,	gray	48 %	-	-	-				NAD
mastic, vellow		2%	-	-	-				NAD
Other Fibers	Fibrous Glass	Cellulose	Mineral Wool	Synthetic		Other		Matrix	
Layer 01	-	-	-	-		-	-	100 °	%
Layer 02	-	35 %	-	-		-	-	65 %	6
Layer 03	-	5 %	-	-		-	-	95 %	6
Client Sample ID:	23816.251	-0017		Sample ID:	S17		Date Analyzed:	07/30/2019	
Client Sample Desc	cription:						Analyst:	Stephanie Golden	<b>.</b> .
ASDESTOS MINERALI	-iders	Layer Percent: C	Chrysotile	Amosite	Crocidolite				Asbestos:
Layer 01									
vinyl, white		98 %	-	-	-				NAD
Layer 02		0.0/							
mastic, yellow	Fibroug	2 %	- Minoral	-	-				NAD
Other Fibers	Glass	Cellulose	Wool	Synthetic		Other		Matrix	
Layer 01	-	-	-	-		-	-	100 %	%
Layer 02	-	4 %	-	-		-	-	96 %	6
Client Sample ID:	23816.251	-0018		Sample ID:	S18		Date Analyzed:	07/30/2019	
Client Sample Deso Asbestos Mineral I	cription: Fibers	Layer	Chrycotilo	Amooito	Crosidalita		Analyst:	Stephanie Golden	Percent
Homogeneous	r	ercent. C	Julysoune	Amosile	Crocidolite				-spestos:
rubbery material with mastic, tan	, gray	100 %	-	-	-				NAD
Other Fibers	Fibrous Glass	Cellulose	Mineral Wool	Synthetic		Other		Matrix	

NVLAP Lab Code: 200741-0

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LabCor Lab/	Cor Port	tland, I	nc. <sup>BULK</sup>	SAMPLE AS	BESTOS	ANALYSIS	Phone: (503) 224-5055 http://www.labcorpdx.net
Inc 4321 SW Portland,	OR 97239	Ste A	Asbes	stos and Envir	ronmental	Analysis	
Client: PBS Engine 4412 SW Co Portland, OF	ering and Envir orbett Avenue 8 97239	ronmental				Repo F	ort Number: 194182R02 Report Date: 07/30/2019
Job Number: 1 Project Name: Project Number: 2 Project Notes:	<b>94182</b> 3816.251 Pha	se 0001					<b>P.O. No:</b> n/a
Client Sample ID: Client Sample Descr Asbestos Mineral Fi	23816.251-001 iption: <u>bers</u> Lay	l <b>9</b> er	Sample ID:	: S19		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden Percent
Homogeneous compressed fibers black/tan	9erci s, 100	ent: Chrysc	-	-			Asbestos:
Other Fibers	Fibrous Glass Ce	Mine ellulose Wo 98 %	eral ool Synthetic 		Other -	-	Matrix 2 %
Client Sample ID: Client Sample Descr Asbestos Mineral Fi	23816.251-002 iption: <u>bers</u> Lay Perc	2 <b>0</b> er ent: Chrvsc	Sample ID:	: S20 Crocidalite		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden Percent Ashestos:
Homogeneous tar, black	100	1% 4%	) - -	-			4 %
Other Fibers	Glass Ce	ellulose Wo	ool Synthetic		Other -		Matrix 96 %
Client Sample ID: Client Sample Descr Asbestos Mineral Fi	23816.251-002 iption: bers Lay Perce	21 er ent: Chryso	Sample ID:	: S21 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden Percent Asbestos:
mastic, orange	2	- %	-	-			NAD
vinyl, tan <b>Layer 03</b>	65		-	-			NAD
fibrous backing, g <u>Other Fibers</u>	ray 33 Fibrous Glass Ce	% 45 % Mine Mine	6 - eral Dol Synthetic	-	Other		45 % Matrix
Layer 01 Layer 02 Layer 03	- -					- -	100 % 100 % 55 %



LabCor Portland 4321 SW Co	or Po	o <b>rtlar</b> ve Ste A	nd, Inc	. BULK	SAMPLE AS	BESTOS	ANALYSIS	Phone: (50) http://www.l	3) 224-5055 abcorpdx.net
Portland, OF	R 9723	9		Asbes	tos and Envir	onmental	Analysis		
Client: PBS Engineerin 4412 SW Corbe Portland, OR 9	ng and E ett Aven 7239	Environmo	ental				Rep	oort Number: Report Date:	194182R02 07/30/2019
Job Number: 194 Project Name: Project Number: 238 Project Notes:	1 <b>82</b> 16.251	Phase 00	01					P.O. No:	n/a
Client Sample ID: 238 Client Sample Descripti Asbestos Mineral Fiber	816.251 ion: r <u>s</u> F	-0022 Layer Percent:	Chrysotile	Sample ID: Amosite	S22 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Stephanie (	Golden Percent Asbestos:
Homogeneous compressed fibrous material, tan with pair white	nt,	100 %	-	-	-				NAD
Other Fibers	Fibrous Glass 10 %	Cellulos 55 %	Mineral e Wool 10 %	Synthetic -		Other -	-	Perlite	Matrix 15 % 10 %
Client Sample ID: 238 Client Sample Descripti Asbestos Mineral Fiber	316.251 ion: <u>rs</u> F	-0023 Layer Percent:	Chrysotile	Sample ID: Amosite	S23 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Stephanie (	Golden Percent Asbestos:
Layer 01 fine compact powder, white	, off-	10 %	-	-	-				NAD
paper backing, off-wh	nite	8 %	-	-	-				NAD
compact chalky mate with paper, white	erial	82 %	-	-	-				NAD
Other Fibers	⊢ibrous Glass	Cellulos	Mineral e Wool	Synthetic		Other			Matrix
Layer 01 Layer 02 Layer 03	-	- 100 % 5 %	- -	-		-	-		100 % 0 % 95 %



### LabCor Portland Inc 4321 SW Corbett Ave., Ste A Portland, OR 97239 BULK SAMPLE ASBESTOS ANALYSIS Asbestos and Environmental Analysis

Phone: (503) 224-5055 http://www.labcorpdx.net

Client: PBS Enginee 4412 SW Cor Portland, OR	ring and Env bett Avenue 97239	vironmen 9	tal				Repo R	ort Number: 194182R02 eport Date: 07/30/2019	
Job Number: 19 Project Name:	94182							<b>P.O. No:</b> n/a	
Project Number: 23 Project Notes:	816.251 Ph	ase 0001							
Client Sample ID: 2 Client Sample Descrip	3816.251-00 ption: Pr	024 rogressive	e Analysis	Sample ID: Group: 1	S24		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden	
Asbestos Mineral Fib	e <u>rs</u> La Per	rcent: C	hrysotile	Amosite	Crocidolite			Percent Asbestos:	
Layer 01 woven fibers, off-wl	hite 1	5 %	-	-	-			NAD	)
Layer 02 soft powder, off-wh	ite 8	35 %	5 %	-	-			5 %	, o
Other Fibers	Fibrous Glass (	Cellulose	Mineral Wool	Synthetic		Other		Matrix	
Layer 01 Layer 02	-	100 % -	- 45 %	-		-	-	0 % 50 %	
Client Sample ID: 2	3816.251-00	025		Sample ID:	S25		Date Analyzed:	07/30/2019 Stephanie Golden	
Asbestos Mineral Fib	e <u>rs</u> La Per	ayer rcent: C	hrysotile	Amosite	Crocidolite		Analyst.	Percent Asbestos:	:
Homogeneous compressed fibrous material, tan with p white	s 10 aint,	00 %	-	-	-			NAD	)
Other Fibers	Fibrous Glass ( 10 %	Cellulose 55 %	Mineral Wool 10 %	Synthetic -		Other -	-	Matrix 10 % Perlite 15 %	



### LabCor Portland Inc 4321 SW Corbett Ave., Ste A Portland, OR 97239 **BULK SAMPLE ASBESTOS ANALYSIS**

Phone: (503) 224-5055 http://www.labcorpdx.net

Asbestos and Environmental Analysis

<u>Client:</u> PBS Engi 4412 SW Portland,	neering and I Corbett Aver OR 97239	Environmei 1ue	ntal				Repo F	ort Number: 194182R02 Report Date: 07/30/2019
Job Number:	194182							<b>P.O. No:</b> n/a
Project Name:								
Project Number:	23816.251	Phase 000	1					
Project Notes:								
Client Sample ID:	23816.251	-0026		Sample ID:	S26		Date Analyzed:	07/30/2019
Client Sample Des	scription:						Analyst:	Stephanie Golden
Asbestos Mineral	Fibers	Layer Percent: (	Chrysotile	Amosite	Crocidolite			Percent Asbestos:
Layer 01								
fine compact po white	owder, off-	15 %	Trace	-	-			< 1 %
Layer 02								
paper backing,	off-white	8 %	-	-	-			NAD
Layer 03								
compact chalky with paper, whit	r material te	77 %	-	-	-			NAD
Other Fibers	Fibrous		Mineral					
	Glass	Cellulose	Wool	Synthetic		Other		Matrix
Layer 01	-	-	-	-		-	-	100 %
Layer 02	-	100 %	-	-		-	-	0 %
Layer 03	-	5 %	-	-		-	-	95 %

Client Sample ID: 23816.251-0027 Sample ID: S27 Date Analyzed: 07/30/2019 Progressive Analysis Group: 1 Stephanie Golden Client Sample Description: Analyst: Comments: Sample archived; not analyzed per request.

Client Sample ID: Client Sample Descr	23816.251 iption:	-0028		Sample ID:	S28		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden
Asbestos Mineral Fi	bers F	Layer Percent:	Chrysotile	Amosite	Crocidolite		-	Percent Asbestos:
Layer 01								
mastic, off-white		15 %	-	-	-			NAD
Layer 02								
flexible material, g with foil, silver	ray	77 %	-	-	-			NAD
Layer 03								
fibrous material, y	ellow	8 %	-	-	-			NAD
Other Fibers	Fibrous Glass	Cellulos	Mineral Se Wool	Synthetic		Other		Matrix
Layer 01	-	-	-	-		-	-	100 %
Layer 02	15 %	-	-	-		-	-	85 %
Layer 03	100 %	-	-	-		-	-	0 %

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LabCor Portland Inc 4321 SW Corbett Ave., Ste A	BULK SAMPLE AS	BESTOS ANALYSIS	Phone: (503) 224-5055 http://www.labcorpdx.net
Portland, OR 97239	Asbestos and Envir	conmental Analysis	
Client: PBS Engineering and Environmental 4412 SW Corbett Avenue Portland, OR 97239		Rep	ort Number: 194182R02 Report Date: 07/30/2019
Job Number: 194182			<b>P.O. No:</b> n/a
Project Name:			
Project Number: 23816.251 Phase 0001 Project Notes:			
Client Sample ID: 23816.251-0029	Sample ID: S29	Date Analyzed:	07/30/2019
Client Sample Description:		Analyst:	Stephanie Golden
Asbestos Mineral Fibers Layer Percent: Chrysotile	Amosite Crocidolite		Percent Asbestos:
Homogeneous			
compressed fibrous 100 % - material, tan with paint, white			NAD
Other Fibers Fibrous Mineral			
Glass Cellulose Wool	Synthetic	Other	Matrix
10 % 55 % 10 %	-		15 %
			10 %
Client Sample ID: 23816.251-0030	Sample ID: S30	Date Analyzed:	07/30/2019
Client Sample Description: Progressive Analysis	Group: 1	Analyst:	Stephanie Golden
Comments: Sample archived; not analyzed per req	uest.		
Client Sample ID: 23816.251-0031	Sample ID: S31	Date Analyzed:	07/30/2019
Client Sample Description: Progressive Analysis	Group: 1	Analyst:	Stephanie Golden
Comments: Sample archived; not analyzed per req	uest.		
Client Sample ID: 23816.251-0032	Sample ID: S32	Date Analyzed:	07/30/2019
Client Sample Description: Progressive Analysis	Group: 2	Analyst:	Stephanie Golden
Asbestos Mineral Fibers Layer			Percent
Percent: Chrysolie	Amosite Grocidolite		Asbestos:
Layer UI			NAD
laver 02			NAD
soft powder grav 85 % 6 %			6%
Other Fibers Fibrous Mineral			0,0
Glass Cellulose Wool	Synthetic	Other	Matrix
Glass Cellulose Wool Layer 01 - 90 % -	Synthetic	Other	Matrix 10 %



LabCor Portland Inc	Cor Portland, In Corbett Ave., Ste A	IC. BULK	SAMPLE AS	BESTOS	ANALYSIS	Phone: (503) 224- http://www.labcorp	5055 dx.net
Portland,	OR 97239	Asbes	stos and Envir	onmental A	Analysis		
Client: PBS Enginee 4412 SW Co Portland, OF	ering and Environmental rbett Avenue 8 97239				Repo F	ort Number: 19418 Report Date: 07/30/	32R02 2019
Job Number: 1 Project Name: Project Number: 2 Project Notes:	<b>94182</b> 3816.251 Phase 0001					<b>P.O. No:</b> n/a	
Client Sample ID: 2 Client Sample Descrit Asbestos Mineral Fil Homogeneous	23816.251-0033 iption: bers Layer Percent: Chrysot	Sample ID: ile Amosite	S33 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden	Percent Asbestos:
Other Fibers	Fibrous Mine Glass Cellulose Woo - 5% -	ral DI Synthetic -	-	Other -	-	Matr 95	ix %
Client Sample ID: 2 Client Sample Descri Asbestos Mineral Fil Homogeneous	23816.251-0034 iption: bers Layer Percent: Chrysot	Sample ID: ile Amosite	S34 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden	Percent Asbestos:
material, tan with p white Other Fibers	Fibrous Mine Glass Cellulose Woo 5 % 65 % 5 9	ral ol Synthetic % -	-	Other -	-	Matr 15 Perlite 10	ix % %
Client Sample ID: Client Sample Descri Asbestos Mineral Fil	23816.251-0035 iption: bers Layer Percent: Chrysot	Sample ID:	S35 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden	Percent Asbestos:
Homogeneous fibrous debris, brown/black	100 % -	-	-				NAD
<u>Other Fibers</u>	Fibrous Mine Glass Cellulose Woo - 50 % -	rai Dl Synthetic -		Other -	-	Matr 50	ix %



LabCor Portland Inc. 4321 SW Corbett Ave., Ste A	C. BULK	SAMPLE AS	BESTOS	ANALYSIS	Phone: (503) 224-5055 http://www.labcorpdx.net
Portland, OR 97239	Asbes	tos and Envir	onmental .	Analysis	
Client: PBS Engineering and Environmental 4412 SW Corbett Avenue Portland, OR 97239				Rep	ort Number: 194182R02 Report Date: 07/30/2019
Job Number: 194182 Project Name: Project Number: 23816.251 Phase 0001 Project Notes:					<b>P.O. No:</b> n/a
Client Sample ID:       23816.251-0036         Client Sample Description:       Asbestos Mineral Fibers         Asbestos Mineral Fibers       Layer         Percent:       Chrysotile	Sample ID:	S36 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden Percent Asbestos:
Homogeneousloose debris, black100 %Other FibersFibrousMinera	-	-			NAD
Glass Cellulose Wool - 10 % -	Synthetic		Other -	-	Matrix 90 %
Client Sample ID:       23816.251-0037         Client Sample Description:       Asbestos Mineral Fibers         Asbestos Mineral Fibers       Layer         Percent:       Chrysotile	Sample ID: Amosite	S37 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden Percent Asbestos:
Homogeneous fibrous material, 100 % - brown/black	-	-			NAD
Other Fibers         Fibrous         Minera           Glass         Cellulose         Wool           -         65 %         -	l Synthetic -		Other -	-	Matrix 35 %
<u>Client Sample ID:</u> 23816.251-0038 Client Sample Description: <u>Asbestos Mineral Fibers</u> Layer Percent: Chrysotile	Sample ID: Amosite	S38 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden Percent Asbestos:
Homogeneous     rubbery material, gray     100 %     -       Other Fibers     Fibrous     Minera       Glass     Colluders     Wool	- Sunthatia	-	Other		NAD
	Synthetic -		-	-	Matrix 100 %
Client Sample ID: 23816.251-0039 Client Sample Description: Progressive Analys	Sample ID: sis Group: 2	S39		Date Analyzed: Analyst:	07/30/2019 Stephanie Golden

Comments: Sample archived; not analyzed per request.



Portland, OR 97239 Asbestos and Environmental Analysis		
Itent:     PBS Engineering and Environmental     Re       4412 SW Corbett Avenue     Portland, OR 97239	port Number: 194182 Report Date: 07/30/20	R02 19
Job Number: 194182	<b>P.O. No:</b> n/a	
Project Name:		
roject Number: 23816.251 Phase 0001		
Project Notes:		
Client Sample ID: 23816.251-0040 Sample ID: S40 Date Analyzed:	07/30/2019	
lient Sample Description: Analyst:	Stephanie Golden	
Asbestos Mineral Fibers Layer Percent: Chrysotile Amosite Crocidolite	A	Percent sbestos:
lomogeneous		
soft powder, off-white 100 % 6 %		6 %
<u>Other Fibers</u> Fibrous Mineral		
65 %	Matrix 29 %	
lient Sample ID: 23816.251-0041 Sample ID: S41 Date Analyzed:	07/30/2019	
lient Sample Description: Analyst:	Tim Cammann	_
Asbestos Mineral Fibers Layer Percent: Chrysotile Amosite Crocidolite	Α	Percent sbestos:
lomogeneous		1 9/
Tubbery Inaterial, gray 100 % 4 %		4 70
Glass Cellulose Wool Synthetic Other	Matrix	
	96 %	
lient Sample ID: 23816.251-0042 Sample ID: S42 Date Analyzed:	07/30/2019	
lient Sample Description: Analyst:	Tim Cammann	_
Asbestos Mineral Fibers Layer Percent: Chrysotile Amosite Crocidolite	A	Percent sbestos:
tomogeneous		ΝΑΓ
material, gray/off-white, with coating, silver		NAL
Other Fibers Fibrous Mineral		
Glass Cellulose Wool Synthetic Other	Matrix 90 %	
lient Sample ID: S43 Date Analyzed:	07/30/2019	
lient Sample Description: Analyst:	Tim Cammann	_
Asbestos Mineral Fibers Layer Percent: Chrysotile Amosite Crocidolite	Α	Percent sbestos:
Iomogeneous loose particulate, off- 100 %		NAC
white		
Glass Cellulose Wool Synthetic Other	Matrix	,
	100 %	0

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LabCor Portland 4321 SW Corbett Ave., Ste A	BULK SAMPLE AS	SBESTOS ANALYSIS	Phone: (503) 224-5055 http://www.labcorpdx.net
Portland, OR 97239	Asbestos and Envi	ronmental Analysis	
Client: PBS Engineering and Environmental 4412 SW Corbett Avenue Portland, OR 97239		R	eport Number: 194182R02 Report Date: 07/30/2019
Job Number: 194182 Project Name: Project Number: 23816.251 Phase 0001 Project Notes:			<b>P.O. No:</b> n/a
Client Sample ID: 23816.251-0044 S	Sample ID: S44	Date Analyzed	I: 07/30/2019
Client Sample Description:		Analys	t: Tim Cammann
Asbestos Mineral Fibers Layer Percent: Chrysotile	Amosite Crocidolite		Percent Asbestos
Homogeneous			
loose particulate, 100 % - clear/gray			NAI
Other Fibers         Fibrous         Mineral           Glass         Cellulose         Wool	Synthetic	Other	Matrix
- Trace -	-		100 %
Comments: Entire sample processed for analysis; a	any further analysis will ree	quire another sample be subm	itted.
<u>Client Sample ID:</u> 23816.251-0045 S	Sample ID: S45	Date Analyzed	l: 07/30/2019
Client Sample Description:		Analys	t: Tim Cammann
Asbestos Mineral Fibers Layer Percent: Chrysotile	Amosite Crocidolite		Percent Asbestos
Layer 01			
vinyl, off-white 95 % -			NAI
Layer 02			
mastic, tan 5 % -			NAI
Other Fibers Fibrous Mineral			
Glass Cellulose Wool	Synthetic	Other	Matrix
Layer 01	-		100 %
Laver 02	-		100 %
	-		
<u>Client Sample ID:</u> 23816.251-0046 S Client Sample Description:	Sample ID: S46	Date Analyzed Analys	I: 07/30/2019 t: Tim Cammann
Client Sample ID:       23816.251-0046       S         Client Sample Description:       Asbestos Mineral Fibers       Layer         Percent:       Chrysotile	Sample ID: S46 Amosite Crocidolite	Date Analyzed Analys	I: 07/30/2019 t: Tim Cammann Percent Asbestos
Client Sample ID:       23816.251-0046       S         Client Sample Description:       Asbestos Mineral Fibers       Layer         Percent:       Chrysotile         Homogeneous       100 %       -	Sample ID: S46 Amosite Crocidolite	Date Analyzed Analys	I: 07/30/2019 t: Tim Cammann Percent Asbestos NAI
Client Sample ID:       23816.251-0046       S         Client Sample Description:       Asbestos Mineral Fibers       Layer         Percent:       Chrysotile         Homogeneous       Ioose particulate, brown       100 %         Other Fibers       Fibrous       Mineral	Sample ID: S46 Amosite Crocidolite	Date Analyzed Analys	I: 07/30/2019 t: Tim Cammann Percent Asbestos NAI
Client Sample ID:       23816.251-0046       S         Client Sample Description:       Asbestos Mineral Fibers       Layer         Asbestos Mineral Fibers       Layer         Percent:       Chrysotile         Homogeneous       Ioose particulate, brown       100 %         Other Fibers       Fibrous       Mineral         Glass       Cellulose       Wool	Sample ID: S46 Amosite Crocidolite	Date Analyzed Analys Other	I: 07/30/2019 t: Tim Cammann Percent Asbestos NAI



LabCor Portland 4321 SW	nc. <sup>BUL</sup>	K SAMPLE AS	Phone: (503) 224-5055 http://www.labcorpdx.net					
Portland	, OR 97239		Asb	estos and Envir	ronmental	Analysis		
<u>Client:</u> PBS Engine 4412 SW Co Portland, OF	ering and Envi orbett Avenue R 97239	ironmental				Repo	ort Number: 194 Report Date: 07/3	182R02 0/2019
Job Number: Project Name: Project Number: Project Notes:	<b>194182</b> 23816.251 Pha	se 0001					<b>P.O. No:</b> n/a	
Client Sample ID: Client Sample Desc Asbestos Mineral F	23816.251-004 ription: ibers Lay Perc	<b>47</b> ver sent: Chrys	Sample II	D: S47 e Crocidolite		Date Analyzed: Analyst:	07/30/2019 Tim Cammann	Percent Asbestos:
Homogeneous loose chalky mate with paper, white, paint, off-white	erial 100 with	)% -	-	-				NAD
Other Fibers	Fibrous Glass Ce 3 %	Mir ellulose W 8 %	ool Synthetic	0	Other -	-	Ma 8	trix 9 %
Client Sample ID: Client Sample Desc Asbestos Mineral F	23816.251-004 ription: ibers Lay Perc	<b>48</b> ver sent: Chrys	Sample II	D: S48		Date Analyzed: Analyst:	07/30/2019 Tim Cammann	Percent Asbestos:
Homogeneous compressed fiber	s, gray 100	)% -	-	-				NAD
Other Fibers	Glass Ce	ellulose W 50 % 5	ool Synthetic 0% -	2	Other -	-	Ma (	trix ) %
Client Sample ID: Client Sample Desc Asbestos Mineral F	23816.251-004 ription: ibers Lay Perc	<b>49</b> ver :ent: Chrys	Sample II	D: S49		Date Analyzed: Analyst:	07/30/2019 Tim Cammann	Percent Asbestos:
Homogeneous loose particulate, tan/black	100	)% -	-	-				NAD
Other Fibers	Fibrous Glass Ce Trace 4	Mir ellulose W 45 %	neral ool Synthetic 	2	Other -	-	Ma 5	trix 5 %

### LabCor Portland Inc Lab/Cor Portland, Inc. 4321 SW Corbett Ave., Ste A Portland, OR 97239

Phone: (503) 224-5055 http://www.labcorpdx.net

Asbestos and Environmental Analysis

<u>Client:</u> PBS Engineering and Environmental 4412 SW Corbett Avenue Portland, OR 97239						Report Number: 194182R02 Report Date: 07/30/2019			
Job Number: 194 Project Name: Project Number: 238 Project Notes:	182 16.251 Phase 00	001					<b>P.O. No:</b> n	/a	
Client Sample ID: 238	16.251-0050		Sample ID:	S50		Date Analyzed:	07/30/2019		
Client Sample Descript	on: Progress	sive Analysis	s Group: 3			Analyst:	Ryan Brown		
Asbestos Mineral Fiber	<u>s</u> Layer	Chrysotile	Amonita	Crasidalita				Percent	
Lavor 01	Feiceni.	OnlySoule	Amosile	Crocidolite				Aspestos:	
woven fibers off-whit	o 12 %		_					ΝΔΠ	
l aver 02	6 12,0							nau	
hard rubbery material white	, 50 %	-	-	-				NAD	
Layer 03									
fine compact powder. gray	38 %	5 %	-	-				5 %	
Other Fibers	Fibrous	Mineral			0.1				
	Glass Cellulos	se Wool	Synthetic		Other			Matrix	
Layer 01	- 100 %	-	-		-	-		0%	
Layer 02		-	-		-	-		100 %	
Layer 03		3 %	-		-	-		92 %	
Client Sample ID: 238	16.251-0051		Sample ID:	S51		Date Analyzed:	07/30/2019		
Client Sample Descript	on: Progress	sive Analysis	s Group: 3			Analyst:	Ryan Brown		
Comments: Sample a	rchived; not ana	lyzed per re	quest.						
Client Sample ID: 238	16.251-0052		Sample ID:	S52		Date Analyzed:	07/30/2019		
Client Sample Descript	on: Progress	sive Analysis	s Group: 3			Analyst:	Ryan Brown		
Comments: Sample a	rchived; not ana	lyzed per re	quest.						
Client Sample ID: 238	16.251-0053		Sample ID:	S53		Date Analyzed:	07/30/2019		
Client Sample Descript	on:					Analyst:	Ryan Brown		
Asbestos Mineral Fiber	s Layer Percent:	Chrysotile	Amosite	Crocidolite				Percent Asbestos:	
Homogeneous									
hard compact powde white	r, 100 %	-	-	-				NAD	
Other Fibers	Fibrous Glass Cellulos	Mineral Se Wool	Synthetic		Other			Matrix	
		-	-		-	-		100 %	



LabCor Portland 4321 SW	Cor P Corbett A	<b>ortlan</b> we., Ste A	d, Inc	BULK	SAMPLE AS	BESTOS	ANALYSIS	Phone: (503) http://www.lab	224-5055 pcorpdx.net	
Portland,	OR 9723	9		Asbes	tos and Envir	onmental	Analysis			
<u>Client:</u> PBS Enginee 4412 SW Co Portland, OR	ering and rbett Aver 97239	Environme 1ue	ntal				Rep F	Report Number: 194182R02 Report Date: 07/30/2019		
Job Number: 1 Project Name: Project Number: 23 Project Notes:	<b>94182</b> 3816.251	Phase 000	)1					<b>P.O. No:</b> n	/a	
Client Sample ID: 2 Client Sample Descrit Asbestos Mineral Fil	23816.251 iption: bers	- <b>0054</b> Layer Percent: (	Chrvsotile	Sample ID:	S54		Date Analyzed: Analyst:	07/30/2019 Ryan Brown	Percent	
Layer 01 coating, white Layer 02		5%	-	-	-				NAD	
Other Fibers	, gray Fibrous Glass	95 % Cellulose	- Mineral e Wool	Synthetic	-	Other			Matrix	
Layer 01 Layer 02	-	- 10 %	- 40 %	-		-	-		100 % 50 %	
Client Sample ID: 2 Client Sample Descri Asbestos Mineral Fil	23816.251 iption: bers	- <b>0055</b> Progressi Layer Percent: (	ve Analysis Chrysotile	Sample ID: s Group: 4 Amosite	S55 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Ryan Brown	Percent Asbestos:	
fine compact powo gray	ler,	100 %	-	-	-				NAD	
<u>Other Fibers</u>	Fibrous Glass 3 %	Cellulose	Mineral Wool 5 %	Synthetic		Other -	-		Matrix 92 %	
Client Sample ID: 2 Client Sample Descrit Asbestos Mineral Fil	23816.251 iption: bers	- <b>0056</b> Progressi Layer Percent: (	ve Analysis Chrysotile	Sample ID: s Group: 4 Amosite	S56 Crocidolite		Date Analyzed: Analyst:	07/30/2019 Ryan Brown	Percent Asbestos:	
Layer 01 woven fibers, gray		35 %	-	-	-				NAD	
fine compact powc	ler,	65 %	-	-	-				NAD	
Other Fibers	Fibrous Glass	Cellulose	Mineral Wool	Synthetic		Other			Matrix	
Layer 01 Layer 02	- 5 %	100 % -	- 5 %	-		-	-		0 % 90 %	



### LabCor Portland Inc Lab/Cor Portland, Inc. 4321 SW Corbett Ave., Ste A Portland, OR 97239

### **BULK SAMPLE ASBESTOS ANALYSIS**

Phone: (503) 224-5055 http://www.labcorpdx.net

Asbestos and Environmental Analysis

Client: PBS Engine 4412 SW C	eering and E Corbett Aven	nvironmen iue	tai				Repo	eport Date: 0	94182R02 7/30/2019
Portland, O	R 97239								,
Job Number:	194182							<b>P.O. No:</b> n	/a
Project Name:									
Project Number:	23816.251	Phase 0001							
Project Notes:									
Client Sample ID:	23816.251	-0057		Sample ID:	S57		Date Analyzed:	07/30/2019	
Client Sample Desc	cription:	Progressiv	e Analysis	Group: 4			Analyst:	Ryan Brown	
Asbestos Mineral F	ibers	Layer	,	,			,	,	Percent
	F	Percent: C	hrysotile	Amosite	Crocidolite				Asbestos:
Layer 01									
woven fibers, gra	ау	35 %	-	-	-				NAD
Layer 02									
fine compact pov gray	wder,	65 %	-	-	-				NAD
Other Fibers	Fibrous		Mineral			Others			
	Glass	Cellulose	VVOOI	Synthetic		Other			Matrix
Layer 01	-	100 %	-	-		-	-		0 %
Layer 02	5 %	-	5 %	-		-	-		90 %
Client Sample ID:	23816.251	-0058		Sample ID:	S58		Date Analyzed:	07/30/2019	
Client Sample Desc	cription:						Analyst:	Rvan Brown	
Chefit Sample Dest							7 analyoti		
Asbestos Mineral F	Fibers	Layer Percent: C	hrysotile	Amosite	Crocidolite		, unarjou		Percent Asbestos:
Asbestos Mineral F	Fibers F	Layer Percent: C	hrysotile	Amosite	Crocidolite		, and you		Percent Asbestos:
Asbestos Mineral F Layer 01 coating, white	Fibers F	Layer Percent: C 5 %	hrysotile -	Amosite -	Crocidolite			.,	Percent Asbestos: NAD
Asbestos Mineral F Layer 01 coating, white Layer 02	Fibers F	Layer Percent: C 5 %	hrysotile -	Amosite -	Crocidolite			.,	Percent Asbestos: NAD
Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe	<b>Fibers</b> F	Layer Percent: C 5 % 95 %	hrysotile - -	Amosite - -	Crocidolite - -				Percent Asbestos: NAD NAD
Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers	rs, gray	Layer Percent: C 5 % 95 %	hrysotile - - Mineral	Amosite - -	Crocidolite - -	Other		.,	Percent Asbestos: NAD NAD
Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers	rs, gray Fibrous Glass	Layer Percent: C 5 % 95 % Cellulose	hrysotile - - Mineral Wool	Amosite - - Synthetic	Crocidolite - -	Other			Percent Asbestos: NAD NAD
Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers Layer 01	rs, gray Fibrous Glass	Layer Percent: C 5 % 95 % Cellulose	hrysotile - Mineral Wool	Amosite - - Synthetic -	Crocidolite - -	Other			Percent Asbestos: NAD NAD Matrix 100 %
Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers Layer 01 Layer 02	rs, gray Fibrous Glass -	Layer Percent: C 5 % 95 % Cellulose - 10 %	hrysotile - Mineral Wool - 40 %	Amosite - - Synthetic - -	Crocidolite - -	Other - -			Percent Asbestos: NAD NAD Matrix 100 % 50 %
Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers Layer 01 Layer 02 Client Sample ID:	Fibers Fibrous Fibrous Glass - - 23816.251	Layer Percent: C 5 % 95 % Cellulose - 10 %	hrysotile - Mineral Wool - 40 %	Amosite - - Synthetic - - Sample ID:	Crocidolite - - S59	Other - -	Date Analyzed:	07/30/2019	Percent Asbestos: NAD NAD Matrix 100 % 50 %
Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers Layer 01 Layer 02 <u>Client Sample ID:</u> Client Sample Desc	rs, gray Fibrous Glass - 23816.251 cription:	Layer Percent: C 5 % 95 % Cellulose - 10 %	hrysotile - Mineral Wool - 40 %	Amosite - Synthetic - Sample ID:	Crocidolite - - S59	Other - -	Date Analyzed: Analyst:	07/30/2019 Ryan Brown	Percent Asbestos: NAD NAD Matrix 100 % 50 %
Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers Layer 01 Layer 02 <u>Client Sample ID:</u> Client Sample Deso Asbestos Mineral F	Fibers Fibrous Fibrous Glass - - 23816.251 cription: Fibers F	Layer Percent: C 5 % 95 % Cellulose - 10 % - 0059 Layer Percent: C	hrysotile - Mineral Wool - 40 %	Amosite - Synthetic - Sample ID: Amosite	Crocidolite - - S59 Crocidolite	Other - -	Date Analyzed: Analyst:	07/30/2019 Ryan Brown	Percent Asbestos: NAD NAD Matrix 100 % 50 %
Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers Layer 01 Layer 02 <u>Client Sample ID:</u> Client Sample Deso Asbestos Mineral F	Fibers Fibrous Glass - - 23816.251 cription: Fibers F	Layer Percent: C 5% 95% Cellulose - 10% - 0059 Layer Percent: C	hrysotile - Mineral Wool - 40 %	Amosite - Synthetic - Sample ID: Amosite	Crocidolite - - S59 Crocidolite	Other - -	Date Analyzed: Analyst:	07/30/2019 Ryan Brown	Percent Asbestos: NAD NAD Matrix 100 % 50 % Percent Asbestos:
Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers Layer 01 Layer 02 <u>Client Sample ID:</u> Client Sample Deso Asbestos Mineral F Layer 01 coating, white	rs, gray Fibrous Glass - - 23816.251 cription: Fibers F	Layer Percent: C 5% 95% Cellulose - 10% - 0059 Layer Percent: C 5%	hrysotile - Mineral Wool - 40 %	Amosite - Synthetic - Sample ID: Amosite -	Crocidolite - - S59 Crocidolite -	Other - -	Date Analyzed: Analyst:	07/30/2019 Ryan Brown	Percent Asbestos: NAD NAD NAD Matrix 100 % 50 %
Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers Layer 01 Layer 01 Client Sample ID: Client Sample Deso Asbestos Mineral F Layer 01 coating, white Layer 02	Fibers Fibrous Glass - - 23816.251 cription: Fibers F	Layer Percent: C 5 % 95 % Cellulose - 10 % - 0059 Layer Percent: C 5 %	hrysotile - Mineral Wool - 40 %	Amosite - Synthetic - Sample ID: Amosite -	Crocidolite - - S59 Crocidolite -	Other - -	Date Analyzed: Analyst:	07/30/2019 Ryan Brown	Percent Asbestos: NAD NAD Matrix 100 % 50 % Percent Asbestos: NAD
Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers Layer 01 Layer 02 <u>Client Sample ID:</u> Client Sample Desc Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe	Fibers Fibrous Glass - - 23816.251 cription: Fibers F	Layer Percent: C 5 % 95 % Cellulose - 10 % - 0059 Layer Percent: C 5 % 95 %	hrysotile - Mineral Wool - 40 %	Amosite - Synthetic - Sample ID: Amosite -	Crocidolite - - S59 Crocidolite - -	Other - -	Date Analyzed: Analyst:	07/30/2019 Ryan Brown	Percent Asbestos: NAD NAD Matrix 100 % 50 % Percent Asbestos: NAD NAD
Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers Layer 01 Layer 02 <u>Client Sample ID:</u> Client Sample Desc Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers	rs, gray Fibrous Glass - - 23816.251 cription: - - - - - - - - - - - - - - - - - - -	Layer Percent: C 5 % 95 % Cellulose - 10 % - 0059 Layer Percent: C 5 % 95 % Cellulose	hrysotile - Mineral Wool - 40 % hrysotile - - Mineral Wool	Amosite - Synthetic - Sample ID: Amosite - - Synthetic	Crocidolite - - S59 Crocidolite - -	Other - - Other	Date Analyzed: Analyst:	07/30/2019 Ryan Brown	Percent Asbestos: NAD NAD NAD Matrix 100 % 50 % Percent Asbestos: NAD NAD NAD
Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers Layer 01 Layer 02 Client Sample ID: Client Sample Deso Asbestos Mineral F Layer 01 coating, white Layer 02 compressed fibe Other Fibers Layer 01	rs, gray Fibrous Glass - - 23816.251 cription: - - Fibers Fibrous Glass - -	Layer Percent: C 5 % 95 % Cellulose - 10 % - 0059 Layer Percent: C 5 % 95 % Cellulose -	hrysotile - Mineral Wool - 40 % hrysotile - - Mineral Wool -	Amosite - Synthetic - Sample ID: Amosite - - Synthetic	Crocidolite S59 Crocidolite	Other - - Other -		07/30/2019 Ryan Brown	Percent Asbestos: NAD NAD NAD Matrix 100 % Percent Asbestos: NAD NAD NAD



LabCor Portland 4321 SW	Cor Po	ortlan	d, Inc	, BULK	SAMPLE ASI	BESTOS	ANALYSIS	Phone: (50 http://www.l	3) 224-5055 abcorpdx.net
Portland,	OR 9723	9		Asbes	tos and Envira	onmental	Analysis		
Client: PBS Enginee 4412 SW Cor Portland, OR	ring and E bett Aven 97239	Environme iue	ental				F	Report Number: Report Date:	194182R02 07/30/2019
Job Number: 19 Project Name: Project Number: 23 Project Notes:	9 <b>4182</b> 3816.251	Phase 00	01					P.O. No:	n/a
Client Sample ID: 2 Client Sample Descri Asbestos Mineral Fit	3816.251 ption: pers F	-0060 Layer Percent:	Chrysotile	Sample ID: Amosite	S60 Crocidolite		Date Analyze Analys	d: 07/30/2019 st: Ryan Brow	n Percent Asbestos:
Layer 01 hard compact powe off-white Layer 02	der,	12 %	-	-	-				NAD
compact micaceou chalky powder, whi	s ite	88 %	-	-	-				NAD
Other Fibers	Fibrous Glass	Cellulos	Mineral e Wool	Synthetic		Other			Matrix
Layer 01 Layer 02	- 4 %	-	-	-	Winchite/Richt erite	- Trace	-		100 % 96 %
Client Sample ID: 2 Client Sample Descri Asbestos Mineral Fit	3816.251 ption: <u>pers</u> F	<b>-0061</b> Layer Percent:	Chrysotile	Sample ID: Amosite	S61 Crocidolite		Date Analyze Analys	d: 07/30/2019 st: Ryan Brow	n Percent Asbestos:
Layer 01 hard compact power white	der,	20 %	-	-	-				NAD
compact micaceou chalky powder, whi	s ite	80 %	-	-	-				NAD
Other Fibers	Fibrous Glass	Cellulos	Mineral e Wool	Synthetic		Other			Matrix
Layer 01	-	-	-	-		-	-		100 %
Layer 02	5 %	-	-	-	Winchite/Richt erite	Trace	-		95 %



### LabCor Portland Inc 4321 SW Corbett Ave., Ste A Portland, OR 97239

50 %

### **BULK SAMPLE ASBESTOS ANALYSIS**

Phone: (503) 224-5055 http://www.labcorpdx.net

Layer 02

Asbestos and Environmental Analysis

								÷		
Client:	PBS Engir 4412 SW Portland, (	neering and Corbett Ave OR 97239	Environme nue	ental				Repo F	ort Number: 1 Report Date: 0	94182R02 07/30/2019
Jol	o Number:	194182							<b>P.O. No:</b> r	ı/a
Proj	ect Name:									
Project	Number:	23816.251	Phase 00	01						
Proj	ect Notes:									
Client	Sample ID:	23816.251	1-0062		Sample ID:	S62		Date Analyzed:	07/30/2019	
Client	Sample Des	cription:	Progress	ive Analysis	s Group: 5			Analyst:	Ryan Brown	
Asbes	tos Mineral	Fibers	Layer	Ohmentile	<b>.</b> .					Percent
	• ·		Percent:	Chrysotile	Amosite	Crocidolite				Asbestos:
Layer	01		<b>00</b> 0/							
loo: par	se fibrous tai ticulate, brov	r vn/black	98 %	-	-	-				NAD
Layer	02									
fibr with	ous material n coating, wh	, gray lite	2 %	-	-	-				NAD
Other	Fibers	Fibrous	6	Mineral						
		Glass	Cellulos	e Wool	Synthetic		Other			Matrix
Layer	01	-	50 %	-	-		-	-		50 %
Layer	02	-	-	50 %	-		-	-		50 %
Client	Sample ID:	23816.251	1-0063		Sample ID:	S63		Date Analyzed:	07/30/2019	
Client	Sample Des	cription:	Progress	ive Analysis	s Group: 5			Analyst:	Ryan Brown	
Asbes	tos Mineral	Fibers	Layer							Percent
			Percent:	Chrysotile	Amosite	Crocidolite				Asbestos:
Layer	01									
roc	ky tar, black		55 %	-	-	-				NAD
Layer	02									
tibr	ous tar, blac	K	45 %	-	-	-				NAD
<u>Other</u>	Fibers	Fibrous		Mineral	Quality of a		Other			
Lover	01	GidSS	Cellulos	e wooi	Synthetic		Uner			Matrix
Layer	01	-	-	-	-		-	-		100 %

50 %

### LabCor Lab/Cor Portland, Inc.

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Inc

4321 SW Corbett Ave., Ste A Portland, OR 97239

Asbestos and Environmental Analysis

Client: PBS Eng 4412 SV Portland	gineering and Environmental V Corbett Avenue , OR 97239	Report Number: 194182R02 Report Date: 07/30/2019
Job Number Project Name	194182	<b>P.O. No:</b> n/a
Project Number: Project Notes:	23816.251 Phase 0001	

This laboratory participates in the National Voluntary Laboratory Accreditation Program (NVLAP). Testing method is per 40 CFR 763 Subpart E, Appendix E, PLM. This report and the data contained therein cannot be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

• "NAD" is No Asbestos Detected.

· Asbestos consists of the following minerals: chrysotile, amosite, crocidolite, tremolite, actinolite, anthophyllite.

• Material binders, such as those found in vinyl floor tiles, may prevent the detection of small diameter asbestos fibers. A gravimetric preparation and point-count is recommended for such samples.

• Quantitative analysis by PLM point count or TEM may be recommended for samples testing at < or = to 1% asbestos.

• The following estimate of error for this method by visual estimation of asbestos percent are as follows:

1% asbestos: >0-3% error, 5% asbestos: 1-9% error, 10% asbestos: 5-15% error, 20% asbestos: 10-30% error.

• This report pertains only to the samples listed on the report. Report considered valid only when signed by analyst.

**Reviewed by:** 

Stephanie Golden Senior Analyst



LabCor Portland 4321 SW Corbett Ave., Ste A	C. BULK	BULK SAMPLE ASBESTOS ANALYSIS				Phone: (503) 224-5055 http://www.labcorpdx.net	
Portland, OR 97239	Asbes	tos and Envir	onmental A	Analysis			
Client: PBS Engineering and Environmental 4412 SW Corbett Avenue Portland, OR 97239				Repo	ort Number: 194 Report Date: 08/0	385R01 6/2019	
Job Number: 194385					<b>P.O. No:</b> n/a		
Project Name: Project Number: 23816.251 Phase 0001 Project Notes:							
Client Sample ID: 23816.251-0064	Sample ID:	S1		Date Analyzed:	08/06/2019		
Client Sample Description: <u>Asbestos Mineral Fibers</u> Percent: Chrysotile	e Amosite	Crocidolite		Analyst:	Tim Cammann	Percent Asbestos:	
Homogeneous compressed fibers, gray, 100 % - with thin coating, white	-	-				NAD	
Other Fibers         Fibrous         Minera           Glass         Cellulose         Wool           -         35 %         35 %	l Synthetic -		Other -	-	Ma 3	trix 0 %	
Client Sample ID: 23816.251-0065 Client Sample Description: Asbestos Mineral Fibers Bercant: Chrysotik	Sample ID:	S2		Date Analyzed: Analyst:	08/06/2019 Tim Cammann	Percent	
Homogeneous	Amosile	CIUCIUUIILE				ASDESIUS.	
compressed fibers, gray, 100 % - with thin coating, white	-	-				NAD	
Other Fibers         Fibrous         Mineral           Glass         Cellulose         Wool           -         35 %         35 %	l Synthetic -		Other -	-	Ma 3	trix 0 %	
Client Sample ID: 23816.251-0066	Sample ID:	S3		Date Analyzed:	08/06/2019		
Client Sample Description: <u>Asbestos Mineral Fibers</u> Percent: Chrysotile	e Amosite	Crocidolite		Analyst:	Tim Cammann	Percent Asbestos:	
Homogeneous compressed fibers, gray, 100 % - with thin coating, white	-	-				NAD	
Other Fibers     Fibrous     Minera       Glass     Cellulose     Wool       -     40 %     35 %	l Synthetic -		Other -	-	Ma 2	trix 5 %	
Client Sample ID: 23816.251-0067 Client Sample Description:	Sample ID:	S4		Date Analyzed: Analyst:	08/06/2019 Tim Cammann		
Asbestos Mineral Fibers Layer Percent: Chrysotile	e Amosite	Crocidolite				Percent Asbestos:	
Homogeneous compressed fibers, gray, 100 % - with thin coating, white	-	-				NAD	
Other Fibers         Fibrous         Minera           Glass         Cellulose         Wool	l Synthetic		Other		Ma	trix	
- 30 % 40 %	-		-	-	3	0 %	

Page 1 of 3



LabCor Portland Inc 4321 SW Corbett Ave., Ste A		d, Inc	BULK SAMPLE ASBESTOS ANALYSIS				Phone: (503) 224-5055 http://www.labcorpdx.net			
	Portlar	nd, OR 9723	39		Asbes	tos and Envir	onmental	Analysis		
<u>Client:</u>	Client: PBS Engineering and Environmental 4412 SW Corbett Avenue Portland, OR 97239							Rep	ort Number: 194 Report Date: 08/0	385R01 06/2019
Job Proje Project I Proje	Number: ect Name: Number: ect Notes:	<b>194385</b> 23816.251	Phase 000	1					<b>P.O. No:</b> n/a	
Client S Client S Asbest	Sample ID: Sample Des os Mineral	23816.25 <sup>-</sup> scription: <u>Fibers</u>	I <b>-0068</b> Layer Percent: C	Chrysotile	Sample ID:	S5 Crocidolite		Date Analyzed: Analyst:	08/06/2019 Tim Cammann	Percent Asbestos:
Homog com with	Jeneous Ipressed fib thin coating	ers, gray, g, white	100 %	-	-	-				NAD
Other F	-ibers	Fibrous Glass	Cellulose 30 %	Mineral Wool 50 %	Synthetic		Other -	-	Ma	atrix 20 %
Client S Client S <u>Asbest</u>	Sample ID: Sample Des os Mineral	23816.25 scription: <u>Fibers</u>	Layer	Chrysotile	Sample ID:	S6		Date Analyzed: Analyst:	08/06/2019 Tim Cammann	Percent
Homog com with	<b>Jeneous</b> Ipressed fib thin coating	ers, gray, g, white	100 %	-	-	-				NAD
<u>Other F</u>	-ibers	Fibrous Glass	Cellulose 35 %	Mineral Wool 35 %	Synthetic		Other -	-	Ma	atrix 30 %

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Inc

4321 SW Corbett Ave., Ste A Portland, OR 97239

Asbestos and Environmental Analysis

Client:PBS Engineering and Environmental<br/>4412 SW Corbett Avenue<br/>Portland, OR 97239Report Number:194385R01<br/>Report Date:Job Number:194385P.O. No:n/aProject Name:23816.251 Phase 0001<br/>Project Notes:F.O. No:N/a

This laboratory participates in the National Voluntary Laboratory Accreditation Program (NVLAP). Testing method is per 40 CFR 763 Subpart E, Appendix E, PLM. This report and the data contained therein cannot be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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• The following estimate of error for this method by visual estimation of asbestos percent are as follows:

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• This report pertains only to the samples listed on the report. Report considered valid only when signed by analyst.

Reviewed by:

Tim Cammann

Analyst



THIS IS TO CERTIFY THAT

### **RICH A. DUFRESNE**

## HAS SUCCESSFULLY COMPLETED THE TRAINING COURSE

for

# 8-HOUR ASBESTOS INSPECTOR / MANAGEMENT

## PLANNER REFRESHER

In accordance with TSCA Title II, Part 763, Subpart E, Appendix C of 40 CFR

Course Date: 04/03/2019 Course Location: Portland, OR

IMR-19-0264A

Certificate:



**PBS** 

AHERA is the Asbestos Hazard Emergency Response Act enacting Title II of Toxic Substance Control Act (TSCA)

Expiration Date: 04/03/2020

Almonth Bak

Greg Baker, Instructor