Project Manual

EEME Install Additional DX Units in 106

Washington State University
Pullman, WA

Project No. 1970-2022
Issued 04/23/2024
Washington State University
Facility Services, Capital

The Architect or Engineer Stamp on this page applies to all portions of the Specifications below.

MECHANICAL ENGINEERS:

MSI Engineers
108 N. Washington Suite 505
Spokane, WA 99201
509-624-1050

Specification Divisions 22 & 23



ELECTRICAL ENGINEERS:

MSI Engineers
108 N. Washington Suite 505
Spokane, WA 99201
509-624-1050

Specification Division 26



END OF ARCHITECTURAL / ENGINEERING STAMPS

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Washington State University
EEME Install Additional DX Units in 106
Pullman, WA

Sealed bids are being requested by the Board of Regents of Washington State University, for the above referenced project.

Project Scope:

This project at the Electrical Mechanical Engineering Building will add additional cooling capacity and a UPS system to server room 106 per the approved construction drawings. Construction and demolition will take place in server room 106 and the ground level mechanical room 003A, with a new cooling unit to be placed on the roof of the building. General scope includes removing and reconfiguring existing duct work, installing new duct work to create a hot and cold isle, installing a new DX "ACU-3/CU-3" cooling system, removing an existing power conditioner, and installing owner supplied UPS system per construction drawings. On-site work scheduling must be coordinated with the WSU Construction Manager and IT Systems and Services staff. Contract time shall be 190 days from Notice to Proceed to Substantial Completion. Proposals MUST BE based on this Contract time.

Project Physical address: 335 NE Spokane Street, Pullman, WA 99164

Bid Estimate: $350,000 - $400,000

Alternate 1- Install ACU-3(ALT)/CU-3(ALT) in lieu of ACU-3/CU-3 per the mechanical equipment schedule sheet M0.02.

Bid Deadline: May 21, 2024, prior to 2:00 p.m., virtual bid opening at 2:30 p.m.

In-Person Pre-bid Meeting: May 7, 2024, 10:00am, McCluskey Services Building 190D.

Visit https://facilities.wsu.edu/facilities-services-capital/contractors/ for bid docs and meeting details.

Email contracts@wsu.edu to be added to the Planholder's List.

Owner reserves the right to reject any and all bids and to waive any informalities or irregularities in the bids received.

Maja S. Huff
509-335-9082
Contracts@wsu.edu
Facilities Services
Washington State University

Additional Project Information available on the Website:

Bids will be received either by email to contracts@wsu.edu or in hard copy at McCluskey Services Building, 2425 East Grimes Way., Pullman, WA. Proposals will then be publicly opened and read aloud at 2:30 p.m. by

https://wsu.zoom.us/j/98644245953?pwd=anlPelpyWGVRcmtLajNUd1M3cFVOZz09
passcode 324573 or Phone 253-215-8782 **and entering Meeting ID 986 4424 5953**
Attendance in person is not allowed.

Parking on campus is enforced 24 hours a day, every day. It is bidder's responsibility to obtain parking permits to attend pre-bid meetings, site visits, and bid openings. Daily permit rates may be found at: http://transportation.wsu.edu/TempFees.html. Identify the meeting and project when obtaining the permit to receive appropriate rates.

Printing Disclaimer: The bidding documents are available for all interested bidders and plancenters. The University does not provide printing services; it is the bidder's responsibility to print the drawings to the appropriate scale indicated. We encourage the use of professional printing shops.

END OF SECTION 00 11 13

PART 1 GENERAL

1.01 PROJECT IDENTIFICATION

A. Refer to the Advertisement for Bids for Project identification, availability of bidding documents, Prebid Conference, and Contract completion date. Refer to Summary of Work, Section 01 11 00, for a brief description of the Work.

1.02 BIDDER QUALIFICATIONS

A. Contractor Registration:

1. Bidders subject to the Contractor's Registration Act (RCW Chapter 18.27) must show their State of Washington Contractor's license number on the Form of Proposal. In addition, bidders are cautioned to verify that all subcontractors submitting bids are also registered and licensed in accordance with the laws of the State of Washington. Owner is prohibited by virtue of RCW 39.06.010 from executing any Contract for public works with any contractor who is not registered or licensed in accordance with the laws of this state. Prior to submitting a bid, bidder must obtain an appropriate clearance and license to do business in the State of Washington as follows:

   a. Contractor's License: Make license application to the Department of Labor and Industries, Contractor's Registration, P.O. Box 7689, Olympia, Washington 98504.

   b. Registration Number: Out-of-State Contractors must obtain a registration number and permission to do business in the State of Washington from the Secretary of State, Olympia, Washington 98501.

   c. Other Registrations: Register with the State Department of Revenue as a contractor engaging in business in this state and register with the State Department of Labor and Industries and the Employment Security Department.

2. Payment and Performance Bonds:

   a. Bidders must be able to furnish satisfactory separate Payment and Performance Bonds for full amount of the initial Contract Sum, plus sales tax.

1.03 EXAMINATION OF SITE AND CONTRACT DOCUMENTS

A. Before submitting a bid or proposal, bidders shall carefully examine the Contract Documents, visit the Project site, and fully inform themselves as to all existing conditions and limitations, and shall include in their bid or proposal a sum to cover the cost of all items included in the Work, and shall rely on their own examination in making their bid or proposal. No change in the Work, the

Contract Sum, or the Contract Time will be allowed for issues that would have been reasonably apparent by the foregoing examination.

B. Bidder acknowledges that it has satisfied itself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the Project site, including all exploratory work done by Owner, as well as from the Drawings and Specifications made a part of the Contract Documents.

C. Bidder acknowledges that adjoining areas will be in normal course during the Work. Bidder should anticipate pedestrian and traffic congestion, limited parking, and the need to coordinate all Work with ongoing operations.

D. Owner assumes no responsibility for any conclusions or interpretations made by bidder based on the information made available by Owner. Should a bidder find discrepancies or omissions in the Drawings or Specifications, or should bidder be in doubt as to their meaning, bidder shall at once notify Owner. If appropriate, Owner will send written instructions to all bidders by addenda. Questions received less than 7 Days before the time of bid opening may not be answered. All issued addenda shall be incorporated into these Contract Documents.

1.04 PREBID CONFERENCE

A. All bidders are encouraged to attend a pre-bid conference. Refer to the Advertisement for Bids for the date, time and location.

B. Parking on campus is enforced 24 hours a day, every day. It is bidder's responsibility to obtain parking permits to attend pre-bid meetings, site visits, and bid openings. Due to the possibility of parking at multiple locations on campus, bidders are advised to consider obtaining Orange Temporary Permits. Go to http://transportation.wsu.edu/TempFees.html for more information about parking permits.

1.05 CLARIFICATIONS

A. Should bidders find discrepancies in, omissions from, or unclear information within the Contract Documents, they should notify Owner at once. Owner shall issue a written instruction in the form of an addendum to all bidders. Neither the Owner nor Architect/Engineer will be responsible for any oral instructions. Questions received less than 7 Days before bid opening may not be answered. All addenda issued prior to the opening of bids will be incorporated into the Contract.

1.06 SPECIFIED PRODUCTS

A. Bids must be based upon items identified in the Specifications or approved substitutions. In certain cases, specific items have been named because of operational or maintenance considerations; approval of substitutions should not be assumed.

B. Requests for approval of substitutions must be made in writing and received by Owner at least 7 Days prior to the date of bid opening. Said request must include complete descriptions, technical data, and performance records. Any approval of the proposed substitution will be made by addendum issued to all bidders.

C. To submit substitution requests prior to Bid opening:

1. Only one substitution request per bidder will be considered for each product.

2. Requests for substitutions shall provide sufficient data to allow Owner to evaluate the suitability of the proposed product. Bidder must clearly identify product and model number of proposed substitution.

D. By requesting a substitution, bidder represents and warrants that (1) it has personally investigated the proposed material or product and determined that it is equal or better in all respects to that specified, (2) the same or better warranty will be provided for the substitution, (3) it has coordinated with affected subcontractors, (4) the substitution will not impact other parts of the Work, (5) the aggregate costs associated with the substitution actually reduces its bid amount, (6) all costs associated with the substitution are included in its bid, and (7) it waives any known or unknown future claim for an increase in the Contract Sum or Contract Time associated with the substitution.

E. Owner retains full discretion over whether to approve a substitution, and Owner's approval does not relieve bidder of the above requirements.

1.07 TAXES

A. State of Washington Sales Tax shall not be included in the bid price, except that the retail sales tax upon sales and rentals to prime contractors and subcontractors of tools, cranes, air compressors, bulldozers, lubricating oil, sandpaper, form lumber, and similar items of material and equipment which are primarily for use by the bidder rather than for resale as a component part of the finished work, shall be included in the bid price. (See WAC 458-20-170 (State Department of Revenue Rule 170))

B. Sales tax applicable to the Contract Sum will be added to the Contract Sum by Owner at the time the Contract (Section 00 50 00) is written and shall be paid to Contractor. Contractor shall then remit payment for the sales tax to the State Department of Revenue in conformance with the law.

1.08 FILING FEES

A. Applicable state laws concerning prevailing wages, hours, workers' compensation, and other conditions of employment are called to the attention of bidders for their compliance. Bidders shall include in their bid any and all fees, including filing fees, required to comply with applicable labor laws.

1.09 PAYMENT AND PERFORMANCE BONDS

A. Upon award of the Contract, the successful bidder will be required to provide Owner with satisfactory separate payment and performance bonds. Cost of bond premiums must be included in the bidder's proposal.

1.10 FORM OF PROPOSAL

A. Proposals must be formatted in accordance with the following:

1. Bidder must utilize the Form of Proposal, examples of which are included in the Contract Documents; all numbers must be clearly and legibly stated both in writing and in figures; and signatures must be in longhand.
2. Bids must not contain any recapitulation of the Work to be done.
3. Bidders must include prices for all Alternate Bid items if they are included in the Form of Proposal.
    a. Bidders shall bid upon all Alternates indicated in the Form of Proposal. When bidding on alternates for which there is no charge, bidder shall write the words "No Charge" or some similar designation in the space provided on the Form of Proposal. If a bidder fails to bid an alternate, or notes "no bid," it will be construed as meaning that there will be no change in the Contract Sum and that the alternate is included in the Contract Sum.
4. Bids shall be received either electronically or in hard copy:
    a. Electronic Bids: Bidders may submit their bid via email to contracts@wsu.edu prior to the bid submission deadline. The emailed bid must include all documents that would have normally been submitted in the sealed envelope, including but not limited to the Form of Proposal and bid bond, in either PDF or Image format.
        1) The official clock for receipt of electronic bids will be the time and date stamp by WSU email services, not bidders email services.
    b. Hard Copy Bids: Each part of the Form of Proposal must be sealed in its own opaque envelope and marked "Proposal – EEME Install Additional DX Units in 106". Bidders name shall appear on the outside of this sealed envelope. All bids are to be delivered or mailed to Facilities Services, P.O. Box 641150, McCluskey Services Building, Washington State University, Pullman, WA 99164-1150. If mailed, the Bid envelope shall be enclosed in another envelope for mailing.
        1) An official clock, at the office location designated for receipt of bids, will be designated by Owner for determining the timely receipt of each bid.

c. Bidders are solely responsible for delivery of their proposals at the specified location and before the specified time set for receipt of bids.

5. Bids will be received on the dates and at the times indicated in the Advertisement for Bids.

6. Proposals received and determined untimely by Owner, may be considered as non-responsive and hard copy bids will be returned to bidder unopened, or notification will be made by email for electronic bids.

7. Bids will be received until the respective times indicated in the Advertisement for Bids. They must be received prior to the respective times stated; i.e., where bids for Part A are required until 2:00 p.m., all bids received by 1:59:59 p.m. are timely; all bids received on or after 2:00:00 p.m. are untimely.

8. Proposals shall considt of the following components:

   a. Proposal: Completed Part A proposal indicating the following:

      1) Base Bid and Alternate Bid (if any) amounts;

      2) Acknowledgment of Addenda received;

      3) Signature, Corporate Identification, and Contractor License number; and

      4) Bid Security to be attached to Part A proposal form.

9. All proposals will remain sealed/unshared until the bid opening.

1.11 BID ALTERNATES, ALLOWANCES AND UNIT PRICES

A. Bid Alternates, Allowances, and Unit Prices adjust the Project scope by adding, deleting, or modifying specific parts of the Work as stated hereinafter.

B. An Alternate is an amount proposed by bidders and stated on the Bid Form for certain construction activities defined in the bidding documents that may be added to or deducted from the Base Bid amount and/or the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Each bidder shall submit, on the Form of Proposal, an amount for each Bid Alternate stating the difference in cost from the Base Bid amount for adding, deleting, or modifying specific materials and/or construction.

2. The difference in cost shall include all deletions, additions, and adjustments to all trades as may be necessary by each modification.

3. Only Alternates authorized by these specifications or pursuant to addenda will be considered.

C. An Allowance is an amount established in the Contract Documents for inclusion in the Contract Sum to cover the cost of prescribed items not specified in detail sufficient to estimate at time of bid.

1. Each bidder shall include in the Base Bid amount the amount for each Allowance as identified in the bidding documents.

D. A Unit Price is an amount as a price per unit of measurement for materials or services added or deleted from the Base Bid amount.

1. Each bidder shall submit on the Bid Proposal Form, an amount for each Unit Price stating the difference per unit or measurement for materials or services added or deleted from the Base Bid amount.
2. The Unit Price stated shall be used as the amount for either adding or deleting the item per unit of measurement from the Work.
3. The Unit Price amounts submitted on the Form of Proposal shall be used as the cost per unit of measurement for the entire duration of the Contract.

1.12 BID GUARANTEE

A. Bidder shall furnish a bid guarantee in the form of a cashier's check or bid bond made payable to the Board of Regents of Washington State University for an amount equal to at least 5% of the total Base Bid amount, as evidence of good faith and as a guarantee that, if awarded the Contract, the bidder will execute the Contract and provide payment and performance bonds as required.

1. Electronic submission of the Bid Guarantee shall constitute full submittal as if delivered in hard copy.

B. Should the successful bidder fail to enter into a Contract and furnish satisfactory bonds within 10 Days after its proposal has been accepted, the bid security shall be forfeited as liquidated damages.

C. Owner reserves the right to hold the bid guarantee of the 3 lowest bidders until the successful bidder has entered into a contract and furnished required bonds.

1.13 MWBE PARTICIPATION

A. Washington State University is committed to the enhancement of opportunities for minority and women owned and controlled businesses in public contracting. The use or solicitation of minority and women's business enterprise firms is expressly encouraged.

1.14 CONTRACTOR AND SUBCONTRACTOR PARTICIPATION – NOT USED

1.15 MODIFICATION OF PROPOSALS

A. Modifications to proposals already submitted will be permitted only if requested in writing over the signature of the bidder and provided such requests are received prior to the time set for receipt of bids.

B. The original Form of Proposal will remain unopened until bid opening. Modifications in the form of facsimile transmissions will not be accepted.

C. Withdrawal of proposals will be permitted only if requested in writing over the signature of the bidder and provided such requests are received prior to the time set for receipt of bids.

D. Withdrawal requests in the form of facsimile transmissions will not be accepted.

E. After the scheduled closing time for the receipt of Form of Proposals, no bidder will be permitted to withdraw a proposal unless said award is delayed for a period exceeding 60 Days.

1.16 ALTERATIONS PROHIBITED

A. Except as otherwise provided herein, Forms of Proposal which are incomplete, or which are conditioned in any way, or which contain items not called for in the Proposal Form, or which are not in conformity to the law, may be rejected.

B. The Form of Proposal invites bids on specific Drawings and Specifications. Only the amounts and information asked for on the Form of Proposal furnished will be considered.

1.17 BID PROTEST PROCEDURES

A. A bidder protesting for any reason the bidding documents, a bidding procedure, the University's objection to a bidder or a person or entity proposed by the bidder, including but not limited to, a finding of non-responsibility, the award of the Contract or any other aspect arising from, or relating in any way to, the bidding, shall file a written protest with the University within two (2) business days of the event giving rise to the protest. (Intermediate Saturdays, Sundays, and legal holidays are not counted as business days.) The written protest shall include the name of the protesting bidder, the title of the bid under which the protest is submitted, a detailed description of the specific factual and legal grounds for the protest, copies of all supporting documents, evidence that the apparent low bidder has been given notice of the protest, and the specific relief requested. The written protest shall be sent by email to contracts@wsu.edu.

B. Upon receipt of the written protest, the University will consider the protest. The University may, within three (3) business days of the University's receipt of the protest, provide any other affected bidder(s) the opportunity to respond in writing to the protest. If the protest is not resolved by mutual agreement of the protesting bidder and the University, the Assistant Vice President for Facilities Services, Capital of the University, or her or his designee, will review the issues and promptly furnish a final and binding written decision to the protesting bidder, and any other affected bidder(s), within six (6) business days of the University's

receipt of the protest. (If more than one (1) protest is received, the University's decision will be provided within six (6) business days of the University's receipt of the last protest.) If no reply is received from the University during the six (6) business-day period, the protest will be deemed rejected.

C. Failure to comply with these protest procedures will render a protest waived.

D. Timely and proper compliance with, and exhaustion of, these protest procedures shall be a condition precedent to any otherwise permissible judicial consideration of a protest.

1.18 LOW RESPONSIBLE BIDDER

A. It is the intent of Owner to award the Contract to the low responsible bidder. Before award, the bidder must meet the following bidder responsibility criteria to be considered a responsible bidder. The bidder may be required by Owner to submit documentation demonstrating compliance with the criteria. Bidder must:

1. Have a current certificate of registration in compliance with chapter 18.27 RCW, which must have been in effect at the time of bid submittal;
2. Have a current Washington Unified Business Identifier (UBI) number;
3. If applicable:
    a. Have Industrial Insurance (workers' compensation) coverage for the bidder's employees working in Washington, as required in Title 51 RCW;
    b. Have a Washington Employment Security Department number, as required in Title 50 RCW;
    c. Have a Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;
4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065(3).
5. Not have been found out of compliance by the Washington State Apprenticeship and Training Council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under chapter 49.04 RCW for the one-year period immediately preceding the first date of advertising for this project.
6. Not have been determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries, or through a civil judgment entered by a court of limited or general jurisdiction, to have willfully violated, any provision of chapter 49.46, 49.48, or 49.52 RCW, as defined in RCW 49.48.82.

B. In addition to the bidder responsibility criteria above, bidder must also meet the following supplemental bidder responsibility criteria applicable to the Project:

1. Bidder shall provide documentation from the manufacturer of the roofing product of the following:
    a. Completion of the Manufacturer's "Contractor" training course.
    b. Manufacturer's certification to install the product and meet warranty requirements.
    c. Proof of "Good Standing" with the manufacturer.
    d. That bidder has installed 200,000 square feet of warranted manufacturers roofing within the past five (5) calendar years.

C. Whenever Owner evaluates Contractor's responsibility, the foregoing may be taken into account. In addition to Contractors experience, evaluation of bidder's responsibility will also be based on the documented experience of the Project Manager, Project Engineer, and the Superintendent proposed for the Project. A minimum of three projects of comparable size and scope will be required for bidder.

D. Within 48 hours of receipt of request, apparent low bidder will provide such information about its team as Owner determines to be reasonably necessary to evaluate the responsibility of the bidder. Failure to reply with requested information will render a bidder non-responsible at Owner's option. At minimum, a bidder shall provide:

1. A financial statement;
2. List of projects currently under construction, including current contract amount and status of each;
3. Names and resumes of proposed Project Manager, Project Engineer, and Superintendent;
4. Name of bonding company/agent; and
5. References including project and owner name, a project contact, and project contact telephone number.

E. As evidence that bidder meets the bidder responsibility criteria, the apparent low bidder must submit documentation as may be required above to the Owner within 48 hours of the bid submittal deadline. Owner reserves the right to request such documentation from other bidders also.

F. Owner will review Contractor's past Contract Performance to assist in evaluating the contractor's qualifications and proven ability to successfully perform future contracts only when past performance has been previously documented via the Contract Performance Program.

G. If Owner determines bidder does not meet the bidder responsibility criteria above and is therefore not a responsible bidder, Owner shall notify bidder in writing with the reasons for its determination. If bidder disagrees with this determination, it may appeal the determination within 24 hours of receipt of Owner's determination by presenting additional information to Owner. Owner will consider the additional

information before issuing its final determination. If the final determination affirms that bidder is not responsible, Owner will not execute a Contract with any other bidder until 2 business days after the bidder determined to be not responsible has received the final determination.

1.19 CONTRACT AWARD

A. Owner intends but is not required to enter into a contract with the successful bidder, for all Work called for in the Contract Documents.

B. The determination of the successful bidder will be made on the basis of the sum of the Base Bid together with Owner-selected Alternates.

C. The responsibility of bidder and its subcontractors will be considered in making the award. Owner reserves the right to reject any or all bids and to waive informalities advantageous to Owner and/or the protection of the public interest.

D. Reinstatement of Bid Alternate not initially selected shall be in accordance with provisions of the Bid Proposal Form of Proposal.

1.20 CONTRACT FORMS

A. Owner's standard form Contract is included with the Contract Documents.

END OF SECTION 00 21 13

Washington State University
EEME Install Additional DX Units in 106
Pullman, WA

Refer to Instructions to Bidders for bid submittal procedures.

Bidder's Firm Name: _____ Date: _____

To: Facilities Services, Capital
McCluskey Services Building, P.O. Box 641150
Washington State University
Pullman, Washington 99164-1150

Pursuant to and in compliance with the Advertisement for Bids and the Instructions to Bidders, the Bidder, having carefully examined the Contract Documents entitled "EEME Install Additional DX Units in 106" and having visited the Project site and examined the conditions affecting the Work, hereby proposes and agrees to provide all labor, materials, equipment, services, and incidentals necessary to complete the Work for the following stipulated sums:

A. BASE BID

_____

_____DOLLARS ($_____),

B. UNIT PRICES – NOT USED

C. ALTERNATES

The Bidder proposes to modify the Base Bid by deleting from, adding to or otherwise modifying the Work as further described by the Contract Documents for the following stipulated sums:

Alternate No. & Description

Alternate No. 1 – Install ACU-3 (ALT)/CU-3(ALT) in lieu of ACU-3/CU-3 per the mechanical equipment schedule sheet M0.02.

_____DOLLARS ($_____.),

For Alternates, which do not affect the Base Bid, indicate a zero (0) in the space provided for the Alternate.

D. REINSTATEMENT OF BID ALTERNATES

The Bidder agrees that Owner has the right to reinstate any Alternate not incorporated in the original Contract, for the sum originally proposed, provided Owner notifies the

Bidder within 60 Days of Notice to Proceed.

E. SALES TAX

The Bidder agrees that the amounts indicated in the proposal do not include Washington State and local sales taxes except as required by the Instructions to Bidders.

F. CONTRACT PROVISIONS

Should the Bidder be notified of the acceptance of this proposal within 60 Days from the date set for the opening thereof or at any time thereafter before this proposal is withdrawn, the bidder agrees to execute a Contract for the Work and to furnish the required bonds.

1. TIME OF COMPLETION
   The bidder agrees, if awarded a Contract for the Work, to complete the Work within the Contract Time specified.
2. LIQUIDATED DAMAGES
   The bidder agrees that time is of the essence of the Contract and acknowledges that the amount of damages specified is a measure of the damages which the Owner will sustain should the Bidder fail to complete the Work within the Contract Time.

G. BID GUARANTEE

The Bidder agrees that the bid guarantee accompanying the Part A Form of Proposal is left in escrow with Owner, that the amount of the guarantee is the measure of the damages that Owner will sustain by failure of the bidder to execute a Contract for the Work and furnish required bonds, and that if the bidder fails to deliver said documents within 10 Days after receipt of notice of award to the bidder, the bid guarantee shall become the property of Owner.

H. MINORITY AND WOMEN'S BUSINESS ENTERPRISE (MWBE) PARTICIPATION

Owner is committed to the enhancement of opportunities for minority and women owned and controlled firms in public contracting. While neither required, nor a part of bidder responsiveness, the use or solicitation of minority and women business enterprises is expressly encouraged.

I. CONTRACTOR AND SUBCONTRACTOR PARTICIPATION – NOT USED

J. ADDENDA

The bidder hereby acknowledges receipt of Addendum by number(s):

K. PREVAILING WAGE CERTIFICATION

The bidder has not been determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries, or through a civil judgment entered by a court of limited or general jurisdiction, to have willfully violated, any provision of chapter 49.46, 49.48, or 49.52 RCW, as defined in RCW 49.48.82.

L. DECLARATION

The bidder represents and warrants that he/she possess the authority to sign for and bind bidder.

The Bidder declares under penalty of perjury under the laws of the State of Washington, that all of the foregoing information as recited is true and correct to the best of his/her knowledge.

Bidder's Firm Name: _____

Signed By: _____ Official Title: _____

Print Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Telephone: _____ Fax: _____

State of Washington Contractor's License Number: _____

Federal Tax Identification Number: _____

Email Address: _____

The firm represented by the above signature is a:

Sole Proprietorship _____
Partnership _____
Corporation _____ State of Incorporation _____
Other _____

END OF SECTION 00 42 13

EEME Install Additional DX Units in 106

Agreement between Owner and Contractor

(Fixed Contract Sum)

This AGREEMENT is effective as of the date of the first signature on the Agreement so long as all other parties' authorized signatories have also executed the Agreement. This Agreement is made by and between the following parties in connection with the Project identified below.

OWNER:	Washington State University c/o Facilities Services, Capital P.O. Box 641150 Pullman, WA 99164-1150
CONTRACTOR:	[To be determined]
ARCHITECT (A/E):	MSI Engineers 108 N Washington, Suite 505 Spokane, WA 99201
PROJECT:	EEME Install Additional DX Units in 106 335 NE Spokane St Pullman, WA 99164

In consideration of the mutual covenants and obligations contained herein, Owner and Contractor agree as set forth herein.

Article 1
The Work of the Contract

1.1 Contractor to fully execute the Work. Contractor shall fully execute the entire Work in strict accordance with the Contract Documents, and shall provide all material, equipment, tools, and labor necessary to timely complete the Work described in and reasonably inferable from the Contract Documents, except to the extent specifically indicated to be the responsibility of others.

1.2 Contractor to further Owner's interests. Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with Owner to cooperate and collaborate with Owner and others involved with the Project and to exercise Contractor's best skill and judgment; to furnish efficient, professional construction administration, management services and supervision with sufficient quantities of fully qualified, competent and experienced personnel; and to perform the Work in an expeditious and economical manner consistent with Owner's interests. The parties will endeavor to promote harmony, cooperation and mutual respect among the Project participants to the fullest extent possible in order to further the success of the Project and to effect prompt and successful completion of the Project within the requirements of the Contract Documents, the Contract Time and the Contract Sum.

Article 2
Contract Documents

2.1 The Contract Documents. The "Contract Documents" form the "Contract." The Contract Documents consist of this Agreement (Agreement between Owner and Contractor or the "Agreement"); any attached Exhibits and other documents listed in the Contract Documents; the General Conditions; other documents listed in Article 8 of this Agreement; and written modifications, amendments and Change Orders to the Contract issued after execution of this Agreement.

2.2. Contract is complete and integrated agreement. The Contract represents the entire, complete, and integrated agreement between the parties and supersedes prior negotiations, representations or agreements, either written or oral. No oral representations or other agreements have been made by the parties except as specifically established in the Contract.

2.3 Contract is between only Owner and Contractor. The Contract Documents shall not be construed to create a contractual relationship of any kind between any Persons other than Owner and Contractor.

Article 3
Definitions

3.1 Terms, words and phrases to have ordinary meanings. Terms, words and phrases used in the Contract Documents shall have the meanings given them in this Agreement and in the General Conditions or, if not defined, in a manner consistent with construction industry standards. In the event of any inconsistency in such definitions, the definitions in this Agreement shall control.

3.2 Construction Documents. The Construction Documents are identified in the General Conditions and other Contract Documents as Drawings and Specifications. The Construction Documents do not include shop drawings or other Submittals.

3.3 Contractor. "Contractor" is the Person identified as such in the Agreement and General Conditions. Contractor must be licensed, bonded, and insured as a contractor in the State of Washington, and must legally be permitted to do business. Contractor's authorized representative, including its Designated Representative, shall be authorized to act on Contractor's behalf with respect to the Project.

3.4 General Conditions modified. Section 4.03E of the General Conditions is hereby modified to clarify that Contractor and Owner may agree on the number of copies of Submittals to be provided to Owner. If no such agreement is reached, Contractor shall submit five copies.

Article 4
Notice to Proceed and Substantial Completion

4.1 Notice to Proceed. The date of Notice to Proceed will be specified in a written Notice issued by Owner. Owner may issue separate written authorizations to proceed for different portions of the Work.

4.2 Contract Time measured from date of commencement. The Contract Time shall be

measured from the Notice to Proceed date to the contractual date of Substantial Completion established in Section 4.3, subject to adjustments as provided in the Contract Documents. Time is of the essence in completion of the Work.

4.3 Substantial Completion and Final Completion. Contractor shall achieve Substantial Completion of the Work 190 Days following Notice to Proceed, subject to adjustments as provided in the Contract Documents, and shall achieve Final Completion not later than 30 Days thereafter. Contractor represents to Owner that the Contract Time is adequate for full performance of the Work. Contractor shall also achieve any interim milestones and phasing requirements set forth in the Contract Documents.

4.4 Liquidated damages. Owner will assess, and Contractor will be responsible for, liquidated damages in the amount of two-hundred thirty-one dollars and seventy-three cents ($231.73) per Day for each Day beyond the contractual date for Substantial Completion that Substantial Completion is not timely achieved, and subsequently two-hundred nineteen dollars and seventy-three cents ($219.73) per Day for each Day beyond the time period established in Section 4.3 that Final Completion of the entire Work is not achieved. Contractor and Owner agree that the liquidated damages amounts are not penalties and are a reasonable estimation of actual damages to Owner, as of this date of Agreement, based on the inherent uncertainty and difficulty in calculating and quantifying damages caused by delays in the construction of university facilities.

Article 5
Contract Sum

5.1 Contract Sum. For Contractor's performance of the Contract, Owner shall pay to Contractor the Contract Sum of _____ _____ dollars ($_____), subject to additions and deductions for changes in the Work as provided in the Contract Documents. The Contract Sum includes by way of example and not limitation all costs of construction; general conditions; all taxes except Washington State sales tax due on the Contract Sum; Contractor's contingency; any approved Allowances; all insurance; overhead; and Contractor's fee.

5.2 Alternates. The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by Owner:

Alternate Number	Description	Price ($0.00)
Alternate No. 1	Install ACU-3(ALT)/CU-3(ALT) in lieu of ACU-3/CU-3 per the mechanical equipment schedule sheet M0.02.	

5.3 Unit Prices. Any Unit Prices are as follows:

Description	Units	Price ($0.00)
None		

Unit Prices as set forth in the Contract Documents are "all in." They include all material, equipment, labor, delivery, installation, and Subcontractor costs, any overhead and profit not included in the fee, and any other costs or expenses in connection with, or incidental to, the performance of that portion of the Work to which such Unit Prices apply.

5.4 Allowances. Allowances included in the Contract Sum are as follows:

Allowance	Amount	Included Items
None		

Allowances may be included in the Contract Sum due to uncertainty in scope, price and/or quantity at the time this Agreement is executed. Whenever actual costs are more or less than an allowance, the Contract Sum will be appropriately adjusted. Contractor must provide Owner with written notice of its intent to expend an allowance amount (providing Owner with the opportunity to approve or reject the cost) before expending an allowance amount.

5.5 Changes in the Work.

5.5.1 Owner may, without invalidating the Contract, order changes in the Work consisting of additions, deletions or other revisions. Owner shall issue such changes in writing.

5.5.2 Adjustments of the Contract Sum and/or Contract Time on account of changes in the Work may be determined by any of the methods listed in the General Conditions.

Article 6
Payments

6.1 Applications for Payment.

6.1.1 The Contract Documents detail the requirements for Applications for Payment. Based upon Applications for Payment that Contractor submits to Owner, Owner shall make progress payments to Contractor on account of the Contract Sum.

6.2 Progress Payments.

6.2.1 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows and in accordance with Section 01 29 00, Applications for Payment:

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Contract Sum allocated to that portion in the Schedule of Values. Pending final determination of the cost to Owner of changes in the Work, amounts not in dispute may be included as provided in the General

Conditions unless Owner requires that actual cost records be provided;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by Owner, suitably stored and insured off the site at a location agreed upon in writing);

.3 Subtract the aggregate sum of previous payments made by Owner;

.4 Subtract amounts, if any, for which Owner has withheld payment; and

.5 Subtract the statutory retainage of five percent (5%) of the above amount as a fund for the protection and payment of the claims of any Person arising out of the Work and the State of Washington with respect to taxes.

6.3 Subcontractor Payment Reporting.

6.3.1 All contract payments are subject to compliance tracking using the Washington State Office of Minority & Women's Business Enterprise's business diversity management system, Access Equity (B2Gnow). Contractor and all subcontractors (regardless of certification) will register and report all progress payments made utilizing the system. The Owner reserves the right to withhold payments from the Contractor for non-compliance with this requirement.

6.4 Final Payment.

6.4.1 Final payment, constituting the entire unpaid balance of the Contract Sum, less retainage, shall be made by Owner to Contractor no later than 30 Days after Contractor has fully performed the Contract and Final Completion has occurred (except for Contractor's responsibility to correct non-conforming Work discovered after final payment or to satisfy other requirements, if any, that extend beyond final payment), and Contractor has submitted a final Application for Payment.

6.4.2 Owner shall release retainage to Contractor in accordance with Chapter 60.28 RCW and the Contract Documents.

Article 7
Miscellaneous Provisions

7.1 Designated Representatives.

7.1.1 Owner's Designated Representative, designated below, shall be authorized to act on Owner's behalf with respect to the Project:

Rick Hull Jr.	Jason Harper
Project Manager	Construction Manager
Facilities Services	Facilities Services

7.1.2 Contractor's Designated Representative, identified below, shall be authorized to act on Contractor's behalf with respect to the Project:

_____
_____
_____

7.1.3 Neither Owner's nor Contractor's Designated Representatives shall be changed without 10 Days' written notice to the other party.

7.2 Interest. Payments due and unpaid under the Contract Documents shall bear interest as specified by RCW 39.76, not to exceed the Bank of America prime plus two percent (2%) per annum.

7.3 Quality control and assurance and Owner's right to inspect the Work: Contractor shall develop and submit an overall Quality Control and Assurance Plan to ensure that the Work is inspected by qualified members of Contractor's staff or third parties. The Quality Control and Assurance Plan must be acceptable to Owner. Owner expressly reserves the right to inspect any and all portions of the Work at any time during the Project. Contractor shall provide access to the Work as needed by Owner or its representatives, including the use of scaffolding, platforms, or lifts. All corrections or observations noted by Owner shall be logged by Contractor for correction, tracking and documentation to the satisfaction of Owner.

7.4 Contractor to actively manage and supervise Work. Contractor shall review and inspect the Work of Subcontractors on a regular basis for defects and deficiencies in their Work and for conformance with the Construction Documents and other Contract Documents, and shall stop the Work of Subcontractors, if necessary. Contractor shall provide notification at regularly scheduled progress meetings of any major defects or deficiencies and recommend remedial action.

7.5 Use of Third Party Neutral. Owner and Contractor intend to utilize a Third Party Neutral to assist in addressing and resolving disputes that may arise during the Project. The Third Party Neutral will be jointly engaged and will have the roles and responsibilities set forth in a Third Party Neutral Agreement, which shall be established in accordance with Section 00 80 10, Third Party Neutral.

Article 8
Enumeration of the Contract Documents

8.1 The Contract Documents. The Contract Documents, except for modifications issued after execution of this Agreement, are enumerated as follows:

8.1.1 This executed Agreement, any attached Exhibits and other documents listed in this Agreement.

8.1.2 The General Conditions for Washington State Facility Construction with Washington State University Amendments, and any Supplementary Conditions of the Contract.

8.1.3 The Addenda, if any, are as follows:

Number	Date	Pages

8.1.4 Other documents, if any, forming part of the Contract Documents are as follows:

See Contract Documents.
Department of Labor and Industries Prevailing Wage Rates.

OWNER: **WASHINGTON STATE UNIVERSITY**	**CONTRACTOR:** **FIRM NAME** **WA CONTRACTOR LICENSE NUMBER**
(Signature) (Date)	(Signature) (Date)
(Printed Name) Vice President and Chief Financial Officer Finance and Administration	(Printed Name) (Title)

END OF SECTION 00 50 00

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WSU amendments to the Washington State Facility Construction
General Conditions are identified by a bar on the right hand side of modified paragraphs

PART 1 - GENERAL PROVISIONS

1.01 DEFINITIONS

A. "Application for Payment" means a written request submitted by Contractor to Owner for payment of Work completed in accordance with the Contract Documents and approved Schedule of Values, supported by such substantiating data as Owner may require.

B. "Architect," "Engineer," or "A/E" means a person or entity lawfully entitled to practice architecture or engineering, representing Owner within the limits of its delegated authority.

C. An "Allowance" is an amount included in the Contract Sum for a stated part of the Work that is not fully defined and/or quantified at the time the Contract Sum is established. When that part of the Work is adequately defined and/or quantified, the Contract Sum will be adjusted to account for the difference between the Allowance and the actual cost of the item. Following the adjustment, that part of the Work will no longer be an Allowance item. Although not capitalized in Section 5.02B, "allowance" shall mean "Allowance."

D. "Change Order" means a written instrument signed by Owner and Contractor stating their agreement upon all of the following: (1) a change in the Work; (2) the amount of the adjustment in the Contract Sum, if any, and (3) the extent of the adjustment in the Contract Time, if any.

E. "Claim" means Contractor's exclusive remedy for resolving disputes with Owner arising out of or relating to the Contract Documents or the breach thereof or requesting an adjustment in the Contract Sum or Contract Time, as more fully set forth in Part 8. As used in the Contract Documents, the exclusive meaning of "equitable adjustment" is the ability of Contractor to follow the contractual dispute resolution process in Part 8, including the requirement for submitting a timely Notice, substantiation, and Claim.

F. The "Contract" is the agreement between Owner and Contractor and is formed by the Contract Documents. The Contract represents the entire and integrated agreement between Owner and Contractor and supersedes prior negotiations, representations or agreements, either written or oral.

G. "Contract Award Amount" is the sum of the Base Bid and any accepted Alternates, if any, for Design-Bid-Build projects and is the accepted initial Guaranteed Maximum Price for Design-Build and GC/CM projects.

H. "Contract Documents" means the General Conditions, modifications to the General Conditions, Supplemental Conditions, Agreement, Drawings and Specifications, and all addenda and modifications thereof.

I. "Contract Sum" is the total amount payable by Owner to Contractor for performance of the Work in accordance with the Contract Documents, including all taxes imposed by law and properly chargeable to the Work, except Washington State sales tax.

J. "Contract Time" is the number of Days or other time period allotted in the Contract Documents from the Notice to Proceed for achieving Substantial Completion of the Work.

K. "Contractor" means the person or entity who has agreed with Owner to perform the Work in accordance with the Contract Documents.

L. "Day(s)" means calendar day(s) unless otherwise specified.

M. "Drawings" are the graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work, and may include plans, elevations, sections, details, schedules, and diagrams.

N. "Final Acceptance" means the written acceptance of the Work by Owner, as more fully set forth in Section 6.08B.

O. "Final Completion" means that the Work is fully and finally complete in accordance with the Contract Documents and Contractor has submitted its final Application for Payment, as more fully set forth in Section 6.09A.

P. "Force Majeure" means those acts entitling Contractor to request an equitable adjustment in the Contract Time, as more fully set forth in paragraph 3.05A.

Q. "Notice" means a written notice which has been delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended or, if delivered or sent by registered or certified mail, to the last business address known to the party giving notice. Although not capitalized in the following provisions, "notice" shall mean "Notice" in Sections 3.03B, 3.03C, 3.06A, 5.01D, 5.02C, 5.03, 5.09A, 5.10A, 5.15A, 5.16F, 5.17, 9.01A, 9.02A, and 9.02B.

R. "Notice to Proceed" means a written Notice from Owner to Contractor that permits pre-construction and construction activities to commence upon specified terms and defines the date on which the Contract Time begins to run.

S. "Owner" means the Washington State University Board of Regents, which has the authority to enter into, administer, and/or terminate the Work in accordance with the Contract Documents. Owner shall designate in writing a Representative who shall have authority to bind Owner with respect to all matters requiring Owner's approval or authorization. A/E does not have such authority.

T. "Person" means a corporation, partnership, business association of any kind, trust, company, or individual.

U. "Prior Occupancy" means Owner's use of all or parts of the Project before Substantial Completion, as more fully set forth in Section 6.08A.

V. "Progress Schedule" means a schedule of the Work, in a form satisfactory to Owner, as further set forth in Section 3.02.

W. "Project" means the total construction of which the Work performed in accordance with the Contract Documents may be the whole or a part and which may include construction by Owner or by separate contractors.

X. "Project Record" means the separate set of Drawings and Specifications as further set forth in paragraph 4.02A.

Y. "Schedule of Values" means a written breakdown allocating the total Contract Sum to each principal category of Work, in such detail and format as requested by Owner.

Z. "Specifications" are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.

AA. "Subcontract" means a contract between Contractor and a Subcontractor for the purpose of obtaining supplies, materials, equipment, work or services of any kind for or in connection with the Work. Although not capitalized in the following provisions, "subcontract" shall mean "Subcontract" in Sections 5.10A, 5.20E, 9.01B, and 9.02B.

BB. "Subcontractor" means any Person of any tier, other than Contractor, who agrees to furnish or furnishes by contract with, or through Contractor, any supplies, materials, equipment, or services of any kind in connection with the Work. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor. Although not capitalized in the following provisions, "subcontractor" shall mean "Subcontractor" in Sections 5.04B, 5.04C, 5.04G, 5.20A, and 5.21B.

CC. "Substantial Completion" means that stage in the progress of the Work (or portion of the Work designated and approved by Owner) when the construction is sufficiently complete, in accordance with the Contract Documents, so that Owner can fully occupy or utilize the Work (or portion designated by Owner) for its intended use, as more fully set forth in Section 6.07. There may be separate dates of Substantial Completion specified in the Contract Documents for various phases or portions of the Work.

DD. "Work" means the construction and services required by the Contract Documents, and includes, but is not limited to, labor, materials, supplies, equipment, services, permits, and the manufacture and fabrication of components, performed, furnished, or provided in accordance with the Contract Documents. Although not capitalized in the following provisions, "work" shall mean "Work" in Sections 3.02D, 5.04B, 5.04C, 5.07D, 5.12A, 6.02 and 7.02A.

EE. A "Work Directive" ("WD") is a binding written order prepared by Owner that directs Work prior to total agreement on adjustment, if any, in the Contract Sum or Contract Time, or both.

FF. "Work Site" means the space identified and circumscribed on construction documents. The work site is controlled by the Contractor and the Contractor is responsible for compliance to regulatory requirements within the circumscribed area. Changes to the work site shall be submitted by Contractor and approved by Owner.

1.02 ORDER OF PRECEDENCE

Any conflict or inconsistency in the Contract Documents shall be resolved by giving the documents precedence in the following order, with a revision to a Contract Document having precedence over the original document and a later document having precedence over an earlier document:

1. Signed Agreement, with any Change Orders having precedence.

2. Supplemental Conditions.

3. Modifications to the General Conditions.

4. General Conditions.

5. Specifications and Drawings. The Specifications and Drawings are complementary and shall have equal precedence. Thus, anything mentioned in the Specifications but not shown on the Drawings, or shown on the Drawings but not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both. If there is any inconsistency between the Specifications and Drawings, Contractor will make an inquiry to Owner to determine how to proceed. Unless otherwise directed, Contractor will provide the better quality or greater quantity of any Work or materials, as reasonably interpreted by Owner, at no change in the Contract Sum or Contract

Time. In case of conflict within the Specifications, provisions in Division 1 shall take precedence over provisions of any other Division. In case of conflict within the Drawings, large scale Drawings shall take precedence over small scale Drawings.

1.03 EXECUTION AND INTENT

Contractor Representations: Contractor makes the following representations to Owner:

1. Contract Sum and Contract Time reasonable: The Contract Sum is reasonable compensation for the Work and the Contract Time is adequate for the performance of the Work, as represented by the Contract Documents;

2. Contractor familiar with project: Contractor has carefully reviewed the Contract Documents, visited and examined the Project site, become familiar with the local conditions in which the Work is to be performed, and satisfied itself as to the nature, location, character, quality and quantity of the Work, the labor, materials, equipment, goods, supplies, work, services and other items to be furnished and all other requirements of the Contract Documents, as well as the surface and subsurface conditions and other matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof;

3. Contractor financially capable: Contractor is financially solvent, able to pay its debts as they mature, and possesses sufficient working capital to complete the Work and perform Contractor's obligations required by the Contract Documents; and

4. Contractor can complete Work: Contractor is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform the obligations required by the Contract Documents and has sufficient experience and competence to do so.

PART 2 - INSURANCE AND BONDS

2.01 CONTRACTOR'S LIABILITY INSURANCE

General insurance requirements: Prior to commencement of the Work, Contractor shall obtain all the insurance required by the Contract Documents and provide evidence satisfactory to Owner that such insurance has been procured, including but not limited to (1) Certificates of Insurance on ACORD Form 25, and/or ACORD Form 27 or their equivalents, and which shall list any applicable self-insured retentions, (2) the actual costs (expressed as a percentage) of Contractor's liability insurance under Section 2.01A.1 below, (3) applicable endorsements evidencing proof of compliance with the requirements listed below, (4) evidence of State Workers' Compensation coverage, and (5) a copy of any builder's risk policy required by the Contract Documents. All policies, endorsements and certificates must be signed copies and shall contain a provision that policies will not be cancelled without first giving thirty (30) days (or in the event of non-payment of premium, ten (10) days) prior written Notice to Owner. Contractor shall furnish to Owner copies of any subsequently issued endorsements amending, modifying, altering or restricting coverage terms or limits. Review of Contractor's insurance by Owner shall not relieve or decrease the liability of Contractor. Companies writing the insurance to be obtained by Part 2 shall be licensed to do business under Chapter 48 RCW or comply with the Surplus Lines Law of the State of Washington. Contractor shall include in the Contract Sum the cost of all insurance and bond costs required for the Work. Insurance carriers providing insurance shall be acceptable to Owner, and its A. M. Best rating shall be indicated on the insurance certificates.

A. Term of insurance coverage: Contractor shall maintain the following insurance coverage during the Work and for one year after Substantial Completion. Contractor shall also maintain the following insurance coverage during the performance of any corrective Work required by Section 5.16.

1. General Liability Insurance: Commercial General Liability (CGL) on an occurrence-based ISO Form CG 00 01 or broader, including products and completed operations, personal and advertising injury, bodily injury and property damage liability arising from Contractor's operations or Work, including operations or Work Contractor may subcontract or sublet to others.

   The policy shall be purchased from a company or companies lawfully authorized to do business in the State of Washington possessing an A.M. Best's policyholder's rating of A or better and a financial rating of no less than XI.

   Contractor's policy shall be designated primary and non-contributory to Owner's policies, and shall include a waiver of subrogation against Owner. Any self-insured retentions or deductibles must be disclosed and approved by Owner, and Contractor agrees to be responsible for payment of any and all self-insured retentions or deductibles.

2. Automobile Liability Insurance: Automobile liability on ISO Form CA 00 01 covering Code 1 (any auto).

3. Stop Gap Liability Insurance for damages because of bodily injuries to Contractor's employees.

B. Industrial Insurance compliance: Contractor shall comply with the Washington State Industrial Insurance Act and, if applicable, the Federal Longshoremen's and Harbor Workers' Act and the Jones Act.

C. Insurance to protect for the following: All insurance coverages shall protect against claims for damages for personal and bodily injury or death, as well as claims for property damage, which may arise from operations in connection with the Work whether such operations are by Contractor or any Subcontractor.

D. Owner as Additional Insured: All insurance coverages shall be endorsed to include Owner, its officers, and employees, and any required governmental agencies as additional named insureds with coverage at least as broad as ISO Forms CG 20 10, CG 20 37, and CA 20 48, with no self-insured retentions applicable to the additional insureds.

E. Subcontractor Coverage: Contractor shall ensure and require that Subcontractors have insurance coverage to cover bodily injury and property damage on all operations and all vehicles owned or operated by Subcontractors. Subcontractors shall name Contractor and Owner, any required governmental agencies, and others designated in the Contract Documents as well as their officers and employees, as additional insureds and give at least thirty (30) Days' Notice of cancellation.

2.02 COVERAGE LIMITS

Insurance amounts: The coverage limits shall be not less than the amounts specified in the Agreement; if limits are not specified in the Agreement, coverage limits shall be not less than as follows:

A. $1,000,000 per occurrence for bodily injury, property damage, personal and advertising injury.

B. $2,000,000 general aggregate to apply separately to each project or location.

C. $2,000,000 annual aggregate for products and completed operations.

D. $1,000,000 combined single limit each automobile accident or loss.

E. $1,000,000 per accident for bodily injury or occupational disease of Contractor's employees

Coverages and Minimums: Owner's review, specification or approval of the insurance in this Contract or of its coverage or amount shall not relieve or decrease the liability of Contractor under the Contract Documents or otherwise. Coverages are the minimum to be provided and are not limitations of liability under the Contract, indemnification, or applicable law provisions. Contractor may, at its expense, purchase larger coverage amounts.

2.03 PROOF OF INSURANCE COVERAGE

A. Certificate & endorsements required: Prior to commencement of the Work, Contractor shall furnish to Owner completed certificates of insurance coverage and endorsements evidencing compliance with the additional insured, cancellation, and waiver of subrogation requirements..

B. List Project info: All insurance certificates shall name Owner's Project number and Project title.

C. Policy: In the event of a claim or loss, Contractor shall promptly provide Owner with a complete copy of all applicable policies.

2.04 PAYMENT AND PERFORMANCE BONDS

Conditions for bonds: Payment and performance bonds for 100% of the Contract Award Amount, plus Washington State sales tax, shall be furnished for the Work, using the current version of the Payment Bond and Performance Bond form published by and available from the American Institute of Architects (AIA) – form A312. No payment or performance bond is required if the Contract Sum is $150,000 or less and Contractor requests and the Owner agrees that Owner may, in lieu of the bond, retain 10% of the Contract Sum for the period specified in RCW 39.08.010.

2.05 ALTERNATIVE SURETY

When alternative surety required: Contractor shall promptly furnish payment and performance bonds from an alternative surety if:

A. Owner has a reasonable objection to the surety; or

B. Any surety fails to furnish reports on its financial condition if required by Owner.

2.06 BUILDER'S RISK

A. Owner to buy builder's risk insurance: Owner shall purchase and maintain builder's risk insurance in the amount of the Contract Sum, including all Change Orders, for the Work on a replacement cost basis until Substantial Completion. For projects not involving new building construction, an "Installation Floater" is an acceptable substitute for the builder's risk insurance. The insurance shall cover the interests of Owner, Contractor, and any Subcontractors, as their interests may appear.

B. Losses covered: Builder's risk insurance shall be placed on an "all risk" basis or equivalent policy form and insure against the perils of fire and extended coverage and physical loss or damage including theft, vandalism, malicious mischief, collapse, false work, temporary buildings, debris removal including demolition, wind, and at Owner's option may include flood and/or earthquake. The policy shall cover reasonable compensation for A/E's services and expenses required as a result of an insured loss. Losses up to the deductible amount shall be the responsibility of Contractor.

C. Waiver of subrogation rights: Owner and Contractor waive all subrogation rights against each other, any Subcontractors, A/E, A/E's subconsultants, separate contractors described in Section 5.19, if any, and any of their subcontractors, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this Section 2.06 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by Owner as fiduciary. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective to a Person or entity even though that Person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the Person or entity had an insurable interest in the property damaged.

PART 3 - TIME AND SCHEDULE

3.01 PROGRESS AND COMPLETION

Contractor to meet schedule: Contractor shall diligently prosecute the Work, with adequate forces, achieve Substantial Completion within the Contract Time, and achieve Final Completion within the time period specified in the Contract Documents. If Contractor fails to perform in a timely manner in accordance with the Contract Documents and, through the fault of Contractor or Subcontractor(s), fails to meet the Progress Schedule, Contractor shall be in default and shall take such steps as may be necessary to immediately improve its progress without change in the Contract Sum or Contract Time.

3.02 CONSTRUCTION SCHEDULE

A. Preliminary Progress Schedule: Unless otherwise provided in Division 1, Contractor shall, within 14 Days after issuance of the Notice to Proceed, submit a preliminary Progress Schedule consistent with the requirements of the Contract Documents. The Progress Schedule shall not exceed time limits specified by the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work, and shall show the sequence in which Contractor proposes to perform the Work, and the dates on which Contractor plans to start and finish major portions of the Work, including dates for submission of Submittals per Section 4.03, which shall be coordinated with the Progress Schedule and identify dates for Owner review, and for acquiring materials and equipment.

B. Form of Progress Schedule: Unless otherwise provided in Division 1, the Progress Schedule shall be in the form of a bar chart, or a critical path method analysis, as specified by Owner. The preliminary Progress Schedule may be general, showing the major portions of the Work, with a more detailed Progress Schedule submitted as directed by Owner.

C. Owner comments on Progress Schedule: Owner shall return comments on the preliminary Progress Schedule to Contractor within 14 Days of receipt. Review by Owner of Contractor's schedule does not constitute an approval or acceptance of Contractor's construction means, methods, logic or sequencing, or its ability to complete the Work within the Contract Time. Contractor shall revise and resubmit its schedule, as necessary. Owner may withhold a portion of progress payments until a Progress Schedule has been submitted that meets the requirements of this Section 3.02.

D. Monthly updates and compliance with Progress Schedule: Contractor shall utilize and comply with the Progress Schedule. On a monthly basis, or as otherwise directed by Owner, Contractor shall submit an updated Progress Schedule at its own expense to Owner indicating actual progress. If, in the opinion of Owner, Contractor is not in conformance with the Progress Schedule for reasons other than acts of Force Majeure as identified in Section 3.05, Contractor shall take such steps as are necessary to bring the actual completion dates of its work activities into conformance with the Progress Schedule, and if directed by Owner, Contractor shall submit a

corrective action plan or revise the Progress Schedule to reconcile with the actual progress of the Work.

E. Contractor to notify Owner of delays: Contractor shall perform the Work in accordance with the most recent Progress Schedule submitted to Owner. Contractor shall promptly notify Owner in writing of any actual or anticipated event that is delaying or could delay achievement of any milestone or performance of any critical path activity of the Work. Contractor shall indicate the expected duration of the delay, the anticipated effect of the delay on the Progress Schedule, and the action being or to be taken to correct the problem. Provision of such Notice does not relieve Contractor of its obligation to complete the Work within the Contract Time.

3.03 OWNER'S RIGHT TO SUSPEND THE WORK FOR CONVENIENCE

A. Owner may suspend Work: Owner may, at its sole discretion, order Contractor, in writing, to suspend all or any part of the Work for up to 90 Days, or for such longer period as mutually agreed.

B. Compliance with suspension; Owner's options: Upon receipt of a written notice suspending the Work, Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of cost of performance directly attributable to such suspension. Within a period up to 90 Days after the notice is delivered to Contractor, or within any extension of that period to which the parties shall have agreed, Owner shall either:

1. Cancel the written notice suspending the Work; or

2. Terminate the Work covered by the notice as provided in the termination provisions of Part 9.

C. Resumption of Work: If a written notice suspending the Work is cancelled or the period of the notice or any extension thereof expires, Contractor shall resume Work.

D. Equitable Adjustment for suspensions: Contractor shall be entitled to an equitable adjustment in the Contract Time, or Contract Sum, or both, for increases in the time or cost of performance directly attributable to such suspension, provided Contractor complies with all requirements set forth in Part 7.

3.04 OWNER'S RIGHT TO STOP AND/OR CARRY OUT THE WORK FOR CAUSE

A. Owner may stop Work for Contractor's failure to perform: If Contractor fails or refuses to perform its obligations in accordance with the Contract Documents, Owner may order Contractor, in writing, to stop the Work, or any portion thereof, until Owner has accepted satisfactory corrective action.

B. Owner may carry out the Work after Contractor's failure to perform: If Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a 14-Day period after receipt of written Notice from Owner to commence and continue to make reasonable progress toward the correction of such default or neglect with diligence and promptness, Owner may, without prejudice to other remedies Owner may have, correct such deficiencies, and an appropriate Change Order shall be issued deducting from payments then or thereafter due Contractor the reasonable cost of correcting the deficiencies, including Owner's expenses and compensation for A/E's additional services made necessary by the default, neglect or failure. If payments then or thereafter due Contractor are not sufficient to cover such amounts, Contractor shall pay the difference to Owner.

C. No equitable adjustment for Contractor's failure to perform: Contractor shall not be entitled to an equitable adjustment in the Contract Time or Contract Sum for any increased cost or time of performance attributable to Contractor's failure or refusal to perform or from any reasonable remedial action taken by Owner based upon such failure.

3.05 DELAY

A. Force Majeure actions not a default; Force Majeure defined: Any delay in or failure of performance by Owner or Contractor shall not constitute a default if and to the extent the cause for such delay or failure of performance was unforeseeable and beyond the control of the party. Acts of Force Majeure include, but are not limited to:

1. Acts of God or the public enemy;

2. Acts or omissions of any government entity not the fault of Owner or Contractor;

3. Fire or other casualty for which Contractor is not responsible;

4. Quarantine or epidemic;

5. Industry-wide strike or defensive lockout;

6. Unusually severe weather conditions which could not have been reasonably anticipated; and

7. Unusual delay in receipt of supplies or products which were ordered and expedited and for which no substitute reasonably acceptable to Owner was available.

    a. "Unusually severe weather" shall mean weather conditions that are abnormal for the period of time for which Force Majeure is claimed, that could not reasonably have been anticipated or avoided, and that had an adverse effect on the Progress Schedule. Neither the Contract Time nor the Contract Sum will be adjusted for normal inclement weather or if the Work was behind schedule (unless behind schedule for a reason not the responsibility of the Contractor) at the time the unusually severe weather occurred. The Contractor shall be entitled to a change in the Contract Time only (but not a change in the Contract Sum) if the Contractor can substantiate to the reasonable satisfaction of the Owner that there was unusually severe weather as compared to normal using a ten (10) year average of accumulated record mean values from climatological data compiled by the U.S. Department of Commerce National Oceanic and Atmospheric Administration for the locale closest to the Project, and that the abnormal inclement weather actually impacted and extended the critical path of the Work. Unusual is defined as a 10-year weather event of either or both precipitation or temperature extremes that fall outside the upper and lower ranges within a 10-year periodicity

B. Contract Time adjustment for Force Majeure: Contractor shall be entitled to an equitable adjustment in the Contract Time for changes in the time of performance directly attributable to an act of Force Majeure, provided it makes a request for equitable adjustment. Contractor shall not be entitled to an adjustment in the Contract Sum resulting from an act of Force Majeure.

C. Contract Time or Contract Sum adjustment if Owner at fault: Contractor shall be entitled to an equitable adjustment in Contract Time, and may be entitled to an equitable adjustment in

Contract Sum, if the cost or time of Contractor's performance is changed due to the fault or negligence of Owner, provided the Contractor makes a request for equitable adjustment.

D. No Contract Time or Contract Sum adjustment if Contractor at fault: Contractor shall not be entitled to an adjustment in Contract Time or in the Contract Sum for any delay or failure of performance to the extent such delay or failure was caused by Contractor or anyone for whose acts Contractor is responsible.

E. Contract Time adjustment only for concurrent fault: To the extent any delay or failure of performance was concurrently caused by the Owner and Contractor, Contractor shall be entitled to an adjustment in the Contract Time for that portion of the delay or failure of performance that was concurrently caused, provided it makes a request for equitable adjustment, but shall not be entitled to an adjustment in Contract Sum.

F. Contractor to mitigate delay impacts: Contractor shall make all reasonable efforts to prevent and mitigate the effects of any delay, whether occasioned by an act of Force Majeure or otherwise. Contractor shall not recover damages, an equitable adjustment or an increase in the Contract Sum or Contract Time from Owner where Contractor could have reasonably avoided the delay by the exercise of due diligence.

G. Types of damages permitted: If Contractor and its Subcontractors are entitled to a change in the Contract Sum, the amount of the change shall be the actual costs incurred by the Contractor and Subcontractors directly related to the change calculated in accordance with Section 7.02. Contractor and its Subcontractors shall not otherwise (not reflected by the actual costs incurred as calculated in accordance with Section 7.02) be entitled to damages arising out of actual or alleged loss of efficiency; morale, fatigue, attitude, or labor rhythm; constructive acceleration; home office overhead; expectant underrun; trade stacking; reassignment of workers; rescheduling of Work, concurrent operations; dilution of supervision; learning curve; beneficial or joint occupancy; logistics; ripple; season change; extended overhead; profit upon damages for delay; impact damages including cumulative impacts; or similar damages. Any effect that such alleged events may have on Contractor or its Subcontractors, to the extent not otherwise paid, is subsumed in and fully compensated through the percentage Fee on Change Orders paid through Section 7.02A.3.e and any liquidated damages paid hereunder.

3.06 NOTICE TO OWNER OF LABOR DISPUTES

A. Contractor to notify Owner of labor disputes: If Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay timely performance in accordance with the Contract Documents, Contractor shall immediately give notice, including all relevant information, to Owner.

B. Pass through notification provisions to Subcontractors: Contractor agrees to insert a provision in its Subcontracts and to require insertion in all sub-subcontracts, that in the event timely performance of any such contract is delayed or threatened by delay by any actual or potential labor dispute, the Subcontractor or Sub-subcontractor shall immediately notify the next higher tier Subcontractor or Contractor, as the case may be, of all relevant information concerning the dispute.

3.07 DAMAGES FOR FAILURE TO ACHIEVE TIMELY COMPLETION

A. Liquidated Damages:

1. Reason for Liquidated Damages: Timely performance and completion of the Work is essential to Owner and time limits stated in the Contract Documents are of the essence.

Owner will incur serious and substantial damages if Substantial Completion of the Work does not occur within the Contract Time. However, it would be difficult if not impossible to determine the exact amount of such damages. Consequently, provisions for liquidated damages are included in the Contract Documents.

2. Calculation of Liquidated Damages amount: The liquidated damage amounts set forth in the Contract Documents will be assessed not as a penalty, but as liquidated damages for breach of the Contract Documents. This amount is fixed and agreed upon by and between the Contractor and Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain. This amount shall be construed as the actual amount of damages sustained by the Owner, and may be retained by the Owner and deducted from periodic payments to the Contractor.

3. Contractor responsible even if Liquidated Damages assessed: Assessment of liquidated damages shall not release Contractor from any obligations or liabilities pursuant to the Contract Documents. If Contractor substantially fails to perform in a timely manner in accordance with the Contract Documents and, through the fault of Contractor or Subcontractor(s), fails to achieve Substantial Completion within the Contract Time, Contractor shall be in default.

B. Actual Damages: If no liquidated damages are established, actual damages may be assessed for failure to achieve both Substantial Completion and Final Completion within the time provided. Actual damages will be calculated on the basis of direct architectural, administrative, and other related costs attributable to the Project from the date when Substantial and/or Final Completion should have been achieved, as applicable. Owner may offset these costs against any payment due Contractor.

PART 4 - SPECIFICATIONS, DRAWINGS, AND OTHER DOCUMENTS

4.01 DISCREPANCIES AND CONTRACT DOCUMENT REVIEW

A. Specifications and Drawings are basis of the Work: The intent of the Specifications and Drawings is to describe a complete Project to be constructed in accordance with the Contract Documents. Contractor shall furnish all labor, materials, equipment, tools, transportation, permits, and supplies, and perform the Work required in accordance with the Drawings, Specifications, and other provisions of the Contract Documents.

B. Parts of the Contract Documents are complementary: The Contract Documents are complementary. What is required by one part of the Contract Documents shall be binding as if required by all. Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both.

C. Contractor to report discrepancies in Contract Documents: Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by Owner. If, during the performance of the Work, Contractor finds a conflict, error, inconsistency, or omission in the Contract Documents, it shall promptly and before proceeding with the Work affected thereby, report such conflict, error, inconsistency, or omission to A/E in writing.

D. Contractor knowledge of discrepancy in documents – responsibility: Contractor shall do no Work without applicable Drawings, Specifications, and, where required, accepted shop drawings and other Submittals, unless instructed to do so in writing by Owner. If Contractor performs any construction activity, and it knows or reasonably should have known that any of the Contract

Documents contain a conflict, error, inconsistency, or omission, Contractor shall be responsible for the performance and shall bear the cost for its correction.

E. Contractor to perform Work implied by Contract Documents: Contractor shall provide any work or materials the provision of which is clearly implied and is within the scope of the Contract Documents even if the Contract Documents do not mention them specifically.

F. Interpretation questions referred to A/E: Questions regarding interpretation of the requirements of the Contract Documents shall be referred to the A/E.

4.02 PROJECT RECORD

A. Contractor to maintain Project Record Drawings and Specifications: Contractor shall legibly mark in ink on a separate set of the Drawings and Specifications all actual construction, including depths of foundations, horizontal and vertical locations of internal and underground utilities and appurtenances referenced to permanent visible and accessible surface improvements, field changes of dimensions and details, actual suppliers, manufacturers and trade names, models of installed equipment, changes made to the building enclosure, and Change Order Proposals. This separate set of Drawings and Specifications shall be the "Project Record." The Project Record shall include all Architectural, Mechanical, Electrical, Structural and Civil as-built drawings, whether or not any changes occur and shall also include Addenda, Change Orders, WDs and other modifications to the Contract, in good order and marked currently to indicate field changes and selections made during construction, as well as one copy of accepted shop drawings, product data, samples and other required Submittals.

B. Update Project Record weekly and keep on site: The Project Record shall be maintained on the Project site throughout the construction and shall be clearly labeled "PROJECT RECORD." The Project Record shall be available to A/E and Owner at all times. The Project Record shall be updated at least weekly noting all changes and shall be available to Owner at all times.

C. Final Project Record to A/E before Final Acceptance: Contractor shall submit the completed and finalized Project Record to A/E prior to Final Acceptance.

4.03 SUBMITTALS

A. Definition of Submittals: "Submittals" means documents and other information required to be submitted to A/E by Contractor pursuant to the Contract Documents, showing in detail: the proposed fabrication and assembly of structural elements; and the installation (i.e. form, fit, and attachment details) of materials and equipment. Submittals can include, but are not limited to, drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, samples, and similar materials furnished by Contractor to explain in detail specific portions of the Work required by the Contract Documents. For materials and equipment to be incorporated into the Work, Contractor submittal shall include the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the item. When directed, Contractor shall submit all samples at its own expense. Owner may duplicate, use, and disclose Submittals provided in accordance with the Contract Documents.

B. Approval of Submittals by Contractor and A/E: Contractor shall coordinate all Submittals with the Progress Schedule per Section 3.02A, shall review them for accuracy, completeness, and compliance with the Contract Documents, and shall indicate its approval thereon as evidence of such coordination and review. Where required by law, Submittals shall be stamped by an appropriate professional licensed by the state of Washington. Submittals submitted to A/E without evidence of Contractor's approval shall be returned for resubmission. Contractor shall

review, approve, and submit Submittals with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of Owner or separate contractors. Contractor's submittal schedule shall allow a reasonable time for A/E review. A/E will review, approve, or take other appropriate action on the Submittals. Contractor shall perform no portion of the Work requiring submittal and review of Submittals until the respective submittal has been reviewed and the A/E has approved or taken other appropriate action. Owner and A/E shall respond to Submittal with reasonable promptness. Any Work by Contractor shall be in accordance with reviewed Submittals. Submittals made by Contractor which are not required by the Contract Documents may be returned without action.

C. Contractor not relieved of responsibility when Submittals approved: Approval, or other appropriate action with regard to Submittals, by Owner or A/E shall not relieve Contractor of responsibility for any errors or omissions in such Submittals, nor from responsibility for compliance with the requirements of the Contract Documents. Unless specified in the Contract Documents, review by Owner or A/E shall not constitute an approval of the safety precautions employed by Contractor during construction, or constitute an approval of Contractor's means or methods of construction. If Contractor fails to obtain approval before installation and the item or work is subsequently rejected, Contractor shall be responsible for all costs of correction.

D. Variations between Submittals and Contract Documents: Submittals, including product data, samples and similar submissions, are not Contract Documents. If Submittals vary from the requirements of the Contract Documents, Contractor shall describe such variations in writing, separate from the Submittals, at the time it submits the Submittals containing such variations. If Owner approves any such variation, an appropriate Change Order will be issued. If the variation is minor and does not involve an adjustment in the Contract Sum or Contract Time, a Change Order need not be issued; however, the modification shall be approved by Owner in writing and recorded upon the Project Record. Approval for substitutions shall not be sought and shall not be approved through the submission of Submittals.

E. Contractor to submit 5 copies of Submittals: Unless otherwise provided in Division 1, Contractor shall submit to A/E for approval 5 copies of all Submittals. Unless otherwise indicated, 3 sets of all Submittals shall be retained by A/E and 2 sets shall be returned to Contractor.

4.04 ORGANIZATION OF SPECIFICATIONS

Specification organization by trade: Specifications are prepared in sections which conform generally with trade practices. These sections are for Owner and Contractor convenience and shall not control Contractor in dividing the Work among the Subcontractors or in establishing the extent of the Work to be performed by any trade.

4.05 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS, AND OTHER DOCUMENTS

A. A/E, not Contractor, owns Copyright of Drawings and Specifications: The Drawings, Specifications, and other documents prepared by A/E are instruments of A/E's service through which the Work to be executed by Contractor is described. Neither Contractor nor any Subcontractor shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by A/E, and A/E shall be deemed the author of them and will, along with any rights of Owner, retain all common law, statutory, and other reserved rights, in addition to the copyright. All copies of these documents, except Contractor's set, shall be returned or suitably accounted for to A/E, on request, upon completion of the Work.

B. Drawings and Specifications to be used only for this Project: The Drawings, Specifications, and other documents prepared by the A/E, and copies thereof furnished to Contractor, are for use solely with respect to this Project. They are not to be used by Contractor or any Subcontractor on

other projects or for additions to this Project outside the scope of the Work without the specific written consent of Owner and A/E. Contractor and Subcontractors are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications, and other documents prepared by A/E appropriate to and for use in the execution of their Work.

C. License granted to Owner: Contractor and all Subcontractors grant a non-exclusive license to Owner, without additional cost or royalty, to use for its own purposes (including reproduction) all Submittals, together with the information and diagrams contained therein, prepared by Contractor or any Subcontractor. In providing Submittals, Contractor and all Subcontractors warrant that they have authority to grant to Owner a license to use the Submittals, and that such license is not in violation of any copyright or other intellectual property right. Contractor agrees to defend and indemnify Owner pursuant to the indemnity provisions in Section 5.03 and 5.22 from any violations of copyright or other intellectual property rights arising out of Owner's use of the Submittals hereunder, or to secure for Owner, at Contractor's own cost, licenses in conformity with this section.

D. Submittals to be used only for this Project: Submittals prepared by Contractor, Subcontractors of any tier, or its or their equipment or material suppliers, and copies thereof furnished to Contractor, are for use solely with respect to this Project. They are not to be used by Contractor or any Subcontractor of any tier, or material or equipment supplier, on other projects or for additions to this Project outside the scope of the Work without the specific written consent of Owner. The Contractor, Subcontractors of any tier, and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Submittals appropriate to and for use in the execution of their Work under the Contract Documents.

E. Electronic Files: If the parties intend to transmit the instruments of service or any other information or documentation in digital form (other than PDF), they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Contract Documents.

PART 5 - PERFORMANCE

5.01 CONTRACTOR CONTROL AND SUPERVISION

A. Contractor responsible for Means and Methods of construction: Contractor shall supervise and direct the Work, using its best skill and attention, and shall perform the Work in a skillful manner. Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work, unless the Contract Documents give other specific instructions concerning these matters. Contractor shall disclose its means and methods of construction when requested by Owner.

B. Competent superintendent required: Contractor, as soon as practicable after award of the Contract, shall furnish in writing to Owner the name and qualifications of its proposed superintendent. Owner may reply within 14 Days to Contractor in writing stating (1) whether Owner has reasonable objection to the proposed superintendent or (2) that Owner requires additional time to review. Failure of Owner to reply within the 14-Day period shall constitute Notice of no reasonable objection. The superintendent shall not be employed on any other project during the course of the Work. Unless approved by the Owner's representative and only when overseeing projects on the same campus or location where oversite and supervision will not be degraded. Performance of the Work shall be directly supervised by a competent superintendent who shall be in attendance at the Project site during performance of the Work and who has authority to act on behalf of Contractor. Communications given to the superintendent shall be as binding as if given to Contractor. The superintendent must be satisfactory to Owner and shall not be changed without the prior written consent of Owner. Owner may require

Contractor to remove the superintendent from the Work or Project site, if Owner reasonably deems the superintendent incompetent, careless, or otherwise objectionable, provided Owner has first notified Contractor in writing and allowed a reasonable period for transition.

C. Contractor responsible for acts and omissions of self and agents: Contractor shall be responsible to Owner for acts and omissions of Contractor, Subcontractors, and their employees and agents.

D. Contractor to employ competent and disciplined workforce: Contractor shall enforce strict discipline and good order among all of the Contractor's employees and other persons performing the Work. Contractor shall not permit employment of persons not skilled in tasks assigned to them. Contractor's employees shall at all times conduct business in a manner which assures fair, equal, and nondiscriminatory treatment of all persons. Owner may, by written notice, request Contractor to remove from the Work or Project site any employee Owner reasonably deems incompetent, careless, or otherwise objectionable.

E. Contractor to keep project documents on site: Contractor shall keep on the Project site a copy of the Drawings, Specifications, addenda, reviewed Submittals, and permits and permit drawings.

F. Contractor to comply with ethical standards: Contractor shall ensure that its owner(s) and employees, and those of its Subcontractors, comply with the Ethics in Public Service Act RCW 42.52, which, among other things, prohibits state employees from having an economic interest in any public works contract that was made by, or supervised by, that employee. Contractor shall remove, at its sole cost and expense, any of its, or its Subcontractors' employees, if they are in violation of this act.

5.02 PERMITS, FEES, AND NOTICES

A. Contractor to obtain and pay for permits: Unless otherwise provided in the Contract Documents, Contractor shall secure and pay for the building, any land use permits and all other permits, licenses, and inspections necessary for proper execution and completion of the Work. Prior to Final Acceptance, the approved, signed permits shall be delivered to Owner.

B. Allowances for permit fees: If allowances for permits or utility fees are called for in the Contract Documents and set forth in Contractor's bid, and the actual costs of those permits or fees differ from the allowances in the Contract Documents, the difference shall be adjusted by Change Order.

C. Contractor to comply with all applicable laws: Contractor shall comply with and give notices required by all federal, state, and local laws, ordinances, rules, regulations, and lawful orders of public authorities applicable to performance of the Work.

D. Taxes: Contractor shall pay sales, consumer, use, business and occupation, income and similar taxes for the Work that are legally enacted when the initial Contract Sum is agreed.

5.03 PATENTS AND ROYALTIES

Payment, indemnification, and notice: Contractor is responsible for, and shall pay, all royalties and license fees. Contractor shall defend, indemnify, and hold Owner harmless from any costs, expenses, and liabilities arising out of the infringement by Contractor of any patent, copyright, or other intellectual property right used in the Work; however, provided that Contractor gives prompt notice, Contractor shall not be responsible for such defense or indemnity when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents. If Contractor has reason to believe that use of the required design, process, or product constitutes an infringement of a patent or copyright, it shall promptly notify Owner of such potential infringement.

5.04 PREVAILING WAGES

A. Contractor to pay Prevailing Wages: Contractor shall pay the prevailing rate of wages to all workers, laborers, or mechanics employed in the performance of any part of the Work in accordance with RCW 39.12 and the rules and regulations of the Department of Labor and Industries. The schedule of prevailing wage rates for the locality or localities of the Work, is determined by the Industrial Statistician of the Department of Labor and Industries. It is the Contractor's responsibility to verify the applicable prevailing wage rate.

B. Statement of Intent to Pay Prevailing Wages: Before payment is made by the Owner to the Contractor for any work performed by the Contractor and subcontractors whose work is included in the application for payment, the Contractor shall submit, or shall have previously submitted to the Owner for the Project, a Statement of Intent to Pay Prevailing Wages, approved by the Department of Labor and Industries, certifying the rate of hourly wage paid and to be paid each classification of laborers, workers, or mechanics employed upon the Work by Contractor and Subcontractors. Such rates of hourly wage shall not be less than the prevailing wage rate.

C. Affidavit of Wages Paid: Prior to release of retainage, the Contractor shall submit to the Owner an Affidavit of Wages Paid, approved by the Department of Labor and Industries, for the Contractor and every subcontractor that performed work on the Project.

D. Disputes: Disputes regarding prevailing wage rates shall be referred for arbitration to the Director of the Department of Labor and Industries. The arbitration decision shall be final and conclusive and binding on all parties involved in the dispute as provided for by RCW 39.12.060.

E. Statement with pay application; Post Statements of Intent at job site: Each Application for Payment submitted by Contractor shall state that prevailing wages have been paid in accordance with the prefiled statement(s) of intent, as approved. Copies of the approved intent statement(s) shall be posted on the job site with the address and telephone number of the Industrial Statistician of the Department of Labor and Industries where a complaint or inquiry concerning prevailing wages may be made.

F. Contractor to pay for Statements of Intent and Affidavits: In compliance with chapter 296-127 WAC, Contractor shall pay to the Department of Labor and Industries the currently established fee(s) for each statement of intent and/or affidavit of wages paid submitted to the Department of Labor and Industries for certification.

G. Certified Payrolls: Consistent with WAC 296-127-320, the Contractor and any subcontractor shall submit a certified copy of payroll records if requested.

5.05 HOURS OF LABOR

A. Overtime: Contractor shall comply with all applicable provisions of RCW 49.28 and they are incorporated herein by reference.

5.06 NONDISCRIMINATION

A. Discrimination prohibited by applicable laws: Discrimination in all phases of employment is prohibited by, among other laws and regulations, Title VII of the Civil Rights Act of 1964, the Vietnam Era Veterans Readjustment Act of 1974, Sections 503 and 504 of the Vocational Rehabilitation Act of 1973, the Equal Employment Act of 1972, the Age Discrimination Act of 1967, the Americans with Disabilities Act of 1990, the Civil Rights Act of 1991, Presidential Executive Order 11246, Executive Order 11375, the Washington State Law Against Discrimination, RCW 49.60, and Gubernatorial Executive Order 85-09. These laws and

regulations establish minimum requirements for affirmative action and fair employment practices which Contractor must meet.

B. During performance of the Work:

1. Protected Classes: Contractor shall not discriminate against any employee or applicant for employment because of race, creed, color, national origin, citizenship or immigration status, sex, sexual orientation, gender identity, age, marital status, or the presence of any physical, sensory, or mental disability, Vietnam era veteran status, or disabled veteran status, honorably discharged veteran or military status, or the use of a trained dog guide or service animal by a person with a disability, nor commit any other unfair practices as defined in RCW 49.60.

2. Advertisements to state nondiscrimination: Contractor shall, in all solicitations or advertisements for employees placed by or for it, state that all qualified applicants will be considered for employment, without regard to race, creed, color, national origin, citizenship or immigration status, sex, sexual orientation, gender identity, age, marital status, or the presence of any physical, sensory, or mental disability, honorably discharged veteran or military status, or the use of a trained dog guide or service animal by a person with a disability.

3. Contractor to notify unions and others of nondiscrimination: Contractor shall send to each labor union, employment agency, or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice advising the labor union, employment agency, or workers' representative of Contractor's obligations according to the Contract Documents and RCW 49.60.

4. Owner and State access to Contractor records: Contractor shall permit access to its books, records, and accounts, and to its premises by Owner, and by the Washington State Human Rights Commission, for the purpose of investigation to ascertain compliance with this section of the Contract Documents.

5. Pass through provisions to Subcontractors: Contractor shall include the provisions of this section in every Subcontract.

5.07 SAFETY PRECAUTIONS

A. Contractor responsible for safety: Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Work. Contractor shall be solely and completely responsible for conditions of the Project site, including safety of all persons and property, during performance of the Work. Contractor shall maintain the Project site and perform the Work in a manner that meets statutory and common-law requirements for the provision of a safe place to work. This requirement shall apply continuously and not be limited to working hours. Any review by Owner or A/E of Contractor's performance shall not be construed to include a review of the adequacy of Contractor's safety measures in, on or near the site of the Work.

B. Contractor safety responsibilities: In carrying out its responsibilities according to the Contract Documents, Contractor shall protect the lives and health of employees performing the Work and other persons who may be affected by the Work; prevent damage to materials, supplies, and equipment whether on site or stored off-site; and prevent damage to other property at the site or adjacent thereto. Contractor shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss; shall erect and maintain all necessary safeguards for such

safety and protection; and shall notify owners of adjacent property and utilities when prosecution of the Work may affect them.

C. Contractor to maintain safety records: Contractor shall maintain an accurate record of exposure data on all incidents relating to the Work resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment. Contractor shall immediately report any such incident to Owner. Owner shall, at all times, have a right of access to all records of exposure.

D. Contractor to provide HazMat training: Contractor shall provide all persons working on the Project site with information and training on hazardous chemicals in their work at the time of their initial assignment, and whenever a new hazard is introduced into their work area.

1. Information. At a minimum, Contractor shall inform persons working on the Project site of:

a. WAC: The requirements of chapter 296-62 WAC, General Occupational Health Standards;

b. Presence of hazardous chemicals: Any operations in their work area where hazardous chemicals are present; and

c. Hazard communications program: The location and availability of written hazard communication programs, including the required list(s) of hazardous chemicals and material safety data sheets required by chapter 296-62 WAC.

2. Training. At a minimum, Contractor shall provide training for persons working on the Project site which includes:

a. Detecting hazardous chemicals: Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);

b. Hazards of chemicals: The physical and health hazards of the chemicals in the work area;

c. Protection from hazards: The measures such persons can take to protect themselves from these hazards, including specific procedures Contractor, or its Subcontractors, or others have implemented to protect those on the Project site from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and

d. Hazard communications program: The details of the hazard communications program developed by Contractor, or its Subcontractors, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

E. Hazardous, toxic or harmful substances: Contractor's responsibility for hazardous, toxic, or harmful substances shall include the following duties:

1. Illegal use of dangerous substances: Contractor shall not keep, use, dispose, transport, generate, or sell on or about the Project site, any substances now or hereafter designated as, or which are subject to regulation as, hazardous, toxic, dangerous, or

harmful by any federal, state or local law, regulation, statute or ordinance (hereinafter collectively referred to as "hazardous substances"), in violation of any such law, regulation, statute, or ordinance, but in no case shall any such hazardous substance be stored more than 90 Days on the Project site.

2. Contractor notifications of spills, failures, inspections, and fines: Contractor shall promptly notify Owner of all spills or releases of any hazardous substances which are otherwise required to be reported to any regulatory agency and pay the cost of cleanup. Contractor shall promptly notify Owner of all failures to comply with any federal, state, or local law, regulation, or ordinance; all inspections of the Project site by any regulatory entity concerning the same; all regulatory orders or fines; and all responses or interim cleanup actions taken by or proposed to be taken by any government entity or private party on the Project site.

F. Public safety and traffic: All Work shall be performed with due regard for the safety of the public. Contractor shall perform the Work so as to cause a minimum of interruption of vehicular traffic or inconvenience to pedestrians. All arrangements to care for such traffic shall be Contractor's responsibilities. All expenses involved in the maintenance of traffic by way of detours shall be borne by Contractor.

G. Contractor to act in an emergency: In an emergency affecting the safety of life or the Work or of adjoining property, Contractor is permitted to act, at its discretion, to prevent such threatened loss or injury, and Contractor shall so act if so authorized or instructed.

H. No duty of safety by Owner or A/E: Nothing provided in this Section 5.07 shall relieve Contractor of sole and complete responsibility for safety at the Project site, for sole and complete responsibility for any violation of safety or property protection requirements or the correction thereof, or impose any duty upon Owner or A/E with regard to, or as constituting any express or implied assumption of control or responsibility over, any other safety conditions relating to employees or agents of Contractor or any of its Subcontractors, or the public. Any Notice Owner or A/E gives to Contractor of a safety or property protection violation will not: (1) relieve Contractor of sole and complete responsibility for the violation and the correction thereof, or for sole liability for the consequences of said violation; (2) impose any obligation upon Owner or A/E to inspect or review Contractor's safety program or precautions or to enforce Contractor's compliance with the requirements of this Section 5.07; or (3) impose any continuing obligation upon Owner or A/E to provide such Notice to Contractor or any other persons or entity.

5.08 OPERATIONS, MATERIAL HANDLING, AND STORAGE AREAS

A. Limited storage areas: Contractor shall confine all operations, including storage of materials, to Owner-approved areas.

B. Temporary buildings and utilities at Contractor expense: Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be provided by Contractor only with the consent of Owner and without expense to Owner. The temporary buildings and utilities shall be removed by Contractor at its expense upon completion of the Work.

C. Roads and vehicle loads: Contractor shall use only established roadways or temporary roadways authorized by Owner. When materials are transported in prosecuting the Work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by federal, state, or local law or regulation.

D. Ownership and reporting by Contractor of demolished materials: Ownership and control of all materials or facility components to be demolished or removed from the Project site by Contractor

shall immediately vest in Contractor upon severance of the component from the facility or severance of the material from the Project site. Contractor shall be responsible for compliance with all laws governing the storage and ultimate disposal. Contractor shall provide Owner with a copy of all manifests and receipts evidencing proper disposal when required by Owner or applicable law.

E. Contractor responsible for care of materials and equipment on-site: Contractor shall be responsible for the proper care and protection of its materials and equipment delivered to the Project site. Materials and equipment may be stored on the premises subject to approval of Owner. When Contractor uses any portion of the Project site as a shop, Contractor shall be responsible for any repairs, patching, or cleaning arising from such use.

F. Contractor responsible for loss of materials and equipment: Contractor shall protect and be responsible for any damage or loss to the Work, or to the materials or equipment until the date of Substantial Completion, and shall repair or replace without cost to Owner any damage or loss that may occur, except damages or loss caused by the acts or omissions of Owner. Contractor shall also protect and be responsible for any damage or loss to the Work, or to the materials or equipment, after the date of Substantial Completion, and shall repair or replace without cost to Owner any such damage or loss that might occur, to the extent such damages or loss are caused by the acts or omissions of Contractor, or any Subcontractor.

5.09 PRIOR NOTICE OF EXCAVATION

A. Excavation defined; Use of locator services: "Excavation" means an operation in which earth, rock, or other material on or below the ground is moved or otherwise displaced by any means, except the tilling of soil less than 12 inches in depth for agricultural purposes, or road ditch maintenance that does not change the original road grade or ditch flow line. Before commencing any excavation, Contractor shall provide notice of the scheduled commencement of excavation to all owners of underground facilities or utilities, through locator services.

5.10 UNFORESEEN PHYSICAL CONDITIONS

A. Notice requirement for concealed or unknown conditions: If Contractor encounters conditions at the site which are subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents, or unknown physical conditions of an unusual nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then Contractor shall give written notice to Owner promptly and in no event later than 7 Days after the first observance of the conditions. Conditions shall not be disturbed prior to such notice.

B. Adjustment in Contract Time and Contract Sum: If such conditions differ materially and cause a change in Contractor's cost of, or time required for, performance of any part of the Work, the Contractor may be entitled to an equitable adjustment in the Contract Time or Contract Sum, or both, provided it makes a request therefore as provided in Part 7.

5.11 PROTECTION OF EXISTING STRUCTURES, EQUIPMENT, VEGETATION, UTILITIES AND IMPROVEMENTS

A. Contractor to protect and repair property: At all times until Owner's occupancy of the Work or a designated portion of the Work, Contractor shall protect the Work from damage, weather, deterioration, theft, vandalism and malicious mischief and shall bear the risk of any uninsured loss or destruction of, or injury or damage to, all materials, equipment, tools, and other items incorporated or to be incorporated in the Work or designated portion, or consumed or used in the performance of the Work or designated portion, including all Work in process and completed

Work. Contractor shall protect from damage all existing structures, equipment, improvements, utilities, streets, curbs, walks and vegetation at or near the Project site or on adjacent property of a third party, the locations of which are made known to or should be known by Contractor. Contractor shall repair any damage, including that to the property of a third party, resulting from failure to comply with the requirements of the Contract Documents or failure to exercise reasonable care in performing the Work. If Contractor fails or refuses to repair the damage promptly, Owner may have the necessary work performed and charge the cost to Contractor. If a governmental authority having jurisdiction requires that the repairing and patching be done with its own labor and/or materials, Contractor shall abide by such regulations, and it shall pay for this work at no additional cost to Owner.

B. Tree and vegetation protection: Contractor shall only remove trees when specifically authorized to do so, and shall protect vegetation that will remain in place.

C. Special site conditions: If, in the course of the Work, Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, Contractor shall immediately suspend any operations that would affect them and shall notify Owner and A/E. Upon receipt of such Notice, Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. Contractor shall continue to suspend these operations until otherwise instructed by Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Part 8.

5.12 LAYOUT OF WORK

A. Advanced planning of the Work: Contractor shall plan and lay out the Work in advance of operations so as to coordinate all work without delay or revision.

B. Layout responsibilities: Contractor shall lay out the Work from Owner-established baselines and bench marks indicated on the Drawings, and shall be responsible for all field measurements in connection with the layout. Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the Work. Contractor shall be responsible for executing the Work to the lines and grades that may be established. Contractor shall be responsible for maintaining or restoring all stakes and other marks established.

5.13 MATERIAL AND EQUIPMENT

A. Contractor to provide new and equivalent equipment and materials: All equipment, material, and articles incorporated into the Work shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in the Contract Documents. References in the Specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard quality and shall not be construed as limiting competition. Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of A/E and after submittal and approval of a substitute request, is equal to that named in the Specifications, unless otherwise specifically provided in the Contract Documents.

B. Contractor responsible for fitting parts together: Contractor shall do all cutting, fitting, or patching that may be required to complete the Work or to make its several parts fit together properly, or receive or be received by work of others set forth in, or reasonably implied by, the Contract Documents. Contractor shall not damage or endanger any work of Owner or separate contractors by cutting, excavating, or otherwise altering the Work and shall not cut or alter the

work of any other contractor unless approved in advance by Owner. Contractor shall restore all areas requiring cutting, fitting and patching to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

C. Owner may reject defective Work: Should any of the Work be found defective, or in any way not in accordance with the Contract Documents, this Work, in whatever stage of completion, may be rejected by Owner. However, neither this authority of Owner nor a decision made either to exercise or not to exercise such authority shall give rise to a duty or responsibility of Owner or its representatives to Contractor, Subcontractors, their agents or employees, or other persons or entities performing portions of the Work.

5.14 AVAILABILITY AND USE OF UTILITY SERVICES

A. Owner to provide and charge for utilities: Owner shall make all reasonable utilities available to Contractor from existing outlets and supplies, as specified in the Contract Documents. Unless otherwise provided in the Contract Documents, the utility service consumed shall be charged to or paid for by Contractor at prevailing rates charged to Owner or, where the utility is produced by Owner, at reasonable rates determined by Owner. Contractor will carefully conserve any utilities furnished.

B. Contractor to install temporary connections and meters: Contractor shall, at its expense and in a skillful manner satisfactory to Owner, install and maintain all necessary temporary connections and distribution lines, together with appropriate protective devices, and all meters required to measure the amount of each utility used for the purpose of determining charges. Prior to the date of Final Acceptance, Contractor shall remove all temporary connections, distribution lines, meters, and associated equipment and materials.

5.15 TESTS AND INSPECTION

A. Contractor to provide for all testing and inspection of Work: Contractor shall maintain an adequate testing and inspection program and perform such tests and inspections as are necessary or required to ensure that the Work conforms to the requirements of the Contract Documents. Contractor shall be responsible for inspection and quality surveillance of all its Work and all Work performed by any Subcontractor. Unless otherwise provided, Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. Contractor shall give Owner timely notice of when and where tests and inspections are to be made. Contractor shall maintain complete inspection records and make them available to Owner.

B. Owner may conduct tests and inspections: Owner may, at any reasonable time, conduct such inspections and tests as it deems necessary to ensure that the Work is in accordance with the Contract Documents. Owner shall promptly notify Contractor if an inspection or test reveals that the Work is not in accordance with the Contract Documents. Unless the subject items are expressly accepted by Owner, such Owner inspection and tests are for the sole benefit of Owner and do not:

1. Constitute or imply acceptance;

2. Relieve Contractor of responsibility for providing adequate quality control measures;

3. Relieve Contractor of responsibility for risk of loss or damage to the Work, materials, or equipment;

4. Relieve Contractor of its responsibility to comply with the requirements of the Contract Documents; or

5. Impair Owner's right to reject defective or nonconforming items, or to avail itself of any other remedy to which it may be entitled.

C. Inspections or inspectors do not modify Contract Documents: Neither observations by an inspector retained by Owner, the presence or absence of such inspector on the site, nor inspections, tests, or approvals by others, shall relieve Contractor from any requirement of the Contract Documents, nor is any such inspector authorized to change any term or condition of the Contract Documents.

D. Contractor responsibilities on inspections: Contractor shall promptly furnish, without additional charge, all facilities, labor, material and equipment reasonably needed for performing such safe and convenient inspections and tests as may be required by Owner. Owner may charge Contractor any additional cost of inspection or testing when Work is not ready at the time specified by Contractor for inspection or testing, or when prior rejection makes reinspection or retest necessary. Owner shall perform its inspections and tests in a manner that will cause no undue delay in the Work.

5.16 CORRECTION OF NONCONFORMING WORK

A. Work covered by Contractor without inspection: If a portion of the Work is covered contrary to the request of Owner or the requirements in the Contract Documents or a governmental authority having jurisdiction, it must, if required in writing by Owner, be uncovered for Owner's observation and be replaced at Contractor's expense and without change in the Contract Sum or Contract Time.

B. Payment provisions for uncovering covered Work: If, at any time prior to Final Completion, Owner desires to examine the Work, or any portion of it, which has been covered, Owner may request to see such Work and it shall be uncovered by Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an adjustment in the Contract Sum for the costs of uncovering and replacement, and, if completion of the Work is thereby delayed, an adjustment in the Contract Time, provided it makes such a request as provided in Part 7. If such Work is not in accordance with the Contract Documents, the Contractor shall pay the costs of examination and reconstruction.

C. Contractor to correct and pay for non-conforming Work: Contractor shall promptly correct Work found by Owner not to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. Contractor shall bear all costs of correcting such nonconforming Work, including additional testing and inspections.

D. Contractor's compliance with correction and warranty provisions: If, within one year after the date of Substantial Completion of the Work or designated portion thereof, or within one year after the date for commencement of any system warranties established under Section 6.08, or within the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, Contractor shall correct it promptly after receipt of written Notice from Owner to do so. Owner shall give such Notice promptly after discovery of the condition. This period of one year shall be extended, with respect to portions of Work first performed after Substantial Completion, by the period of time between Substantial Completion and the actual performance of the Work. Contractor's duty to correct with respect to Work repaired or replaced shall run for one year from the date of repair or

replacement. Obligations under this Section 5.16D shall survive Final Acceptance and are in addition to other warranties provided by contract or law.

E. Contractor to remove non-conforming Work: Contractor shall remove from the Project site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by Contractor nor accepted by Owner.

F. Owner may charge Contractor for non-conforming Work: If Contractor fails to correct nonconforming Work within a reasonable time after written notice to do so, Owner may replace, correct, or remove the nonconforming Work and charge the cost thereof to the Contractor.

G. Contractor to pay for damaged Work during correction: Contractor shall bear the cost of correcting destroyed or damaged Work, whether completed or partially completed, caused by Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

H. No Period of limitation on other requirements: Nothing contained in this section shall be construed to establish a period of limitation with respect to other obligations which Contractor might have according to the Contract Documents. Establishment of the time period of one year as described in Section 5.16D relates only to the specific obligation of Contractor to correct the Work, and has no relationship to the time within which the Contractor's obligation to comply with the Contract Documents may be sought to be enforced, including the time within which such proceedings may be commenced.

I. Owner may accept non-conforming Work and charge Contractor: If Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, Owner may do so instead of requiring its removal and correction, in which case the Contract Sum may be reduced as appropriate and equitable.

5.17 CLEAN UP

Contractor to keep site clean and leave it clean: Contractor shall at all times keep the Project site, including hauling routes, infrastructures, utilities, and storage areas, free from accumulations of waste materials. Before completing the Work, Contractor shall remove from the premises its rubbish, tools, scaffolding, equipment, and materials. Upon completing the Work, Contractor shall leave the Project site in a clean, neat, and orderly condition satisfactory to Owner. If Contractor fails to clean up as provided herein, and after reasonable notice from Owner, Owner may do so and the cost thereof shall be charged to Contractor.

5.18 ACCESS TO WORK

Owner and A/E access to Work site: Contractor shall provide Owner and A/E access to the Work in progress wherever located.

5.19 OTHER CONTRACTS

Owner may award other contracts; Contractor to cooperate: Owner may undertake or award other contracts for additional work at or near the Project site. Owner shall help coordinate the activities of Owner's own forces and of each separate contractor engaged by Owner with the Work of Contractor, who shall reasonably cooperate with the other contractors and with Owner's employees and shall carefully adapt scheduling and perform the Work in accordance with these Contract Documents to reasonably accommodate the other work.

5.20 SUBCONTRACTORS AND SUPPLIERS

A. Subcontractor Responsibility: The Contractor shall include the language of this paragraph in each of its first tier subcontracts, and shall require each of its subcontractors to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. Upon request of the Owner, the Contractor shall promptly provide documentation to the Owner demonstrating that the subcontractor meets the subcontractor responsibility criteria below. The requirements of this paragraph apply to all subcontractors regardless of tier. At the time of subcontract execution, the Contractor shall verify that each of its first tier subcontractors meets the following bidder responsibility criteria:

1. Have a current certificate of registration as a contractor in compliance with chapter 18.27 RCW, which must have been in effect at the time of subcontract bid submittal;

2. Have a current Washington Unified Business Identifier (UBI) number;

3. If applicable, have:

   a. Industrial Insurance (workers' compensation) coverage for the subcontractor's employees working in Washington, as required in Title 51 RCW;

   b. A Washington Employment Security Department number, as required in Title 50 RCW;

   c. A Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;

   d. An electrical contractor license, if required by Chapter 19.28 RCW;

   e. An elevator contractor license, if required by Chapter 70.87 RCW.

4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065 (3).

5. On a project subject to the apprenticeship utilization requirements in RCW 39.04.320, not have been found out of compliance by the Washington state apprenticeship and training council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under chapter 49.04 RCW for the one-year period immediately preceding the date of the Owner's first advertisement of the project.

6. Meet all supplemental responsibility criteria set forth in the Contract Documents.

B. Provide names of Subcontractors and use qualified firms: Before submitting the first Application for Payment, Contractor shall furnish in writing to Owner the names, addresses, and telephone numbers of all Subcontractors, as well as suppliers providing materials in excess of $2,500. Contractor shall utilize Subcontractors and suppliers which are experienced and qualified, and meet the requirements of the Contract Documents, if any. Contractor shall not utilize any Subcontractor or supplier to whom Owner has a "reasonable objection," and shall obtain Owner's written consent before making any substitutions or additions. A "reasonable objection" shall include without limitation:

.1 a proposed Subcontractor differing from the entity listed with a proposal or bid,

.2 lack of "responsibility" of the proposed Subcontractor, as defined in RCW 39.04.350 or otherwise in the Contract Documents, or

.3 lack of qualification, including technical qualification, as required by the Specifications.

C. Subcontracts in writing and pass through provision: All Subcontracts must be in writing. By appropriate written agreement, Contractor shall require each Subcontractor, so far as applicable to the Work to be performed by the Subcontractor, to be bound to Contractor by terms of the Contract Documents, and to assume toward Contractor all the obligations and responsibilities which Contractor assumes toward Owner in accordance with the Contract Documents. Each Subcontract shall preserve and protect the rights of Owner in accordance with the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights. Where appropriate, Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. However, nothing in this paragraph shall be construed to alter the contractual relations between Contractor and its Subcontractors with respect to insurance or bonds.

D. Coordination of Subcontractors; Contractor responsible for Work: Contractor shall schedule, supervise, and coordinate the operations of all Subcontractors. No Subcontracting of any of the Work shall relieve Contractor from its responsibility for the performance of the Work in accordance with the Contract Documents or any other obligations of the Contract Documents.

E. Automatic assignment of subcontracts: Each subcontract agreement for a portion of the Work is hereby assigned by Contractor to Owner provided that:

1. Effective only after termination and Owner approval: The assignment is effective only after termination by Owner for cause pursuant to Section 9.01 and only for those Subcontracts which Owner accepts by notifying the Subcontractor in writing; and

2. Owner assumes Contractor's responsibilities: After the assignment is effective, Owner will assume all future duties and obligations toward the Subcontractor which Contractor assumed in the Subcontract.

3. Impact of bond: The assignment is subject to the prior rights of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.

5.21 WARRANTY OF CONSTRUCTION

A. Contractor warranty of Work: In addition to any special warranties provided elsewhere in the Contract Documents, Contractor warrants that all Work conforms to the requirements of the Contract Documents and is free of any defect in equipment, material, or design furnished, or workmanship performed by Contractor.

B. Contractor responsibilities: With respect to all warranties, express or implied, for Work performed or materials furnished according to the Contract Documents, Contractor shall:

1. Obtain warranties: Obtain, assign if requested, and furnish directly to Owner, all warranties that would be given in normal commercial practice or that are required by the Contract Documents, first executed by the applicable Subcontractor and those suppliers and manufacturers furnishing materials for the Work, and subsequently countersigned by Contractor, which shall extend to Owner all rights, claims, benefits and interests that Contractor may have under express or implied warranties or guarantees against the Subcontractor, supplier or manufacturer for defective or non-conforming Work;

2. Warranties for benefit of Owner: Require all warranties to be executed, in writing, for the benefit of Owner;

3. Enforcement of warranties: Enforce all warranties for the benefit of Owner, if directed by Owner; and

4. Contractor responsibility for subcontractor warranties: Be responsible to enforce any subcontractor's, manufacturer's, or supplier's warranties should they extend beyond the period specified in the Contract Documents.

C. Warranties beyond Final Acceptance: The obligations under this section shall survive Final Acceptance.

5.22 INDEMNIFICATION

A. Contractor to indemnify Owner: To the fullest extent permitted by law, Contractor shall defend, indemnify, and hold Owner and A/E, their consultants, and agents and employees, directors, officers, lenders, successors and assigns of any of them (collectively, the "Indemnified Parties"), harmless from and against all third-party claims, demands, losses, damages, or costs, including but not limited to damages arising out of bodily injury or death to persons and damage to property, direct and indirect, or consequential (including but not limited to costs and attorneys' fees incurred on such claims or in proving the right to indemnification), arising out of, caused by or resulting from:

1. Sole negligence of Contractor: The sole negligence or willful misconduct of Contractor or any of its Subcontractors, their agents and anyone directly or indirectly employed by them or anyone for whose acts they may be liable ("Indemnitor");

2. Concurrent negligence: The concurrent negligence of Indemnitor, but only to the extent of the negligence of Indemnitor; and

3. Patent infringement: The use of any design, process, or equipment that constitutes an infringement of any United States patent presently issued, or violates any other proprietary interest, including copyright, trademark, and trade secret, unless specifically directed to use such design, process, or equipment by Owner.

The obligations of Contractor under this Section 5.22 shall not be construed to negate, abridge, or otherwise reduce any other right or obligations of indemnity that would otherwise exist as to any party or person described in this Section. To the extent the wording of this Section 5.22 would reduce or eliminate the insurance coverage of Owner or Contractor, this Section 5.22 shall be considered modified to the extent that such insurance coverage is not affected. To the extent that any portion of this Section 5.22 is stricken by a court or arbitrator for any reason, all remaining provisions shall retain their vitality and effect. The provisions of this Section 5.22 shall survive completion, acceptance, final payment and termination of the Contract.

B. Employee action and RCW Title 51: In any action against Owner and any other entity indemnified in accordance with this section, by any employee of Contractor, its Subcontractors, Sub-subcontractors, agents, or anyone directly or indirectly employed by any of them, the indemnification obligation of this section shall not be limited by a limit on the amount or type of damages, compensation, or benefits payable by or for Contractor or any Subcontractor under RCW Title 51, the Industrial Insurance Act, or any other employee benefit acts. In addition, Contractor waives immunity as to Owner and A/E only, in accordance with RCW Title 51.

PART 6 - PAYMENTS AND COMPLETION

6.01 CONTRACT SUM

Owner shall pay Contract Sum: Owner shall pay Contractor the Contract Sum plus Washington State sales tax for performance of the Work, in accordance with the Contract Documents.

6.02 SCHEDULE OF VALUES

Contractor to submit Schedule of Values: Before submitting its first Application for Payment, Contractor shall submit to Owner for approval a breakdown allocating the total Contract Sum to each principal category of work, in such detail as requested by Owner ("Schedule of Values"). The approved Schedule of Values shall allocate at least the percentage of the original Contract Sum so designated in the Contract Documents to that portion of the Work between Substantial Completion and Final Completion to recognize not-yet-earned costs for demobilization, Project Record, O&M manuals, and any other requirements for Project closeout and in advancing the Work from Substantial Completion to Final Completion. The approved Schedule of Values shall be used by Owner as a basis for reviewing progress payments. Payment for Work shall be made only for and in accordance with those items included in the Schedule of Values.

6.03 APPLICATION FOR PAYMENT

A. Monthly Application for Payment with substantiation: At monthly intervals, unless determined otherwise by Owner, Contractor shall submit to Owner an itemized Application for Payment for Work (using Owner's form) completed in accordance with the Contract Documents and the approved Schedule of Values. Each application shall be supported by such substantiating data as Owner may require.

B. Contractor certifies Subcontractors paid: By submitting an Application for Payment, Contractor is certifying that all Subcontractors have been paid, less earned retainage in accordance with RCW 60.28.011, as their interests appeared in the last preceding Application for Payment. By submitting an Application for Payment, Contractor is recertifying that the representations set forth in Section 1.03 are true and correct, to the best of Contractor's knowledge, as of the date of the Application for Payment. Owner has the right to request written evidence from Contractor that Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by Owner to Contractor for subcontracted Work. Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Owner shall not have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

C. Reconciliation of Work with Progress Schedule: At the time it submits an Application for Payment, Contractor shall analyze and reconcile, to the satisfaction of Owner, the actual progress of the Work with the Progress Schedule. The submission of an Application for Payment constitutes a certification that the Work is current on the Progress Schedule.

D. Payment for material delivered to site or stored off-site: If authorized by Owner, the Application for Payment may include request for payment for material delivered to the Project site and suitably stored, or for completed preparatory work. Payment may similarly be requested for material stored off the Project site, provided Contractor complies with or furnishes satisfactory evidence of the following:

1. Suitable facility or location: The material will be placed in a facility or location that is structurally sound, dry, lighted and suitable for the materials to be stored or otherwise approved by Owner;

2. Facility or location within 10 miles of Project: The facility or location is located within a 10-mile radius of the Project. Other locations may be utilized, if approved in writing, by Owner;

3. Facility or location exclusive to Project's materials: Only materials for the Project are stored within the facility or location (or a secure portion of a facility or location set aside for the Project);

4. Insurance provided on materials in facility or location: Contractor furnishes Owner a certificate of insurance extending Contractor's insurance coverage for damage, fire, and theft to cover the full value of all materials stored, or in transit;

5. Facility or location locked and secure: The facility or location (or secure portion thereof) is continuously under lock and key, and only Contractor's authorized personnel shall have access;

6. Owner right of access to facility or location: Owner shall at all times have the right of access in company of Contractor;

7. Contractor assumes total responsibility for stored materials: Contractor and its surety assume total responsibility for the stored materials; and

8. Contractor provides documentation and Notice when materials moved to site: Contractor furnishes to Owner certified lists of materials stored, bills of lading, invoices, and other information as may be required, and shall also furnish Notice to Owner when materials are moved from storage to the Project site.

6.04 PROGRESS PAYMENTS

A. Owner to pay within 30 Days: Owner shall make progress payments, in such amounts as Owner determines are properly due, within 30 Days after receipt of a properly executed Application for Payment. Owner shall notify Contractor in accordance with chapter 39.76 RCW if the Application for Payment does not comply with the requirements of the Contract Documents.

B. Withholding retainage; Options for retainage: Owner shall retain 5% of the amount of each progress payment until 45 Days after Final Acceptance and receipt of all documents required by law or the Contract Documents, including, at Owner's request, consent of surety to release of the retainage. In accordance with chapter 60.28 RCW, Contractor may request that monies reserved be retained in a fund by Owner, deposited by Owner in a bank or savings and loan, or placed in escrow with a bank or trust company to be converted into bonds and securities to be held in escrow with interest to be paid to Contractor. Owner may permit Contractor to provide an appropriate bond in lieu of the retained funds.

C. Title passes to Owner upon payment: Title to all Work and materials covered by a progress payment shall pass to Owner at the time of such payment free and clear of all liens, claims, security interests, and encumbrances. Passage of title shall not, however, relieve Contractor from any of its duties and responsibilities for the Work or materials, or waive any rights of Owner to insist on full compliance by Contractor with the Contract Documents. A progress payment, or partial or entire use or occupancy of the Project by Owner, shall not constitute acceptance of Work.

D. Interest on unpaid balances: Payments due and unpaid in accordance with the Contract Documents shall bear interest as specified in chapter 39.76 RCW.

6.05 PAYMENTS WITHHELD

A. Owner's right to withhold payment: Owner may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any payment to such extent as may be necessary to protect Owner from loss or damage for reasons including but not limited to:

1. Non-compliant Work: Work not in accordance with the Contract Documents;

2. Remaining Work to cost more than unpaid balance: Reasonable evidence that the Work required by the Contract Documents cannot be completed for the unpaid balance of the Contract Sum;

3. Owner correction or completion of Work: Work by Owner to correct defective Work or complete the Work in accordance with Section 5.16;

4. Third party claims for which Contractor may be responsible: Claims (except where an insurer has unconditionally accepted coverage without prior payment of any deductibles or self-insured retentions) filed or reasonable evidence indicating probable filing of such claims unless Contractor provides security acceptable to Owner;

5. Failure to pay Subcontractor: The failure of Contractor to make payments to Subcontractors for labor, materials or equipment;

6. Damages: Damage to Owner or a separate contractor (except where an insurer has unconditionally accepted coverage);

7. Affidavits of Wages Paid: Failure to submit affidavits pertaining to wages paid as requested or otherwise required by statute;

8. Progress Schedule: Failure to submit a properly updated Progress Schedule;

9. Maintenance of Project Record: Failure to properly maintain as the Project Record;

10. Other construction records: Failure to properly submit any other required construction reports or records;

11. Certified payrolls: Failure to properly submit certified payrolls when requested;

12. Contractor's failure to perform: Contractor's failure otherwise to perform in accordance with the Contract Documents; or

13. Contractor's negligent acts or omissions: Cost or liability that may occur to Owner as the result of Contractor's fault or negligent acts or omissions.

B. Owner to notify Contractor of withholding for unsatisfactory performance: In any case where part or all of a payment is going to be withheld for unsatisfactory performance, Owner shall notify Contractor in accordance with chapter 39.76 RCW.

6.06 RETAINAGE, BOND CLAIM RIGHTS, AND LIENS

A. Chapters 39.08 RCW and 60.28 RCW incorporated by reference: Chapters 39.08 RCW and 60.28 RCW, concerning the rights and responsibilities of Contractor and Owner with regard to the performance and payment bonds and retainage, are made a part of the Contract Documents by reference as though fully set forth herein.

B. Liens: Contractor shall promptly pay (and secure the discharge of any liens asserted by) all persons properly furnishing labor, equipment, materials or other items in connection with the performance of the Work (including, but not limited to, any Subcontractors) to the extent that Owner has paid Contractor for this Work. Owner may, at its option, withhold payment, in whole or in part, to Contractor until lien and claim releases are furnished. Contractor may provide other security acceptable to Owner, such as a bond, in lieu of paying disputed liens or claims. Contractor shall defend, indemnify, and hold harmless Owner from any liens, including all expenses and attorneys' fees, except to the extent a lien has been recorded because of a failure of payment by Owner for the Work implicated in any such lien.

6.07 SUBSTANTIAL COMPLETION

A. Substantial Completion defined: Substantial Completion is the stage in the progress of the Work (or portion thereof designated and approved by Owner) when the construction is sufficiently complete, in accordance with the Contract Documents, so Owner has full and unrestricted use and benefit of the facilities (or portion thereof designated and approved by Owner) for the use for which it is intended, the Project has been constructed in substantial accordance with the Contract Documents, and at a minimum the following elements have been accomplished (see also, Section 01 70 00 Project Completion):

1. A written punch list has been prepared;

2. The Authority Having Jurisdiction has granted a certificate of occupancy; and

3. The first final draft of the Operation and Maintenance manuals has been submitted to Owner.

All Work other than incidental corrective or punch list work shall be completed. Substantial Completion shall not have been achieved if the Work cannot achieve Final Completion within the time specified in the Agreement. The date Substantial Completion is achieved shall be established in writing by Owner. Contractor may request an early date of Substantial Completion which must be approved by Change Order. Owner's occupancy of the Work or designated portion thereof does not necessarily indicate that Substantial Completion has been achieved.

B. Contractor to provide weekly reports before Substantial Completion: Beginning at least 30 Days before the scheduled date of Substantial Completion, Contractor shall prepare reports weekly, identifying items to be completed in order to obtain necessary occupancy certificates and permits, and make recommendations to Owner for effectuating the earliest possible completion. When Contractor considers that the Work, or a portion thereof that Owner agrees to accept separately, has achieved Substantial Completion, Contractor shall prepare and submit to Owner a comprehensive list of items to be completed or corrected prior to final payment. Contractor shall proceed promptly to complete and correct items on the list. Failure to include an item on the list does not alter the responsibility of Contractor to complete all Work in accordance with the Contract Documents.

C. Owner to determine if Work is complete: Upon receipt of Contractor's list, Owner will make an inspection to determine whether the Work or designated portion thereof has achieved Substantial Completion. If Owner's inspection discloses any item, whether or not included on Contractor's list, that is not sufficiently complete in accordance with the Contract Documents so that Owner can occupy or utilize the Work or designated portion thereof for its intended use, Contractor shall, before the occurrence of Substantial Completion, complete or correct the item upon notification by Owner, and Contractor shall then submit a request for another inspection by Owner to determine Substantial Completion. If Owner determines that the Work or designated portion has not achieved Substantial Completion, Contractor shall expeditiously complete the Work or

designated portion, again request an inspection, and pay the costs associated with the re-inspection.

D. Owner may take over punch list: If, at 30 Days after the date of Substantial Completion, Owner considers that the remaining items on its list ("punch list") are unlikely to be completed within the time period specified in the Contract Documents for Final Completion, Owner may, upon seven Days' written Notice to Contractor, take over and perform some or all of the punch list items. If Contractor fails to correct the deficiencies within the time period specified, Owner may deduct the actual cost of performing this punch list work, including any design costs, plus ten 10% to account for Owner's transaction costs, from the Contract Sum.

E. Owner to establish date of Substantial Completion: When the Work or designated portion thereof has achieved Substantial Completion, Owner shall establish the date of Substantial Completion in writing, establish responsibilities of Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and fix the time within which Contractor shall finish all items on the list accompanying the document. The writing establishing Substantial Completion shall be submitted to Contractor for its written acceptance of the responsibilities assigned to it. Any items not included in the document but required or necessary for Final Completion of the Work shall be supplied and installed by Contractor as a part of the Contract Sum, notwithstanding their not being included in the punch list. Upon written acceptance of the writing establishing Substantial Completion by Contractor and Owner, and upon Contractor's Application for Payment, Owner shall make payment as provided in the Contract Documents. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents. No further payment will be due or owing until the payment following Final Completion.

F. Contractor to complete punch list in timely manner: Contractor shall prepare, continue to monitor, and cause to be completed, all punch lists with respect to the activity of each Subcontractor and report weekly to Owner on outstanding punch list items.

6.08 PRIOR OCCUPANCY

A. Prior Occupancy defined; Restrictions: Owner may, when legally permissible to do so and upon written Notice to Contractor, take possession of or use any completed or partially completed portion of the Work ("Prior Occupancy") at any time prior to Substantial Completion, and Contractor shall cooperate with such occupancy and use and the establishment of a punch list. Unless otherwise agreed in writing, Prior Occupancy shall not: be deemed an acceptance of any portion of the Work; accelerate the time for any payment to Contractor; prejudice any rights of Owner provided by any insurance, bond, guaranty, or the Contract Documents; relieve Contractor of the risk of loss or any of the obligations established by the Contract Documents; establish a date of Substantial or Final Completion; establish a date for termination or partial termination of the assessment of liquidated damages; or constitute a waiver of claims.

B. Damage; Duty to repair and warranties: Notwithstanding anything in the preceding paragraph, Owner shall be responsible for loss of or damage to the Work resulting from Prior Occupancy. Contractor's one year duty to repair any system warranties shall begin on building systems activated and used by Owner as agreed in writing by Owner and Contractor.

6.09 FINAL COMPLETION, ACCEPTANCE, AND PAYMENT

A. Final Completion defined: Final Completion shall be achieved when the Work is fully and finally complete in accordance with the Contract Documents. The date Final Completion is achieved shall be established by Owner in writing, but in no case shall it constitute Final Acceptance, which is a subsequent, separate, and distinct action (see also, Section 01 70 00 Project Completion).

B. Final Acceptance defined: Unless otherwise determined by Owner, Final Acceptance shall be achieved after Contractor has completed all the requirements of the Contract Documents. The date Final Acceptance is achieved shall be established by Owner in writing. Pursuant to RCW 60.28, "Lien for Labor, Materials, Taxes on Public Works," completion of the Contract Work shall occur upon Final Acceptance. Neither Final Acceptance nor final payment shall release Contractor or its sureties from any obligations of these Contract Documents or the payment and performance bonds, or constitute a waiver of any claims by Owner arising from Contractor's failure to perform the Work in accordance with the Contract Documents (see also, Section 01 70 00 Project Completion).

C. Final payment waives Claim rights: Acceptance of final payment by Contractor or any Subcontractor shall constitute a waiver and release to Owner of all claims by Contractor or any such Subcontractor for an increase in the Contract Sum or the Contract Time, and for every act or omission of Owner relating to or arising out of the Work, except for those Claims made in accordance with the procedures, including the time limits, set forth in Part 8.

PART 7 - CHANGES

7.01 CHANGE IN THE WORK

A. Changes in the Work: Changes in the Work may be accomplished after execution of the Contract without invalidating the Contract. Changes in the Work that adjust the Contract Sum and/or Contract Time are incorporated into the Contract solely by Change Order and are subject to the limitations stated in this Part 7 and elsewhere in the Contract Documents. A Change Order may be bilateral or unilateral, as described below. Change Orders may be initiated by mutual agreement or through a Contract Change Proposal ("CCP") or Work Directive ("WD").

B. Change Orders:

1. A Bilateral Change Order is signed by Owner and Contractor to record their agreement on the terms of a change in the Work. A Bilateral Change Order may reflect the agreement of Owner and Contractor on a standalone issue, or it may incorporate one or more mutually agreed upon CCPs or WDs. A Bilateral Change Order shall constitute full payment and final settlement of all claims for time and cost, including direct, indirect, impact and consequential costs, related to the Change Order and Work covered by, affected by and related to the events giving rise to the Change Order.

2. A Unilateral Change Order is initially signed only by Owner to set forth, subject to the Contract, the terms of a change in the Work based upon one or more CCPs and/or WDs to which the parties have not yet fully agreed. Within 7 Days of its receipt of a Unilateral Change Order, Contractor shall notify Owner in writing either (a) of its acceptance of its terms, in which case the Unilateral Change Order will automatically become a Bilateral Change Order, or (b) of Contractor's rejection, in which case Contractor must submit a written rejection within 14 Days after Contractor delivered written Notice of rejection to Owner as noted above. The written rejection must fully explain the reasons for rejecting the Unilateral Change Order and include all necessary supporting documentation. The rejection will then be considered in accordance with Section 8.02 (Informal Resolution of Disputes). Failure to submit a written Notice of rejection within 7 Days of Contractor's receipt of a Unilateral Change Order or a written rejection with 14 Days shall constitute Contractor's acceptance of the terms of the Unilateral Change Order.

C. Change Orders via Contract Change Proposal:

1. Contractor shall be responsible for maintaining an Issues Log. If Contractor at any time believes that a change in the Work has or may have occurred, Contractor shall add such item to the Issues Log. At a minimum, the Issues Log shall identify:

   a. Detailed scope of the change in the Work;

   b. Contract Time impact noting specifically how it impacted the critical path of the project, if any;

   c. The amount of any anticipated, proposed, or approved change in the Contract Sum;

   d. Date first included on the Issues Log;

   e. Owner-initiated or Contractor-initiated; and

   f. Action status.

2. If the Contractor believes an item on the Issues Log warrants a CCP, Contractor shall provide written Notice to Owner in accordance with Section 8.02, and shall submit a written CCP in accordance with this Section. All CCPs shall be substantiated and submitted within 7 Days of being added to the Issues Log along with a revised progress schedule identifying the time impact affecting the critical path, if any. The CCP shall identify the proposed full compensation for implementing the proposed change in the Work, including any adjustment in the Contract Sum or Contract Time. Upon receipt of the CCP, Owner may accept the proposal and incorporate it into a Bilateral Change Order, reject the proposal and either issue a WD or elect not to proceed with the proposal, request further documentation, or negotiate acceptable terms with Contractor.

D. Work Directives:

1. A WD is a written order prepared by Owner that directs Contractor to perform Work prior to total agreement on an adjustment, if any, in the Contract Sum and/or Contract Time. Owner may direct Contractor, at any time and without invalidating the Contract, through a WD to proceed with a change in the Work or to perform Work that Contractor contends to be a change in the Work, with or without the agreement of Contractor and prior to agreement of the basis for adjustment, if any, to the Contract. Owner's use of a WD does not constitute agreement that the directive constitutes a change in the Work, the Contract Sum or the Contract Time.

2. A WD normally includes:

   a. The scope of the directed Work,

   b. Any proposed adjustment to the Contract Sum or not-to-exceed amount,

   c. Any proposed change to the Contract Time,

   d. The proposed method of determining any change in the Contract Sum and/or Contract Time, and

e. The supporting data that Contractor must submit in accordance with the requirements of Part 7 of the General Conditions.

3. Upon receipt of a WD, Contractor shall promptly commence and proceed diligently with performance of the directed Work. Within 7 Days of its receipt of a WD, Contractor shall notify Owner in writing either (a) of its acceptance of its terms, in which case the terms will become effective, and the WD will be incorporated into a Bilateral Change Order, or (b) of Contractor's rejection of the terms, in which case Contractor must submit a written rejection within 14 Days after Contractor delivered written Notice to Owner as noted above. The written rejection must fully explain the reasons for rejecting the WD and include all necessary supporting documentation. The rejection will then be considered in accordance with Section 8.02. Contractor's rejection of a WD shall not relieve Contractor of its obligation to comply promptly with the WD.

E. Contractor fault or negligence alleged as basis for change in Contract Sum: No change in the Contract Sum shall be allowed to the extent Contractor's changed cost of performance is due to the fault or negligence of Contractor or anyone for whose acts Contractor is responsible; or to the extent Contractor is responsible for change concurrently caused by Contractor and Owner; or to the extent the change is caused by an act of Force Majeure as defined in Section 3.05.

7.02 CHANGE IN THE CONTRACT SUM

A. General Application

1. Contract Sum changes only by Change Order: The Contract Sum shall only be changed by a Change Order.

2. Allowances: Any Allowances stated in the Contract Documents shall be included in the Contract Sum. Items covered by Allowances shall be supplied for such amounts and by such persons or entities as Owner may direct, but Contractor shall not be required to employ persons or entities to whom Contractor has made reasonable and timely objection. Owner shall select materials and equipment under an Allowance with reasonable promptness. Allowances shall cover the net cost to Contractor of materials and equipment delivered and/or installed at the site, as identified in the Allowance, and all required taxes, less applicable trade discounts. Whenever actual costs are more than or less than Allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect the difference between actual, reasonable costs and the Allowances.

3. Pricing Components: Contractor shall maintain and submit a complete itemization of the costs incurred as a result of any change in the Work, including labor, material, Subcontractor costs, and fee. The total cost of any change in the Work or of any other increase or decrease in the Contract Sum, including a Claim, shall be limited to the actual, reasonable amounts for the following components, itemized in the manner set forth below and submitted on breakdown sheets in a form approved by Owner. If the total cost of the change in the Work does not exceed $5,000.00, Contractor shall not be required to submit a breakdown if the description of the change in the Work is sufficiently definitive for Owner to determine fair value.

   a. Labor costs: The labor cost component is determined by multiplying the estimated or actual additional number of hours needed to perform the change in the Work by the fully burdened hourly labor costs. The fully burdened hourly costs shall include the following:

(1) Basic wages and benefits: Hourly rates and benefits as stated on the Department of Labor and Industries approved "Statement of Intent to Pay Prevailing Wages" shall be applicable unless a high, documented amount is actually paid by a contractor for the laborers, apprentices, journeymen, foremen, and other staff performing and/or directly supervising the change in the Work at the site. Any amount in excess of approved "Statement of Intent to Pay Prevailing Wages" shall be substantiated and subject to audit.

(2) Worker's insurance: Direct contributions to the State of Washington for industrial insurance; medical aid; and supplemental pension, by the class and rates established by the Department of Labor and Industries.

(3) Federal insurance: Direct contributions required by the Federal Insurance Compensation Act; Federal Unemployment Tax Act; and the State Unemployment Compensation Act.

(4) Supervision: The labor cost component may include the actual, demonstrated additional supervision hours (not already compensated by Owner) directly related to a change in the Work.

(5) Travel and Per Diem allowance: Travel allowance and/or subsistence, if applicable, required by regional labor union agreements, which are itemized and identified separately.

b. Material costs: The material cost component must be itemized and include material invoices or reasonable lump-sum estimates of the quantity and cost of additional materials needed to perform the change in the Work. Material costs shall be developed first from actual known costs; second from supplier quotations; and, if neither of these is available, then from standard industry pricing guides acceptable to Owner. Material costs shall consider all available discounts. Freight costs, express charges, or special delivery charges shall be itemized.

c. Equipment costs: The equipment cost component must be itemized by the type of equipment and include the estimated or actual length of time the construction equipment appropriate for the Work is or will be used on the change in the Work on site. Costs will be allowed for construction equipment only to the extent used solely for the changed Work, or for additional rental costs actually incurred by Contractor solely for the changed Work. Equipment charges shall be computed on the basis of actual invoice costs or, if owned, from the current edition of the Associated General Contractors Washington State Department of Transportation (AGC WSDOT) Equipment Rental Agreement current edition as of the Contract execution date. The EquipmentWatch Rental Rate Blue Book shall be used as a basis for establishing rental rates of equipment not listed in the above source. The maximum rate for standby equipment shall not exceed that shown in the AGC WSDOT Equipment Rental Agreement. The rate for Contractor-owned equipment necessarily standing by for future use on the changed Work shall be no more than 50% of the rate established above unless otherwise approved by Owner. The total rental cost shall not exceed the cost of purchasing the equipment outright.

d. Subcontractor costs: The Subcontractor cost component consists of payments Contractor makes to Subcontractors for the cost of changed Work performed by

Subcontractors. Subcontractors' costs shall be calculated and itemized in the same manner as prescribed herein for Contractor.

e. Fee: The Fee component is compensation for all items and costs not listed in subparagraphs a through d above, and is added to the total cost to Owner of the sum of these items. The Fee shall compensate Contractor, Subcontractor and suppliers for, among other things, combined overhead, profit and other costs, including all office, home office and site overhead, employee per diem, subsistence and travel costs not separately reimbursable under subparagraph a above, warranty, safety costs, printing and copying, quality control/assurance, purchasing, small or hand tool (a tool that costs $250 or less and is normally furnished by the performing contractor) or expendable charges, temporary construction facilities, field engineering, schedule updating, Project Record, home office cost, taxes (including all taxes except B&O tax and Washington State sales tax payable based on the amount of the approved Application for Payment), office engineering, estimating costs, additional overhead because of extended time, Claim and change preparation, direct and indirect delay, acceleration or impact, and any other cost incidental to the change in the Work. The Fee shall be strictly limited in all cases to the rates below.

(1). Contractor markup on Contractor Work: Contractor is allowed a Fee for any Work actually performed by Contractor's own forces of 16% of the first $50,000 of the cost of such Work and 4% of the remaining cost, if any.

(2). Subcontractor markup for Subcontractor Work: Each Subcontractor (including lower-tier Subcontractors) is allowed a Fee for any Work actually performed by its own forces of 16% of the first $50,000 of the cost of such Work and 4% of the remaining cost, if any.

(3). Contractor markup for Subcontractor Work: Contractor is allowed a Fee for any Work performed by its Subcontractor(s) of 6% of the first $50,000 of the amount due each Subcontractor for such Work and 4% of the remaining amount, if any.

(4). Subcontractor markup for lower-tier Subcontractor Work: Each Subcontractor is allowed a Fee for any Work performed by its Subcontractor(s) of any lower-tier of 4% of the first $50,000 of the amount due the lower-tier Subcontractor for such Work and 2% of the remaining amount, if any.

(5). Basis of cost applicable for markup: The cost of the Work to which the Fee is to be applied shall be based on the cost components in subparagraphs 7.02.A 3.a – d.

(6). Application of Fee: The Fee shall not be included on deductive changes in the Work. Where a change in the Work involves additive and deductive work by Contractor or the same Subcontractor, the Fee as well as bond and insurance markups will apply to the net difference.

f. Insurance and bond premiums: The cost of any change in insurance or bond premium is added to the sum of the cost components in subparagraphs 7.02.A 3.a – e and is limited to the following:

(1) Contractor's liability insurance: The cost of any changes in Contractor's contractually required liability insurance arising directly from the Change Order; and

(2) Payment and Performance Bond: The cost of any additional premium for Contractor's contractually required bond arising directly from the Change Order.

g Tax: Washington State sales tax and B&O tax arising directly from the Change Order shall be added to the cost of the Change Order.

h. Unit Prices: If Unit Prices, including pre-agreed rates for material quantities, are applicable to a change in the Work, the Unit Prices shall be applied to the quantities of the items involved as determined in Section 7.02A. Quantities must be supported by field measurement statements signed by Owner. Owner shall be afforded access and be permitted to measure quantities. Contractor shall not exceed any cost limit(s) without Owner's prior written approval. Unit Prices shall include reimbursement for all direct and indirect costs of the Work, but exclude Fee (7.02 A.e), bond, and insurance costs (7.02 A.f.).s.

7.03 CHANGE IN THE CONTRACT TIME

A. Changes in Contract Time: The Contract Time shall only be changed by a Change Order.

B. Time extension permitted only if delay is not Contractor's fault: If Contractor is delayed at any time in the commencement or progress of the Work (1) by an act or neglect of Owner or anyone for whose acts Owner is responsible; or (2) by changes ordered by Owner in the Work; or (3) by Force Majeure; or (4) by delay authorized by Owner pending dispute resolution; or (5) by other causes that Owner determines may justify delay, then Contractor shall reasonably attempt to mitigate the delay, and the Contract Time shall be extended by Change Order for such reasonable time as Owner may reasonably determine consistent with the provisions of the Contract Documents. No adjustment in the Contract Time shall be allowed to the extent Contractor's changed time of performance is due to the fault or negligence of Contractor or anyone for whose acts Contractor is responsible.

C. Contractor must demonstrate impact on critical path of schedule: Any change in the Contract Time covered by a Change Order or Claim shall be limited to the change in the critical path of the Work attributable to the change or event(s) giving rise to the Change Order or Claim. Contractor shall be responsible for showing clearly on the Progress Schedule that the change or event had a specific impact on the critical path and, except in case of concurrent delay, was the sole cause of such impact, and could not have been avoided by resequencing of the Work or other reasonable alternatives in accordance with Section 01 32 13 Project Schedule.

D. Cost arising from change in Contract Time: Contractor is entitled to compensation for the cost of a change in Contract Time only if all the following conditions are met:

1. Must be solely fault of Owner: The change in Contract Time must solely be caused by the fault or negligence of Owner or others for whom Owner is responsible;

2. Procedures: Contractor must follow the procedure set forth in Section 7.03B and Section 8.02;

3. Demonstrate impact on critical path: Contractor must establish the extent of the change in Contract Time in accordance with Section 7.03C and Section 01 32 13 Project

Schedule. Owner is not obligated directly or indirectly for damages or an increase in the Contract Sum for any delay suffered by a Subcontractor that does not increase the Contract Time; and

4. Cost measured exclusively by the pricing components of Section 7.02A.3: If Contractor or a Subcontractor of any tier is entitled to compensation arising from or related to a change in Contract Time, the pricing components of Section 7.02A.3 shall exclusively be used to measure the actual costs incurred as a result of the change in Contract Time. Neither Contractor nor a Subcontractor of any tier is entitled to payment for costs arising out of actual or alleged loss of efficiency; morale, fatigue, attitude, or labor rhythm; home office overhead; expectant underrun; trade stacking; reassignment of workers; rescheduling of work; concurrent operations; dilution of supervision; learning curve; beneficial or joint occupancy; logistics; ripple; season change; extended overhead; profit upon damages for delay; impact damages, including cumulative impact; or similar damages.

PART 8 - CLAIMS AND DISPUTE RESOLUTION

8.01 CLAIMS

A. Definition: A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of the Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract Documents. The term “Claim” also includes other disputes and matters in question between Owner and Contractor arising out of or relating to the Contract Documents. Claims must be initiated in writing and be made in accordance with the Contract Documents. Neither a CCP, a Request for Information, a Bilateral or Unilateral Change Order, a reservation of rights, minutes of a meeting, a daily report, or a log entry shall constitute a Claim or Notice of a Claim. However, Owner and Contractor may agree in a signed writing to supplement how Contractor can provide a Notice of Claim as specified in this Part 8.

B. Continuing Contract performance: Pending final resolution of a Claim, including the dispute resolution process in Part 8, and except as otherwise agreed in writing or in the Contract Documents, Contractor shall proceed diligently with performance of the Work and maintain the Progress Schedule, and Owner shall continue to make payments of undisputed amounts in accordance with the Contract Documents.

C. Claims for additional cost: If Contractor wishes to make a Claim for an increase in the Contract Sum, written Notice as provided herein shall be given before proceeding to execute the Work, and written Notice and a written Claim must be made in accordance with this Part 8, or it will be waived.

D. Claims for additional time: If Contractor wishes to make a Claim for an increase in the Contract Time, written Notice as provided herein shall be given, and a written Claim must be made in accordance with this Part 8, or it will be waived.

E. Claims for consequential damages: Contractor and Owner waive certain Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes damages incurred by Owner for profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and damages incurred by Contractor for principal and home office overhead and expenses including but not limited to the compensation of personnel stationed there, for loss of financing, business and/or reputation, for losses on other projects, for loss of profit, and for interest or financing costs. This mutual waiver is applicable, without limitation, to all consequential damages due to either party’s termination. Nothing contained in this subparagraph E, however, shall be deemed to preclude an

award of liquidated or other delay damages, when applicable, in accordance with the Contract Documents, or to preclude or limit Contractor's obligation to procure and maintain the insurance policies required by this Contract or indemnify Owner for damages, including direct, indirect or consequential damages, alleged by a third party.

8.02 INFORMAL RESOLUTION OF DISPUTES

A. Procedure to reduce disputes: In an effort to reduce the incidence and cost to all parties of extended disputes, all disputes, direct or indirect, arising out of or relating to the Contract Documents or the breach thereof, except those that have been waived under the terms of the Contract Documents, shall be decided exclusively by the dispute resolution procedure of Part 8 unless the parties mutually agree in writing otherwise. To the extent that Owner and Contractor agree to a partnering or dispute review process to help address disputes, these processes shall be in addition to, and not in place of, the mandatory contractual dispute resolution procedures.

B. Notice: Except for disputes requiring Notice before proceeding with the affected Work as otherwise described in the Contract Documents, Contractor shall submit a written Notice of any Claim to Owner's Project Manager, consistent with the requirements of the Contract Documents, within 7 Days of the occurrence of the event giving rise to a dispute. If Contractor did not have actual knowledge of such an event, the written Notice shall be submitted within 7 Days of the date that Contractor reasonably should have been aware of the event. The Notice shall set forth, at a minimum, a description of the event(s) leading to or causing the dispute, the nature of the impacts to Contractor and its Subcontractors, if any, and an estimate of any claimed adjustments in the Contract Sum and/or Contract Time. Without waiving any rights, Owner and Contractor may discuss and attempt to resolve a dispute identified in a Notice of Claim directly with each other or with a third-party neutral or dispute review board if utilized on a Project.

C. Substantiation: If an issue remains unresolved, Contractor shall submit timely written substantiation to support Contractor's position relating to the Notice of Claim. Such substantiation, which shall include an explanation of Contractor's position and any supporting documentation, shall be provided within 30 Days of submitting a Notice. Contractor may delay submitting data by an additional 14 Days if it notifies Owner that substantial data must be assembled.

D. Owner's Project Manager to make initial decision on all disputes: After Contractor has submitted written substantiation to Owner that complies with all applicable provisions of Parts 7 and 8, as well as Section 01 32 13, Project Schedule, Owner's Project Manager will endeavor to respond, in writing, to Contractor within 7 Days of the date substantiation is received, or with Notice to Contractor of the date by which Owner's Project Manager expects to render a decision. If necessary to fully and fairly evaluate an issue, the Project Manager may request additional information or extend the time in which to respond. If the issue is not resolved, or if Project Manager does not respond within the later of 7 Days of the date written substantiation is received or the date specified for rendering a decision, the dispute may be escalated by Contractor to Owner's Assistant Vice President, Facilities Services, Capital as set forth in Section 8.02E below.

E. Contractor may respond to initial decision: The initial decision of the Project Manager will be final and conclusive unless, within 7 Days of the date Contractor receives the initial decision or the date specified for rendering a decision, Contractor notifies Owner's Project Manager in writing of Contractor's disagreement with the initial decision, in which case Contractor must then submit a written rejection to Owner's Assistant Vice President, Facilities Services, Capital within 14 Days. The written rejection must attach the submitted Notice and substantiation and fully explain the reasons for Contractor's disagreement with the initial decision. It must also include all applicable supporting documentation. Failure to submit a written rejection to Owner's Assistant Vice

President, Facilities Services, Capital within 14 Days shall constitute Contractor's acceptance of the initial decision.

F. Assistant Vice President, Facilities Services, Capital decision: Following Contractor's full compliance with the procedure above, Owner's Assistant Vice President, Facilities Services, Capital will endeavor to respond in writing to Contractor with a decision within 7 Days of delivery of the Contractor's rejection or with Notice to Contractor of the date by which Owner's Assistant Vice President, Facilities Services, Capital expects to render a decision. If Owner's Assistant Vice President, Facilities Services, Capital does not respond within the later of 7 Days after delivery of the rejection or the date specified to render a decision, the dispute will be deemed denied and Contractor may further escalate the dispute as set forth in Section 8.02G below.

G. Claim: If Contractor disagrees with the decision of the Assistant Vice President, Facilities Services, Capital, or if no decision is timely received, Contractor shall timely submit a Claim if it wishes to pursue formal dispute resolution or seek additional relief against Owner of any kind. A Claim must be consistent with the Notice, substantiation and rejection previously provided, be submitted to Owner in writing within 14 Days of the date the decision of the Assistant Vice President, Facilities Services, Capital is received by Contractor or due, and comply with Section 8.04. Any claim of a Subcontractor of any tier may be brought only through, and after review by, Contractor. Contractor acknowledges and agrees that no additional documentation from what was submitted to Owner's Assistant Vice President, Facilities Services, Capital (per part 'F' of this section) may be submitted and considered in any subsequent dispute resolution proceeding. Contractor's failure to provide timely information for Owner's consideration during the dispute resolution procedure of Part 8 has a substantial impact upon and prejudices Owner, including but not limited to its inability to fully investigate or verify a Claim, mitigate damages, choose alternative options, adjust the budget, delete or modify the impacted Work, and/or monitor time, cost and quantities.

8.03 FORMAL RESOLUTION OF CLAIMS

A. Option for direct discussions: At any time following Contractor's initiation of formal dispute resolution, Owner may require that an officer of Contractor and Owner's Assistant Vice President, Facilities Services, Capital (all with authority to settle) meet, confer, and attempt to resolve the Claim. If the Claim is not resolved during such meeting, or if no such meeting is requested, Contractor may bring no litigation against Owner unless Contractor complies with the procedures described in Sections 8.03B and C. This requirement cannot be waived except by an explicit written waiver signed by Owner and Contractor.

B. Mediation:

1. Mediation required: Claims, disputes, or other matters in controversy arising out of or related to the Contract shall be subject to mediation as a condition precedent to the initiation of binding dispute resolution. This requirement cannot be waived except by an explicit written waiver signed by both Owner and Contractor. Unless Owner and Contractor mutually agree in writing otherwise, all unresolved Claims shall be considered at a single mediation session that shall occur after Substantial Completion and prior to Final Acceptance by Owner.

2. Mediation procedure: The parties shall endeavor to resolve Claims by mediation. A request for mediation shall be delivered in writing to the other party to the Contract, and the parties shall promptly attempt to mutually agree on a mediator. If the parties do not agree on a mediator within 30 Days of a party's demand, the mediation, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect

on the date of the Agreement. Mediation shall proceed in advance of binding dispute resolution proceedings.

3. Mediation fee to be shared: The parties to the mediation shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction.

4. Representatives with authority must attend mediation: Representatives of Contractor and Owner must attend the mediation session in person with authority to settle the Claim. To the extent there are other parties in interest, such as A/E, insurers or Subcontractors, their representatives, also with authority to settle the Claim, shall also attend the mediation session in person.

C. Litigation: Contractor may bring no litigation on a Claim unless the Claim has been raised and considered in accordance with the procedures of this Part 8, including mandatory mediation. Contractor shall have the burden to demonstrate in any litigation that it has complied with all requirements of this Part 8. All unresolved Claims of Contractor shall be waived and released unless Contractor has complied with the time limits of the Contract Documents, and litigation is served and filed within 180 Days after the Date of Substantial Completion approved in writing by Owner. This requirement cannot be waived except by an explicit, written waiver signed by Owner and Contractor. The pendency of a mediation, which shall mean the time period between a party's receipt of a written mediation demand and the date of the initial mediation session, shall stay this deadline for serving and filing a lawsuit. The deadline may also be stayed for an additional period by agreement of the parties or court order. Neither Contractor nor a Subcontractor, whether claiming under a bond or lien statute or otherwise, shall be entitled to attorneys' fees directly or indirectly from Owner (but may recover attorneys' fees from the bond or statutory retainage fund itself to the extent allowable under law).

8.04 CLAIMS PROCESS

A. Notice and Claims: Any Notice and any Claim of Contractor, whether under the Contract or otherwise, must be made pursuant to and in strict accordance with the applicable provisions of the Contract Documents. No act, omission, or knowledge, actual or constructive, of Owner or anyone for whose acts Owner is responsible shall in any way be deemed to be a waiver of the requirement for timely written Notice and a timely written Claim unless Owner and Contractor sign an explicit, unequivocal written waiver. The fact that Owner and Contractor may consider, discuss, or negotiate a Claim that has or may have been procedurally or substantively defective or untimely under the Contract shall not constitute a waiver of the provisions of the Contract Documents unless Owner and Contractor sign an explicit, unequivocal written waiver. Contractor acknowledges and agrees that Contractor's failure to timely submit required Notices and/or timely submit Claims has a substantial impact upon and prejudices Owner, including but not limited to its inability to fully investigate or verify the Claim, mitigate damages, choose alternative options, adjust the budget, delete or modify the impacted Work, and/or monitor time, cost and quantities.

B. Claim must cover all costs and be documented: A Claim shall be deemed to cover all changes in cost and time (including direct, indirect, impact, and consequential) to which Contractor (and Subcontractors) may be entitled and may not contain reservations of rights without Owner's written approval; any such unapproved reservations of rights shall be without effect. Any requests by Contractor for an adjustment in both the Contract Sum and Contract Time that arise out of the same event(s) shall be submitted together. A Claim must be fully substantiated and documented. At a minimum, a Claim shall contain the following information:

1. Factual statement of Claim: A detailed factual statement of the Claim for additional compensation and/or time, if any, providing all necessary dates, locations, and items of Work affected by the Claim, that confirms not only that Contractor suffered the damages claimed, but that the damages claimed were actually a result of the act, event, or condition complained of;

2. Dates: The date on which event(s) arose which gave rise to the Claim;

3. Owner and A/E employee's knowledgeable about Claim: The name of each employee of Owner and/or A/E believed to be knowledgeable about the Claim;

4. Support from Contract Documents: The specific provisions of the Contract Documents that support the Claim;

5. Identification of other supporting information: The identification of any documents and the substance of any oral communications that support the Claim;

6. Copies of supporting documentation: Data and copies of any identified documents, other than the Contract Documents, that support the Claim, including without limitation a complete explanation as to why the relief sought is not within the scope of the Contract Documents;

7. Details on Claim for Contract Time: If an adjustment in the Contract Time is sought, the specific days and dates for which it is sought; the specific reasons Contractor believes an extension in the Contract Time should be granted, and Contractor's analysis of its Progress Schedule to demonstrate the reason for the extension in Contract Time showing cause and analysis of the resultant delay to the critical path and other information required by the Contract Documents and Section 01 32 13, Project Schedule;

8. Details on Claim for adjustment of Contract Sum: If an adjustment in the Contract Sum is sought, the exact amount sought and a breakdown of that amount into the categories and with the detail required by Section 7.02; and

9. Statement certifying Claim: A statement certifying, under penalty of perjury, that the Claim is made in good faith, that the supporting cost and pricing data are true and accurate to the best of Contractor's knowledge and belief, that the Claim is fully supported by the accompanying data, and that the amount requested accurately reflects the adjustment in the Contract Sum or Contract Time for which Contractor believes Owner is responsible.

C. False Claims: Contractor shall not make any negligent or fraudulent misrepresentations, concealments, errors, omissions, or inducements to Owner in the formation or performance of this Contract. If Contractor or a Subcontractor submits false or frivolous substantiation or a Claim to Owner, which for purposes of this Section 8.01C is defined as substantiation or a Claim based in whole or in part upon a materially incorrect fact, statement, representation, assertion, or record, Owner shall be entitled to collect from Contractor by offset or otherwise (without prejudice to any right or remedy of Owner) any and all costs and expenses, including investigation and consultant costs, incurred by Owner in investigating, responding to, and defending against such false or frivolous substantiation or Claim.

D. Notification of surety: Owner may, but is not obligated to, notify Contractor's surety, if any, of the nature and amount of any claim it may assert against Contractor. If the claim relates to a possibility of Contractor's default, Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

E. Liens: If a Claim relates to or is the subject of a lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice and filing deadlines.

F. All Claims must be submitted for final resolution within the time period specified by applicable law: Owner and Contractor shall commence all Claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of this Part 8 and within the time period specified by applicable law.

G. Waiver of rights: Any Claim of Contractor against Owner shall be conclusively deemed to have been waived by Contractor unless made in accordance with the requirements of Part 8.

H. Owner may investigate: To assist in the review of a Claim, Owner may at any time visit the Project site, communicate directly with Subcontractors, or request additional information (including requesting an audit as authorized below) in order to fully evaluate the issues raised by the Claim.

I. Owner may audit Claims: All Claims filed against Owner shall be subject to audit at any time following the filing of the Claim. Failure of Contractor or Subcontractors of any tier to permit Owner access to the books and records of Contractor or Subcontractors of any tier, or to maintain and retain sufficient records to allow Owner to verify all or a portion of the Claim, shall constitute a waiver of the Claim and shall bar any recovery.

J. Contractor to make documents promptly available: In support of Owner's audit of any Claim, Contractor and any Subcontractor shall, upon request, promptly make available to Owner within seven Days of Owner's request, at the office of Contractor or any requested Subcontractor during normal business hours, at least the following documents and other documents requested by Owner; failure to fully comply with this requirement shall constitute a material breach of contract and waiver of any Claim:

1. Daily time sheets and supervisor's daily reports;
2. Collective bargaining agreements;
3. Insurance, welfare, and benefits records;
4. Payroll registers;
5. Earnings records;
6. Payroll tax forms;
7. Material invoices, requisitions, and delivery confirmations;
8. Material cost distribution worksheet;
9. Equipment records (list of company equipment, rates, etc.);
10. Vendors', rental agencies', Subcontractors', and agents' invoices;
11. Contracts between Contractor and each of its Subcontractors, and all lower-tier Subcontractor contracts and supplier contracts;
12. Subcontractors' and agents' payment certificates;

13. Cancelled checks (payroll and vendors);

14. Job cost reports, including job cost summary and job cost detail reports, related labor and equipment reports, and monthly totals;

15. Job payroll ledger;

16. Planned resource loading schedules and summaries;

17. General ledger;

18. Cash disbursements journal;

19. Financial statements for all years during performance of the Work. In addition, Owner may require, if it deems it appropriate, additional financial statements for 3 years preceding execution of the Work;

20. Depreciation records on all company equipment whether these records are maintained by the company involved, its accountant, or others;

21. If a source other than depreciation records is used to develop costs for Contractor's internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents;

22. All non-privileged documents which relate to each and every Claim together with all documents which support the amount of any adjustment in the Contract Sum or Contract Time sought by each Claim;

23. Work sheets or software used to prepare and establish the cost components for items of the Claim, including but not limited to labor, benefits and insurance, materials, equipment, Subcontractors, all documents that establish the time periods, individuals involved, the hours for the individuals, and the rates for the individuals;

24. Work sheets, software, and all other documents used by Contractor to prepare its bid;

25. The above items for its Subcontractors; and

26. Any other information in any form or media not expressly protected from discovery by applicable law.

K. Contractor to cooperate and provide facilities for audit: The audit may be performed by employees or representatives of Owner. Contractor and its Subcontractors shall provide adequate facilities acceptable to Owner for the audit during normal business hours. Contractor and all Subcontractors shall make a good faith effort to cooperate with Owner's auditors.

L. Reciprocal RCW 42.56 rights: Contractor agrees, on behalf of itself and Subcontractors, that any invocation of RCW 42.56 at any time by Contractor or a Subcontractor, or their respective representatives, shall initiate an equivalent right to disclosures from Contractor and Subcontractors for the benefit of Owner. Failure to fully comply with these requirements shall constitute a material breach of the Contract and shall constitute a waiver of all Claims by Contractor and any Subcontractor that does not fully comply.

PART 9 - TERMINATION OF THE WORK

9.01 TERMINATION BY OWNER FOR CAUSE

A. 7 Day Notice to Terminate for Cause: Owner may, upon 7 Days written notice to Contractor and to its surety, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for cause upon the occurrence of any one or more of the following events:

1. Contractor fails to prosecute Work: Contractor fails to prosecute the Work or any portion thereof with sufficient diligence to ensure Substantial Completion of the Work within the Contract Time;

2. Contractor bankrupt: Contractor is adjudged bankrupt, makes a general assignment for the benefit of its creditors, or a receiver is appointed on account of its insolvency;

3. Contractor fails to correct Work: Contractor fails in a material way to replace or correct Work not in conformance with the Contract Documents;

4. Contractor fails to supply workers or materials: Contractor repeatedly fails to supply skilled workers or proper materials or equipment;

5. Contractor failure to pay Subcontractors or labor: Contractor repeatedly fails to make prompt payment due to Subcontractors or for labor;

6. Contractor violates laws: Contractor materially disregards or fails to comply with laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction; or

7. Contractor in material breach of Contract: Contractor is otherwise in material breach of any provision of the Contract Documents.

B. Owner's actions upon termination: Upon termination, Owner may at its option:

1. Take possession of Project site: Take possession of the Project site and take possession of or use all materials, equipment, tools, and construction equipment and machinery thereon owned by Contractor to maintain the orderly progress of, and to finish, the Work;

2. Accept assignment of Subcontracts: Accept assignment of subcontracts pursuant to Section 5.20; and

3. Finish the Work: Finish the Work by whatever other reasonable method it deems expedient.

C. Surety's role: Owner's rights and duties upon termination are subject to the prior rights and duties of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.

D. Contractor's required actions: When Owner terminates the Work in accordance with this section, Contractor shall take the actions set forth in paragraph 9.02B, and shall not be entitled to receive further payment until the Work is accepted.

E. Contractor to pay for unfinished Work: Contractor shall not be entitled to receive further payment until the Work is finished. If the unpaid balance of the Contract Sum exceeds the cost of finishing the Work, including compensation for A/E's services and expenses made necessary thereby and any other extra costs or damages incurred by Owner in completing the Work, or as a result of

Contractor's actions, such excess shall be paid to Contractor. If such costs exceed the unpaid balance, Contractor shall pay the difference to Owner. These obligations for payment shall survive termination.

F. Contractor and Surety still responsible for Work performed: Termination of the Work in accordance with this section shall not relieve Contractor or its surety of any responsibilities for Work performed.

G. Conversion of "Termination for Cause" to "Termination for Convenience": If Owner terminates Contractor for cause and it is later determined that none of the circumstances set forth in paragraph 9.01A exist, then such termination shall be deemed a termination for convenience pursuant to Section 9.02.

9.02 TERMINATION BY OWNER FOR CONVENIENCE

A. Owner Notice of Termination for Convenience: Owner may, upon written notice, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for the convenience of Owner.

B. Contractor response to termination Notice: Unless Owner directs otherwise, after receipt of a written notice of termination for either cause or convenience, Contractor shall promptly:

1. Cease Work: Stop performing Work on the date and as specified in the notice of termination;

2. No further orders or Subcontracts: Place no further orders or subcontracts for materials, equipment, services or facilities, except as may be necessary for completion of such portion of the Work as is not terminated;

3. Cancel orders and Subcontracts: Cancel all orders and subcontracts, upon terms acceptable to Owner, to the extent that they relate to the performance of Work terminated;

4. Assign orders and Subcontracts to Owner: Assign to Owner all of the right, title, and interest of Contractor in all orders and subcontracts;

5. Take action to protect the Work: Take such action as may be necessary or as directed by Owner to preserve and protect the Work, Project site, and any other property related to this Project in the possession of Contractor in which Owner has an interest; and

6. Continue performance not terminated: Continue performance only to the extent not terminated.

C. Terms of adjustment in Contract Sum if Contract terminated: If Owner terminates the Work or any portion thereof for convenience, Contractor shall be entitled to make a request for an equitable adjustment for its reasonable direct costs incurred prior to the effective date of the termination, plus reasonable allowance for overhead and profit on Work performed prior to termination, plus the reasonable administrative costs of the termination, but shall not be entitled to any other costs or damages, whatsoever, provided however, the total sum payable upon termination shall not exceed the Contract Sum reduced by prior payments. Contractor shall be required to make its request in accordance with the provisions of Part 7.

D. Owner to determine whether to adjust Contract Time: If Owner terminates the Work or any portion thereof for convenience, the Contract Time shall be adjusted as determined by Owner.

9.03 TERMINATION BY CONTRACTOR FOR CAUSE

A. Contractor termination: Except as provided by RCW 60.28.080, Contractor may terminate the Contract for any of the following reasons:

1. Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped permanently;

2. An act of government, such as a declaration of national emergency, that requires all Work to be stopped permanently;

3. Because Owner has improperly not made payment of undisputed amounts within the time stated in the Contract Documents; or

4. The Work is stopped for a period of 60 consecutive Days through no act or fault of Contractor, a Subcontractor, or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with Contractor,

B. Contractor termination procedure: If one of these reasons exists, Contractor may, upon seven Days' written Notice to Owner (during which period Owner has the opportunity to cure), terminate the Contract and recover from Owner payment for Work executed in accordance with the Contract Documents, including reasonable overhead and profit on Work executed and costs incurred by reason of such termination. The total recovery of Contractor shall not exceed the unpaid balance of the Contract Sum.

PART 10 - MISCELLANEOUS PROVISIONS

10.01 GOVERNING LAW

Applicable law and venue: The Contract Documents and the rights of the parties herein shall be governed by the internal laws of the state of Washington, without regard to its choice-of-law provisions. Venue shall be in the county in which the Project is located, unless otherwise specified.

10.02 SUCCESSORS AND ASSIGNS

Bound to successors; Assignment of Contract: Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to the partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party shall assign the Contract without written consent of the other, except that Contractor may assign the Work for security purposes to a bank or lending institution authorized to do business in the state of Washington. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations set forth in the Contract Documents. If a majority of the ownership or the control of Contractor is acquired by a third party, and such acquisition reasonably imperils performance or creates a conflict of interest that Owner, in its sole discretion, cannot reasonably reconcile, then Owner may terminate this Contract at any time for cause under Section 9.01.

10.03 MEANING OF WORDS

Meaning of words used in Contract Documents: Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. Reference to standard Specifications, manuals, or codes of any technical society, organization, or association, or to the code of any governmental authority, whether such reference is specific or by implication, shall be to the latest

standard specification, manual, or code in effect on the date for submission of bids, except as may be otherwise specifically stated. Wherever in the Drawings and Specifications an article, device, or piece of equipment is referred to in the singular manner, such reference shall apply to as many such items as are shown on the Drawings, or required to complete the installation.

10.04 RIGHTS AND REMEDIES

A. No waiver of rights: Waiver of any provisions of the Contract Documents must be in writing and authorized by Owner. No other waiver is valid on behalf of Owner. No action, delay in acting, or failure to act by Owner or A/E shall constitute a waiver of a right or duty afforded under the Contract Documents, nor shall action, delay in acting, or failure to act constitute approval or an acquiescence in a breach therein, or otherwise prejudice the right of Owner to enforce a right or remedy at any subsequent time, except as may be specifically agreed in writing.

B. Rights under Contract do not limit other rights: Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

C. If portion of Contract is void, remainder is enforceable: If any portion of this Contract is held to be void or unenforceable, the remainder of the Contract shall be enforceable without such portion.

10.05 CONTRACTOR REGISTRATION AND COMPLIANCE

A. Contractor must be registered and licensed: Pursuant to RCW 39.06, Contractor shall be registered and licensed as required by the laws of the State of Washington, including but not limited to RCW 18.27. Contractor shall also have a current state unified business identifier number; have industrial insurance coverage for Contractor's employees working in Washington as required in Title 51 RCW; have an employment security department number as required in Title 50 RCW; have a state excise tax registration number as required in Title 82 RCW; and not be disqualified from bidding on any public works contract under RCW 39.06.010 (unregistered or unlicensed contractors) or RCW 39.12.065(3) (prevailing wage violations).

B. Employer contributions: Pursuant to RCW 50.24, "Contributions by Employers," in general and RCW 50.24.130 in particular, Contractor shall pay contributions for wages for personal services performed under this Contract or arrange for a bond acceptable to the Commissioner.

C. Apprenticeship requirements: If the Contract Sum for the Project exceeds one million dollars, Contractor shall comply with all applicable apprenticeship requirements.

10.06 TIME COMPUTATIONS

Computing time: When computing any period of time, the day of the event from which the period of time begins shall not be counted. The last day is counted unless it falls on a weekend or legal holiday, in which event the period runs until the end of the next day that is not a weekend or holiday. When the period of time allowed is less than 7 days, intermediate Saturdays, Sundays, and legal holidays are excluded from the computation.

10.07 RECORDS RETENTION

Six year records retention period: The wage, payroll, and cost records of Contractor, and its Subcontractors, and all records subject to audit in accordance with Section 8.03, shall be retained for a period of not less than 6 years after the date of Final Acceptance.

10.08 THIRD-PARTY AGREEMENTS

No third party relationships created: The Contract Documents shall not be construed to create a contractual relationship of any kind between: A/E and Contractor; Owner and any Subcontractor; or any persons other than Owner and Contractor.

10.09 ANTITRUST ASSIGNMENT

Contractor assigns overcharge amounts to Owner: Owner and Contractor recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by the purchaser. Therefore, Contractor hereby assigns to Owner any and all claims for such overcharges as to goods, materials, and equipment purchased in connection with the Work performed in accordance with the Contract Documents, except as to overcharges which result from antitrust violations commencing after the Contract Sum is established and which are not passed on to Owner under a Change Order. Contractor shall put a similar clause in its Subcontracts, and require a similar clause in its sub-Subcontracts, such that all claims for such overcharges on the Work are passed to Owner by Contractor.

10.10 HEADINGS AND CAPTIONS

Headings for convenience only: All headings and captions used in these General Conditions are only for convenience of reference, and shall not be used in any way in connection with the meaning, effect, interpretation, construction, or enforcement of the General Conditions, and do not define the limit or describe the scope or intent of any provision of these General Conditions.

10.11 INDEPENDENT CONTRACTOR

Contractor is independent contractor: Contractor shall be and operate as an independent contractor in the performance of the Work and shall have complete control over and responsibility for all personnel performing the Work. Contractor is not authorized to enter into any agreements or undertakings for or on behalf of Owner or to act as or be an agent or employee of Owner.

10.12 OWNER'S ROLE

Owner's role is limited. Owner will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely Contractor's responsibility under the Contract Documents. The presence of Owner at the Project site shall not in any manner be construed as assurance that the Work is being completed in compliance with the Contract Documents, nor as evidence that any requirement of the Contract Documents of any kind, including Notice, has been met or waived. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Owner will not have control over or charge of and will not be responsible for acts or omissions of Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

END OF SECTION 00 72 00

E3RA

ASBESTOS AND LEAD SURVEY

ELECTRICAL / MECHANICAL ENGINEERING BUILDING

WASHINGTON STATE UNIVERSITY PULLMAN, WASHINGTON

WSU CONTRACT NO. 17995

WSU PROJECT NO. 4432-2009

Submitted to:

Mr. Chad Larson
Washington State University
Architectural & Engineering Services
McCluskey Services Building
Post Office Box 641150
Pullman, Washington 99164-1150

PLAN AND / OR SPECIFICATION REVIEW
DATE
INITIAL
EHS 2009030
ENVIRONMENTAL HEALTH SERVICES
Air Pollution
Asbestos
Biohazard Agent
Chemical Storage
Chem Waste Mgmt
Drinking Water
Eyewash/Shower
Food Sanitation
Lighting
Radiation, Non-Ion.
Sewage Disposal
Solid Waste
Spill Control
Swimming Pools
Vector Control
Ventilation
Water Pollution
General Review

Submitted by:

E3RA, Inc.
9802 - 29th Avenue West, Suite B102
Everett, Washington 98204

Project No. E08163

February 9, 2009

9802 29th Ave. W #B102
Everett, WA 98204
425-356-3372
425-356-3374 fax

E3RA

February 9, 2009

Washington State University
Architectural & Engineering Services
McCluskey Services Building
Post Office Box 641150
Pullman, Washington 99164-1150

Attention: Mr. Chad Larson, PE, Facilities Project Officer

Subject: **Electrical / Mechanical Engineering Building (Building 0078A) – Asbestos and Lead Survey**
Electrical / Mechanical Engineering Building 0078A
Washington State University
Pullman, Washington
WSU Project #: 4432-2009

Dear Mr. Larson:

The information provided herein documents an asbestos and lead Good Faith survey conducted by E3RA, Inc. (E3RA) at Electrical / Mechanical Engineering Building (Building 0078A). The survey, bulk sample collection, and sample preparation was conducted on January 16th – 20th, 2009 by Asbestos Hazard Emergency Response Act (AHERA)-Certified Building Inspectors. The survey was limited to an evaluation of the presence and approximate quantity of asbestos-containing building material and lead-containing coatings (e.g. paint) potentially used in the construction of the above referenced facility.

E3RA trusts that the enclosed report provides WSU Architectural & Engineering Services with the information required at this time. If you have questions about the information presented within this report, please contact the undersigned.

Sincerely,

E3RA, Inc.

Chad Kean, CHMM
Project Scientist
electronically signed 020909

Doug Henry, CIH
Principal Scientist
electronically signed 020909

ASBESTOS AND LEAD SURVEY
ELECTRICAL / MECHANICAL ENGINEERING BUILDING
WASHINGTON STATE UNIVERSITY
PULLMAN, WASHINGTON

At the request of Washington State University (WSU) – Facility Operations Architectural & Engineering Services (FacOps), E3RA, Inc. (E3RA) performed a survey to identify the presence, location and quantity of asbestos-containing building material (ACBM) and lead (Pb)-containing paint (LCP) potentially used in the construction of the Electrical / Mechanical Engineering Building (EEME) located on WSU's campus in Pullman, Washington. The purpose of the survey was to identify ACBM and LCP in anticipation of future projects to be planned by WSU. This survey was performed in accordance with federal, state and local regulatory requirements.

Asbestos-Containing Materials

According to Washington Administrative Code (WAC) 296-62-07721, prior to the start of work, a building owner must identify the presence, location and quantity of ACBM and/or presumed asbestos-containing material (PACM) in the work area. This information must be communicated to contractors bidding on work, contractors performing other work, employees and tenants in or adjacent to the work area. This survey was intended to assist WSU – FacOps in meeting those regulatory requirements.

The following ACBM was identified:

- Mastic (black) associated with non asbestos-containing Vinyl Floor Tile (white 12"x12" w/ black streaks)
- Mastic (black/yellow) associated with non asbestos-containing Vinyl Floor Tile (white 12"x12" w/ grey and white streaks) Under Carpet
- Mastic (black/yellow) associated with non asbestos-containing Vinyl Floor Tile (black 12"x12" w/ white specks) Over Leveling Compound (white)
- Cement Board Counter Top (black)
- Asphaltic Sealant (black)

The following PACM was identified:

- Fire Door Lining
- Flange Gaskets

Table 1, *Bulk Asbestos Fiber Analysis*, attached to the main report, summarizes sample number, material description, location and the analytical results. In addition, WSU was provided with an electronic spreadsheet of the information presented in Table 1.

Lead-Containing Paints

Representative sampling was conducted of suspect LCP throughout the building so that construction and maintenance workers could identify the location and quantity of lead in surface coatings that may impact their work. Samples of suspect LCP were analyzed in-situ with a hand-held, direct-reading Niton X-Ray Fluorescence (XRF) spectrum analyzer. XRF analysis indicates that none of the 58 samples analyzed contain a concentration of lead greater than the United States Department of Housing and Urban Development (HUD) lead-based classification guideline of 1.0 milligram per square centimeter (mg/cm^2). Although all of the paint coatings tested do not classify as "lead-based", some of the paint coatings do contain enough lead to warrant special handling during certain construction activities.

Table 2, *XFR Data*, attached to the main report, summarizes sample number, paint color, building component, substrate and the analytical result. In addition, WSU was provided with an electronic spreadsheet of the information presented in Table 2.

PROJECT TITLE:	Electrical / Mechanical Engineering Building – Good Faith Survey
LOCATION:	Electrical / Mechanical Engineering Building, WSU, Pullman, Washington
CLIENT:	WSU Architectural & Engineering Services
E3RA JOB NUMBER:	E08163
WSU CONTRACT NO.:	**17995**
WSU PROJECT NO.:	**4432-2009**

The following Asbestos Hazard Emergency Response Act (AHERA)-certified inspector performed the survey:

Chad Kean
Certification Number 1028478
Expiration date: March 19, 2009

Casey Lowe
Certification Number 10302102
Expiration date: September 3, 2009

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ASBESTOS AND LEAD SURVEY
ELECTRICAL / MECHANICAL ENGINEERING BUILDING
WASHINGTON STATE UNIVERSITY
PULLMAN, WASHINGTON

1.0 INTRODUCTION

E3RA, Inc. (E3RA) was retained by Washington State University (WSU) – Facility Operations Architectural & Engineering Services (FacOps) to conduct an assessment of asbestos-containing building material (ACBM) and lead (Pb)-containing paint (LCP) potentially used in the construction of the Electrical / Mechanical Engineering Building (EEME) (Building 0078A) at Washington State University in Pullman, Washington. This survey was performed in accordance with E3RA's proposal, dated December 31, 2008, and federal, state and local regulatory requirements.

1.1 Objective

The objective of the survey was to evaluate the potential presence of ACBM and LCP within and on the exterior of EEME in anticipation of future projects to be planned by WSU. The survey but did not include areas beyond the 'foot print' of the building or within inaccessible areas such as ceiling or wall cavities. The asbestos survey was conducted in general accordance with the "Good Faith" asbestos survey requirements in the Washington Administrative Code (WAC) 296-62-07721, (Communication of Hazards to Employees) as required by the Washington State Department of Labor and Industry (L&I) and regionally by the Washington State Department of Ecology (Ecology) Eastern Regional Office for buildings that are to be renovated.

The LCP survey was conducted to provide information to assist in complying with WAC 296-155-176 (Lead in Construction).

1.2 Scope of Work

The scope of services for the regulated materials assessment included the following tasks:

- Perform a "Good Faith" asbestos survey to identify the presence, location and quantity of ACBM and presumed asbestos-containing material (PACM) within and on the exterior of the building. Materials identified as suspect materials were sampled or presumed in accordance with the Asbestos Hazard Emergency Response Act (AHERA) sampling requirements 40 Code of Federal Regulations (CFR) 763.86 and analyzed by a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory for the presence and quantify of asbestos. Samples were analyzed using polarized light microscopy (PLM) Environmental Protection Agency (EPA) Method 600/R-93/116.

- Perform a survey to identify LCP within and on the exterior of the building. The lead assessment included field analysis with a direct-reading, hand-held Niton X-Ray Fluorescence (XRF) spectrum analyzer.

- Incorporation of the results of the survey this report which includes a description of survey methodology; material descriptions; sample location drawings; results of sample analysis; and material quantities as applicable.

1.3 Limitations of the Assessment

The conclusions within this report are professional opinions based solely upon visual site observations and interpretations of analytical data as described in this report. Typical construction techniques can render portions of the building inaccessible. As a result, additional ACBM and LCP may be present in inaccessible areas (e.g., within wall cavities and above hard ceilings). Suspect ACBM and LCP within inaccessible areas and/or not identified in this report should be so presumed until characterized. In addition, E3RA did not gain access to room 3B ("Transformer Room") due to access limitations and the materials contained within room 3B were therefore not included as part of this survey.

The opinions presented herein apply to the site conditions existing at the time of the investigation and interpretation of current regulations pertaining to asbestos and lead. Opinions and recommendations provided herein may not apply to future conditions that may exist at the site. Regulatory requirements in effect at the time of the work should be verified prior to any work that impacts regulated materials. This report represents the findings of this survey only and is not intended to establish scope or contractual terms to regulated material abatement.

2.0 SITE DESCRIPTION

EEME is a seven-story structure with a basement and a flat built-up asphalt roof. The exterior of the building is a mix of concrete, brick, metal and glass. The heating, ventilation and air-conditioning (HVAC) system is comprised of multiple HVAC units located in the mechanical rooms on the second, third and sixth floors.

Interior horizontal finishes include vinyl floor tile, terrazzo, carpet, gypsum board wall systems (gypsum board, tape and joint compound), acoustical ceiling tile (suspended and glued on), ceramic tile, and finished concrete. Interior vertical finishes include gypsum board wall systems, glass, concrete, ceramic tile and brick.

3.0 METHODOLOGY

Information concerning the subject property was obtained during site inspections conducted by E3RA representatives Mr. Chad Kean and Mr. Casey Lowe on January 16th-20th, 2009. This section describes the sampling methodology. Supporting documentation provided within the survey report includes material summary tables and the appendices that include site photographs, laboratory analytical reports, chain-of-custody's, and staff/laboratory certifications.

3.1 Asbestos Survey Methodology

A 'walk-through' inspection of accessible areas was conducted to identify suspect ACBM and PACM. Sub-surface suspect materials within wall and ceiling cavities were not investigated. However, the survey attempted to identify thermal system insulation (TSI) on mechanical piping systems that may be in wall

cavities by studying the system configuration and 'tracing' visible TSI. The asbestos survey was performed by a AHERA-certified building inspectors in accordance with a sampling protocol appropriate for the renovation of existing structures. The inspector's AHERA certifications are provided in Appendix C. The sampling protocol was modeled after 40 CFR 763.86 and by L&I regulation WAC 296-62-077021. The approximate quantity of materials was obtained from scaled drawings provided by WSU – FacOps and by field measurements.

3.1.1 Sampling and Sample Documentation

Suspect ACBM was grouped into homogeneous sampling areas (HSA) and categorized according to 40 CFR 763, as TSI, surfacing material or miscellaneous material. The sampling plan included, at a minimum, the collection and analysis of samples as follows:

Thermal System Insulation

- In a distributive manner, a minimum of three samples of each HSA that was not presumed to contain asbestos.
- At least one bulk sample from each homogenous area of patched TSI if the patch was less than 6 square feet.

Surfacing Material

- In a distributive manner, a minimum of three samples collected from each homogenous area that was 1,000 square feet or less.
- A minimum of five samples collected from each homogenous area that was greater than 1,000 square feet but less than or equal to 5,000 square feet.
- A minimum of seven samples collected from each homogenous area that was greater than 5,000 square feet.

Miscellaneous Material

- In a distributive manner as deemed sufficient by the accredited inspector. At least one sample was collected of each suspect miscellaneous material not presumed to contain asbestos.

Non-Suspect Materials

- According to 40 CFR 763-86(4), sampling of the following materials are not required where the accredited inspector has deemed the material to be fiberglass, foam glass, rubber or other recognized non-ACBM.

Samples were collected by carefully removing small portions of the suspect material with a sharp knife or other hand tool suitable to the material being sampled. Each sample was placed in a labeled plastic container immediately after collection. Sample containers were then placed in a large re-sealable plastic bag for transportation to the laboratory. The sampling instrument was wiped with a clean moist cloth to decontaminate the tool and minimize the potential release of asbestos fibers or contamination of subsequent samples. Data pertinent to each sample (e.g., date, sample number, material description and material category) was recorded on a field data sheet. Figures 1 thru 6, attached, are floor plans that have

been modified to identify approximate asbestos sample locations. Photographs of selected ACBM identified during the survey are provided in Appendix A.

3.1.2 Laboratory Analysis

Asbestos bulk samples and chain-of-custody submittal sheets were delivered to Seattle Asbestos Test, LLC (SAT) in Lynnwood, Washington for asbestos analysis. SAT participates in the NVLAP for quality control procedures. As specified in 40 CFR Chapter I (1-1-87 edition) Part 763, Subpart F, Appendix A, each sample was analyzed using PLM/dispersion staining techniques in accordance with EPA Method 600/R-93/116. The detection limit for this type of analysis is approximately one percent (by volume). Materials containing more than one percent asbestos are considered to be ACBM. SAT performs reanalysis of five percent of bulk samples for the purpose of internal quality control. Laboratory analytical data reports and chain-of-custody forms are provided in Appendix B. Laboratory certifications are provided in Appendix D.

3.2 Lead Paint Survey Methodology

An AHERA-certified building inspector and Washington State lead-based paint program certified inspector and risk assessor, experienced in the identification and sampling of LCP using portable XRF - lead identification technology, performed the LCP survey. The XRF reports lead concentrations in milligrams of lead per square centimeter of surface (mg/cm^2). In an effort to evaluate the possible presence of LCP, interior and exterior painted surfaces were identified and sample locations were selected to be representative of the primary color combinations found within the building. Color, condition, evidence of layering, type of substrate and location were factors when selecting sample locations. Data pertinent to the sample such as color, location, building feature (e.g., wall) and substrate (e.g., wood) was recorded on field data sheets.

4.0 RESULTS

The following details the results of the asbestos and lead assessment survey.

4.1 Asbestos Investigation

A total of 39 bulk samples were collected as part of the survey. Of these samples, six were identified through laboratory analysis as regulated ACBM (greater than or equal to 1% asbestos). A summary of the asbestos sampling and results is presented in Table 1, *Bulk Asbestos Fiber Analysis*, after the main report section. Table 1 includes the sample number, material description, location and the analytical results.

The following ACBM was identified:

- Mastic (black) associated with non asbestos-containing Vinyl Floor Tile (white 12"x12" w/ black streaks)
- Mastic (black/yellow) associated with non asbestos-containing Vinyl Floor Tile (white 12"x12" w/ grey and white streaks) Under Carpet
- Mastic (black/yellow) associated with non asbestos-containing Vinyl Floor Tile (black 12"x12" w/ white specks) Over Leveling Compound (white)
- Cement Board Counter Top (black)

- Asphaltic Sealant (black)

The following PACM was identified:

- Fire Door Lining
- Flange Gaskets

Commonly "suspect" materials that were sampled and identified as non-ACBM include:

- Vinyl Floor Tile (black 12"x12") and Mastic (brown)
- Floor Coating (tan)
- Ceramic Tile (green/white 2"x2") and Grout (grey) and Adhesive (yellow)
- Vinyl Floor Sheeting (grey) and Mastic (yellow)
- Elevated Floor System Adhesive (black)
- Vinyl Floor Sheeting (grey terrazzo pattern) and Mastic (yellow)
- Ceiling Tile (white 12"x12" glued on w/ worm hole pattern) and Adhesive (brown)
- Ceiling Tile (white suspended 2'x2' w/ worm hole pattern)
- Vinyl Cove Base (tan 4") and Adhesive (brown)
- Sink Undercoating (black)
- Vinyl Cove Base (cream 4") and Adhesive (white) Over Gypsum Wall Board
- Gypsum Board Wall System (gypsum board, tape, joint compound)
- Duct Tape (white)
- Vinyl Cove Base (blue 6") and Adhesive (cream)
- Vinyl Cove Base (blue 4") and Adhesive (cream)
- Duct Sealant (tan)
- Roofing Caulk (yellow)
- Window Putty (grey)
- Built Up Roofing and Paint (silver)
- Parapet Wall Built Up Roofing and Paint (silver)

It should be noted that other suspect ACBM that was not sampled during this survey might be present within or on the outside of the subject building. If suspect ACBM not identified in this report is found during construction activities, it is recommended that such materials be characterized prior to being disturbed.

4.2 Lead Paint Investigation

58 representative coatings from the interior and exterior of the building were analyzed by XRF. Table 2, *XFR Data*, attached to the main report, summarizes sample number, paint color, building component, substrate and the analytical result reported in mg/cm^2. XRF analysis indicates that none of the 58 samples analyzed contain a concentration of lead greater than the United States Department of Housing and Urban Development (HUD) lead-based classification guideline of 1.0 milligram per square centimeter (mg/cm^2). None of the surfaces surveyed are considered to be lead-based paints (greater than 1.0 mg/cm^2), however, XRF readings indicate that some of the surfaces contain quantities of lead that may classify as a regulated hazard during certain construction activities.

5.0 CONCLUSIONS AND RECOMMENDATIONS

A copy of this report should be provided to contractors bidding on work and each contractor must have a copy of this report during scheduled construction activities at the site that may impact suspect or confirmed regulated building materials.

5.1 Asbestos-Containing Materials

Current federal, state, and local regulations require that a licensed asbestos-abatement contractor and trained workers remove ACBM. Prior to abatement of ACBM, current regulations require that notifications be filed with L&I Division of Occupational Safety and Health (DOSH) and Ecology's Eastern Regional Office at least 10 days prior to commencement of the removal project. The DOSH requires pre-abatement air monitoring and clearance air sampling upon completion of the asbestos abatement project. An asbestos removal project is not complete until the analytical results from clearance samples indicate that the residual fiber levels in the ambient air are within acceptable limits. Following removal of the ACBM, asbestos-containing debris must be disposed of at a landfill that accepts asbestos waste in accordance with the current federal, state, and local regulations.

As previously noted, there is a possibility that other suspect ACBM may be present within the building that was not sampled during this survey. Contractors and maintenance workers should use caution when performing work within the project areas even after the completion of asbestos abatement. Should work activities discover additional concealed suspect ACBM not already sampled, workers should avoid damaging those materials until they have been properly sampled, analyzed and abated in accordance with local, state, and federal regulations.

5.2 Lead-Containing Paint

The summary of LCP samples analyzed at the subject site was prepared so that it may be used by construction and maintenance workers to identify the location and quantity of lead in surface coatings that may impact their work. The provided analytical results may be used in conjunction with other applicable data (e.g., air monitoring) to evaluate the potential for elevated occupation lead exposures during construction activities. Although all of the paint coatings tested do not classify as lead-based paints (greater than 1.0 mg/cm^2), analytical data indicate that some may contain quantities of lead that exceed the WSDLI Construction Standards for any detectable concentration of lead and may be classified as a potential hazard during certain construction activities. Contractors and WSU employees performing construction and maintenance work should be aware of the lead construction standard and provide proper worker protection.

If material coated with LCP is to be disposed of as part of any future projects, some or all of the demolition debris may be subject to the requirements of Washington State Department of Ecology (WAC 173-303-090). According to WAC 173-303-090, a solid waste in which the TCLP for lead exceeds five milligrams per liter (mg/L) would designate as a dangerous waste for the purpose of disposal. However, based upon the observed lead concentrations, it is not anticipated that the general construction debris would classify as dangerous waste.

TABLE 1
BULK ASBESTOS FIBER ANALYSIS

Sample Number	Description	Type	Location / Estimated Quantity[1]	Percent Asbestos
VT-01-1 and VT-01-2	**Vinyl Floor Tile (white 12"x12" w/ black streaks) and Mastic (black)**	**Misc**	**Rooms B10N, B6, B21, B23, B25, B27, B31, B37, B43, B45, B46, B47, B49, B53, B55, B57, B58, B59, 6, 6AT, 9, 14, 16, 21, 23, 25, 26*, 27, 28*, 31, 33, 34, 35, 37, 43, 44, 45, 47, 49, 53, 55, 56, 57, 59, 102, 102A, 102C, 102D, 102E, 102F, 102G, 102H, 105, 107, 121, 123, 125, 127, 131, 133, 135, 137, 143, 145, 147, 149, 153, 155, 157, 159, 202, 202A, 202B, 202C, 202D, 202E, 202F, 202G, 202H, 205, 206, 206A, 206T, 207, 214, 216, 221, 223, 224A, 225, 227, 228*, 230, 231, 233, 235, 237, 240, 300E, 301, 302, 303, 304, 305, 306, 307, 400, 401, 402, 403, 404, 405, 406, 500, 501, 502, 503, 504, 505, 506 / 27,800 SF** ***under carpet**	**ND (tile) 2% Chrysotile (mastic)**
VT-02-1	Vinyl Floor Tile (black 12"x12") and Mastic (brown)	Misc	Rooms B10, B10N, B10S, 10, 10N, 10S, 100N, 100S, 200, 200N / NA	ND (all layers)
FC-01-1	Floor Coating (tan)	Misc	Rooms B24 and B26 / NA	ND
CMT-01-1	Ceramic Tile (green/white 2"x2") and Grout (grey) and Adhesive (yellow)	Misc	Rooms B11, B15, 11, 15, 111, 115, 211, 215, 507 / NA	ND (all layers)
SVF-01-1 and SVF-01-2	Vinyl Floor Sheeting (grey) and Mastic (yellow)	Misc	Elevators / NA	ND (all layers)
VT-03-1	**Vinyl Floor Tile (white 12"x12" w/ grey and white streaks) and Mastic (black/yellow) Under Carpet**	**Misc**	**Room 52 / 935 SF**	**ND (tile) 2% Chrysotile (mastic)**
FM-01-1	Elevated Floor System Adhesive (black)	Misc	Rooms 54, 106, 106A, 106T, 128, 130, 136, 152, 152A, 154 / NA	ND
VT-04-1	**Vinyl Floor Tile (black 12"x12" w/ white specks) and Mastic (black/yellow) Over Leveling Compound (white)**	**Misc**	**Rooms 100N and 100S / 140 SF**	**ND (tile) 2% Chrysotile (mastic) ND (leveling compound)**

TABLE 1
BULK ASBESTOS FIBER ANALYSIS

Sample Number	Description	Type	Location / Estimated Quantity[1]	Percent Asbestos
SVF-02-1	Vinyl Floor Sheeting (grey terrazzo pattern) and Mastic (yellow)	Misc	Rooms 224 and 224B / NA	ND (all layers)
CT-01-1	Ceiling Tile (white 12"x12" glued on w/ worm hole pattern) and Adhesive (brown)	Misc	Rooms B6, B24, B38, B46, B46A, B54, B58 / NA	ND (all layers)
CT-02-1	Ceiling Tile (white suspended 2'x2' w/ worm hole pattern)	Misc	Rooms B10N, B10S, B10SW, B10SV, B11, B15, B19, B21, B23, B25, B26, B27, B31, B37, B43, B45, B46, B47, B49, B53, B55, B57, B59, 6, 6AT, 10, 10E, 10N, 10NW, 10S, 11, 14, 15, 16, 21, 23, 25, 26, 27, 28, 31, 33, 34, 35, 37, 43, 44, 45, 47, 49, 52, 53, 54, 54A, 55, 56, 57, 59, 100, 100E, 100N, 100NW, 100S, 102, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 102H, 105, 106, 106A, 106T, 107, 111, 115, 119, 121, 123, 125, 127, 128, 130, 131, 133, 135, 136, 137, 143, 145, 147, 149, 152, 152A, 153, 154, 155, 157, 159, 200, 200E, 200N, 200NW, 202, 202A, 202B, 202C, 202D, 202E, 202F, 202G, 202H, 205, 206, 206A, 206T, 207, 211, 214, 215, 216, 221, 223, 224A, 224AA, 225, 227, 228, 230, 231, 233, 235, 237, 240, 300E, 301, 302, 303, 304, 305, 306, 307, 400, 401, 402, 403, 404, 405, 406, 500, 501, 502, 503, 504, 505, 506, 507 / NA	ND
CB-01-1	Vinyl Cove Base (tan 4") and Adhesive (brown)	Misc	Throughout / NA	ND (all layers)
CAB-01-1	**Cement Board Counter Top (black)**	**Misc**	**Room B38 / 100SF**	**9% Chrysotile**
SU-01-1	Sink Undercoating (black)	Misc	Room B26, B36, 44, 224AA, 224B, 230, 234 / NA	ND
CB-02-1	Vinyl Cove Base (cream 4") and Adhesive (white) Over Gypsum Wall Board	Misc	Rooms B26, 26 and 28 / NA	ND (all layers)
GWB-01-1 to GWB-01-7	Gypsum Board Wall System (gypsum board, tape, joint compound)	Misc/ Surf	Throughout / NA	ND (all layers)

TABLE 1
BULK ASBESTOS FIBER ANALYSIS

Sample Number	Description	Type	Location / Estimated Quantity[1]	Percent Asbestos
DT-01-1 to DT-01-3	Duct Tape (white)	TSI	Rooms B15, 3A and 3 / NA	ND
CB-03-1	Vinyl Cove Base (blue 6") and Adhesive (cream)	Misc	Rooms B46 and B46A / NA	ND (all layers)
CB-04-1	Vinyl Cove Base (blue 4") and Adhesive (cream)	Misc	Rooms B46 and B46A / NA	ND (all layers)
DS-01-1	Duct Sealant (tan)	Misc	Mechanical Rooms / NA	ND
RF-01-1 to RF-01-3	Built Up Roofing and Paint (silver)	Misc	Roof / NA	ND (all layers)
RF-02-1 to RF-02-3	Parapet Wall Built Up Roofing and Paint (silver)	Misc	Roof – Parapet Walls / NA	ND (all layers)
RF-03-1	**Asphaltic Sealant (black)**	**Misc**	**2nd Floor Roof – Around Edges / 40 LF**	**6% Chrysotile**
RF-04-1	Roofing Caulk (yellow)	Misc	Roof – Around Edges / NA	ND
WP-01-1	Window Putty (grey)	Misc	Exterior Windows / NA	ND
FD-01	**Fire Door Lining**	**Misc**	**Throughout / 245 Fire Doors**	**PACM**
FPG-01	**Flange Gaskets**	**Misc**	**Throughout / 200 Gaskets**	**PACM**

[1]Quantity estimated for asbestos-containing materials only.
Misc – Miscellaneous Material
Surf – Surfacing Material
TSI – Thermal System Insulation
SF – Square Feet
LF – Linear Feet
ND – None Detected
Bold – Denotes samples containing greater than, or equal to, 1% asbestos.

Table 2
XRF Data

Sample #	Sample Date	Sample Location[1]	Component	Substrate	Color	Wall	A Wall	XRF Reading (mg/cm2)	XRF Error (mg/cm2)
105	1/18/2009	0.3 mg/cm^2 Calibration Std.						0.3	0.04
106	1/18/2009	B38	Wall	Drywall	Light Green	D	North	0	0.02
107	1/18/2009	B38	Wall	Drywall	Light Green	A	North	0	0.02
108	1/18/2009	B38	Door	Metal	Grey	A	North	0	0.02
109	1/18/2009	B10NW	Wall	Concrete	Grey	B	North	0	0.02
110	1/18/2009	B10NW	Hand Rail	Metal	Silver	Hand Rail	North	0	0.02
111	1/18/2009	B10NW	Stairs	Metal	Grey	Stairs	North	0.01	0.3
112	1/18/2009	B10NW	Stairs	Metal	Grey	Stairs	North	0	0.02
113	1/18/2009	B10N	Wall	Drywall	Grey	B	North	0	0.02
114	1/18/2009	B10N	Wall	Drywall	Grey	D	North	0	0.02
115	1/18/2009	B10	Wall	Drywall	Grey	C	North	0	0.02
118	1/18/2009	B19	Radiator	Metal	Grey	Radiator	North	0	0.02
119	1/18/2009	B10N	Cable Chase	Metal	Grey	Cable Chase	North	0	0.02
120	1/18/2009	B26	Wall	Drywall	Grey	C	North	0	0.02
121	1/18/2009	B31	Wall	Drywall	Grey	B	North	0	0.02
122	1/18/2009	1.1 mg/cm^2 Calibration Std.						1.1	0.1

Table 2
XRF Data

Sample #	Sample Date	Sample Location[1]	Component	Substrate	Color	Wall	A Wall	XRF Reading (mg/cm2)	XRF Error (mg/cm2)
123	1/18/2009	B31	Ceiling	Drywall	Grey	Ceiling	North	0	0.02
124	1/18/2009	B10N	Door Frame	Metal	Grey	D	North	0	0.02
125	1/18/2009	B10S	Wall	Drywall	Grey	D	North	0	0.02
127	1/18/2009	B24	Wall	Drywall	Grey	B	North	0	0.02
128	1/18/2009	B54	Wall	Drywall	Grey	D	North	0	0.02
129	1/18/2009	10	Wall	Drywall	Grey	C	North	0	0.02
130	1/18/2009	10	Door	Metal	Grey	A	North	0	0.02
132	1/18/2009	10C	Hand Rail	Metal	Silver	Hand Rail	North	0.7	0.6
133	1/18/2009	6	Wall	Drywall	Grey	A	North	0.01	0.02
134	1/18/2009	3	Wall	Drywall	Grey	H	North	0	0.02
135	1/18/2009	34	Wall	Drywall	Grey	C	North	0	0.02
137	1/18/2009	10S	Wall	Drywall	Grey	B	North	0	0.02
139	1/18/2009	54	Wall	Drywall	Grey	A	North	0.01	0.03
140	1/18/2009	10S	Wall	Drywall	Grey	D	North	0	0.02
141	1/18/2009	136	Wall	Drywall	White	D	North	0	0.02
142	1/18/2009	100N	Wall	Drywall	Grey	B	North	0	0.02

Table 2
XRF Data

Sample #	Sample Date	Sample Location[1]	Component	Substrate	Color	Wall	A Wall	XRF Reading (mg/cm2)	XRF Error (mg/cm2)
143	1/18/2009	130	Wall	Drywall	Grey	C	North	0	0.02
144	1/18/2009	100S	Wall	Drywall	Grey	B	North	0.01	0.03
145	1/18/2009	100S	Door	Metal	Grey	C	North	0	0.02
146	1/18/2009	100E	Wall	Drywall	Grey	A	North	0	0.02
147	1/18/2009	100E	Wall	Concrete	Grey	A	North	0	0.02
149	1/18/2009	102	Wall	Concrete	Green	Pillar	North	0.6	0.6
150	1/18/2009	230	Wall	Drywall	Grey	D	North	0	0.02
151	1/18/2009	200N	Wall	Drywall	Grey	D	North	0.5	0.5
152	1/18/2009	200N	Wall	Drywall	Grey	B	North	0	0.02
153	1/18/2009	200N	Wall	Concrete	Grey	D	North	0	0.02
154	1/18/2009	200N	Rail	Metal	Grey	C	North	0	0.02
155	1/18/2009	200	Wall	Drywall	Grey	A	North	0	0.02
157	1/18/2009	206	Wall	Drywall	Green	D	North	0	0.02
158	1/18/2009	200E	Radiator	Metal	Silver	Radiator	North	0	0.02
160	1/18/2009	300E	Wall	Drywall	Light Grey	D	North	0	0.02
161	1/18/2009	304	Wall	Drywall	Peach	A	North	0	0.02

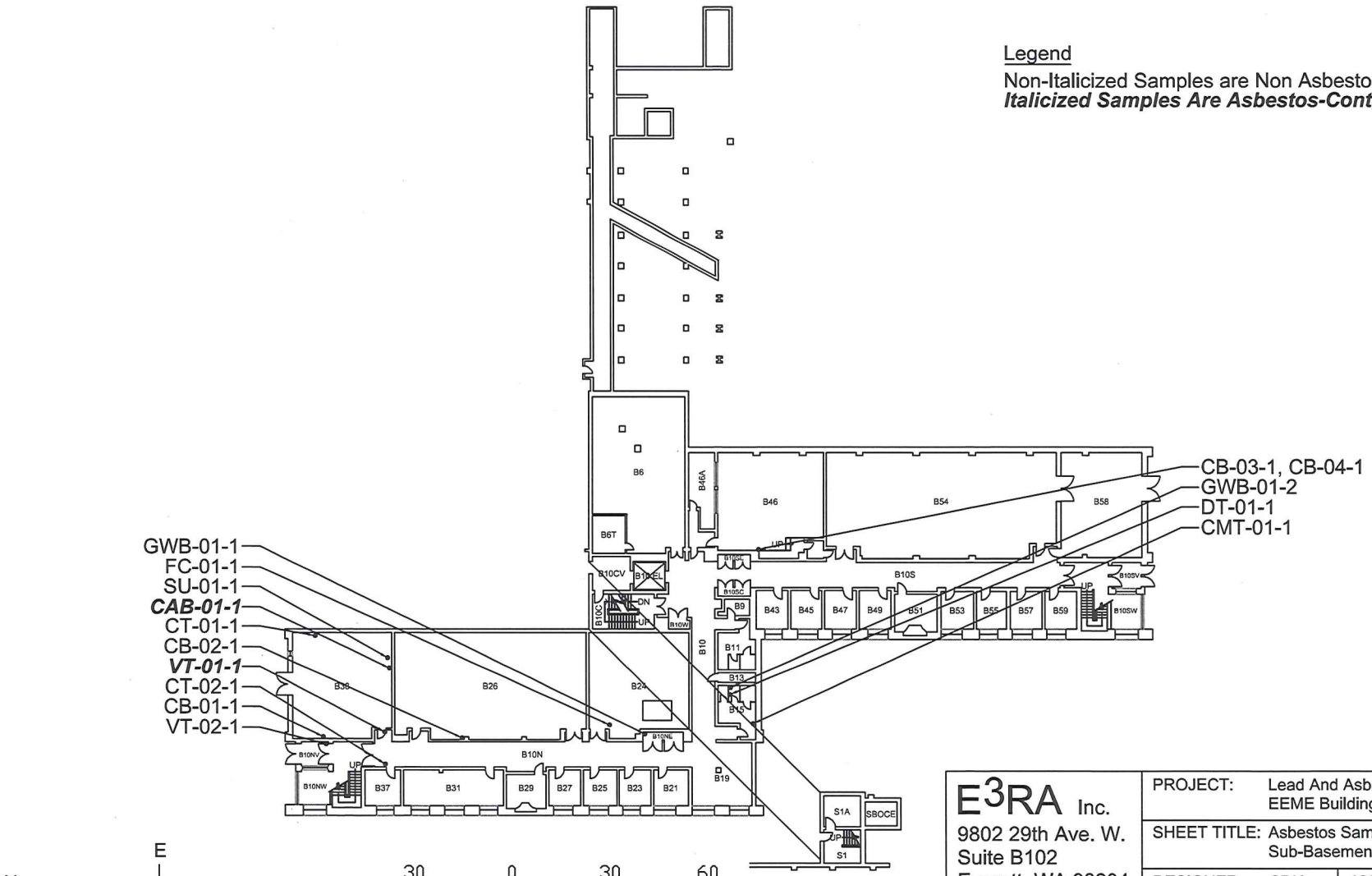
Table 2
XRF Data

Sample #	Sample Date	Sample Location[1]	Component	Substrate	Color	Wall	A Wall	XRF Reading (mg/cm2)	XRF Error (mg/cm2)
162	1/18/2009	301	Wall	Drywall	White	C	North	0	0.02
163	1/18/2009	400	Wall	Drywall	Light Grey	B	North	0	0.02
164	1/18/2009	406	Wall	Drywall	White	A	North	0	0.02
165	1/18/2009	401	Wall	Drywall	White	A	North	0	0.02
166	1/18/2009	500	Wall	Drywall	Light Grey	F	North	0	0.02
167	1/18/2009	506	Wall	Drywall	Light Grey	A	North	0	0.02
168	1/18/2009	500	Door Frame	Metal	Light Grey	B	North	0	0.02
169	1/18/2009	600	Wall	Drywall	Light Grey	A	North	0	0.02
170	1/18/2009	600	Stair Rail	Metal	Light Grey	J	North	0	0.02
172	1/18/2009	600	Wall	Drywall	Light Grey	I	North	0	0.02
173	1/19/2009	Shutter Calibration						4.26	0
174	1/19/2009	Roof Deck	Wall	Metal	Silver	C	North	0	0.02
175	1/19/2009	241	Door	Metal	Silver	A	North	0	0.02
176	1/19/2009	1.6 mg/cm^2 Calibration Std.						1.6	0.1

1 – room numbers unless otherwise denoted
mg/cm^2 – denotes milligrams (of lead) per centimeter squared (of surface)
A Wall – primary wall for location identification. From A Wall move clockwise A, B, C…
Note: Out of sequence sample numbers due to multiple sampling days, null samples and multiple buildings sampled.

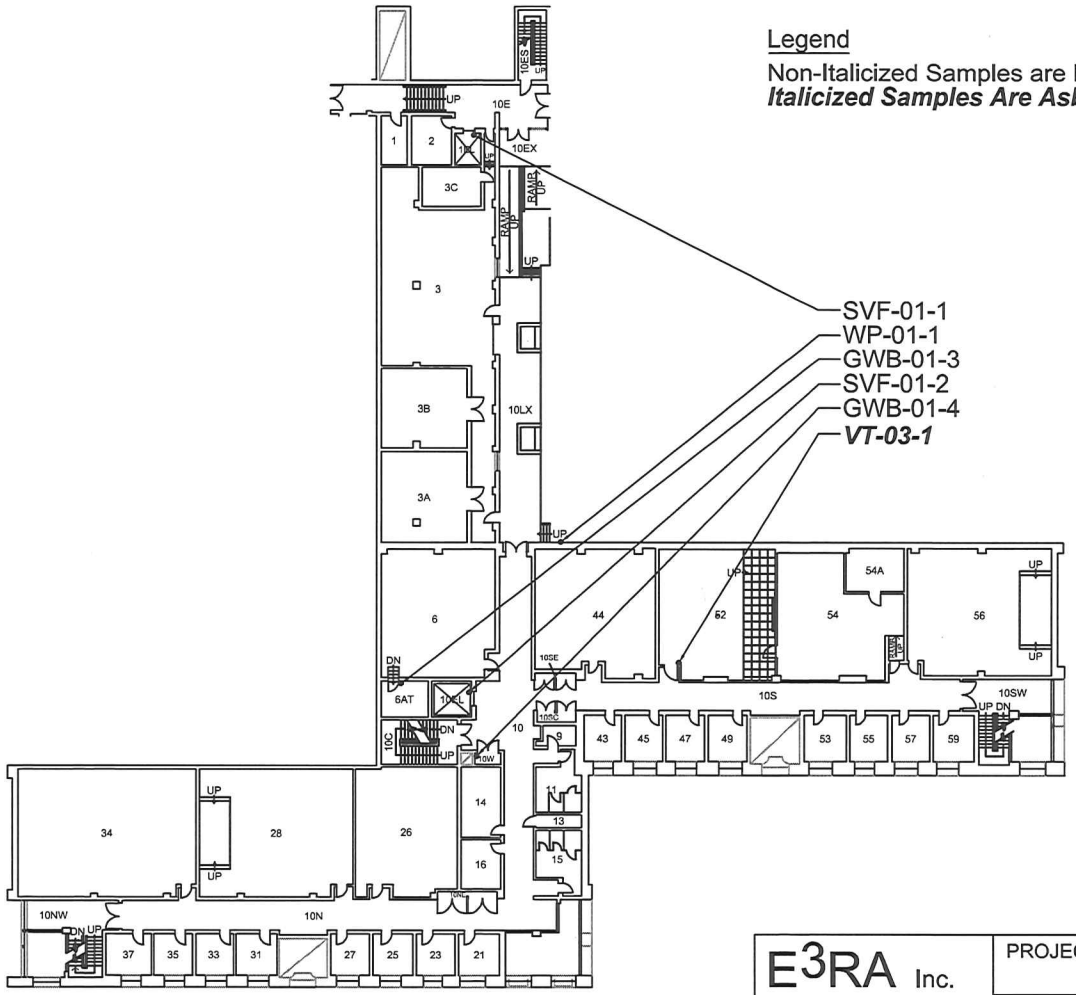
FIGURES 1, 2, 3, 4, 5, and 6

SUSPECT ACBM SAMPLE LOCATIONS



E3RA Inc.
9802 29th Ave. W.
Suite B102
Everett, WA 98204
425-356-3372
425-356-3374 fax
www.e3ra.com

PROJECT:	Lead And Asbestos Survey EEME Building		
SHEET TITLE:	Asbestos Sample Locations Sub-Basement and Basement Floor		
DESIGNER:	CDK	JOB NO.	E08163
DRAWN BY:	CDK	SCALE:	1" = 30'
CHECKED BY:	DJH	FIGURE:	1
DATE:	Feb. 6, 2009	FILE:	Sample Loc.dwg



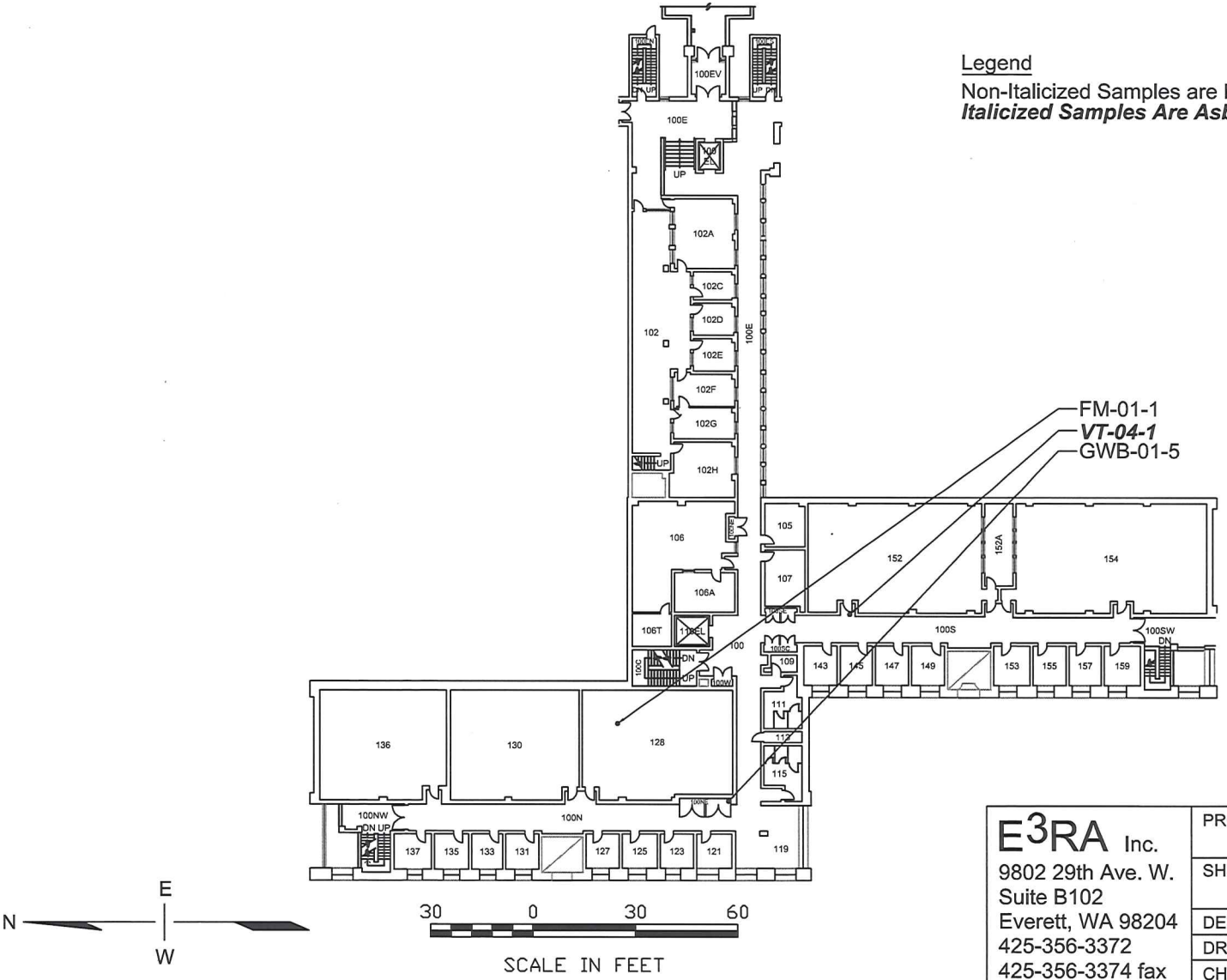
N E W

30 0 30 60

SCALE IN FEET

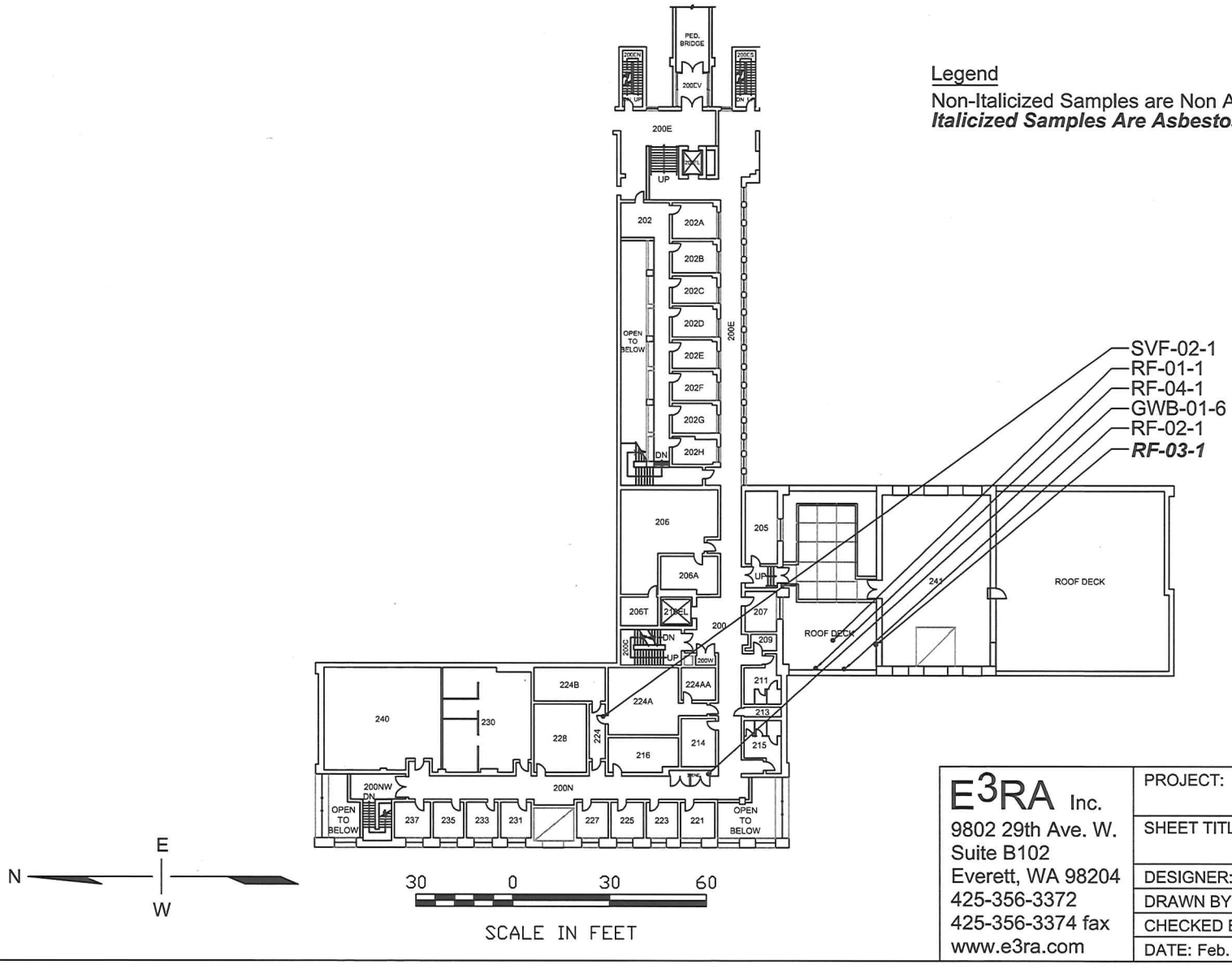
E3RA Inc.
9802 29th Ave. W.
Suite B102
Everett, WA 98204
425-356-3372
425-356-3374 fax
www.e3ra.com

PROJECT:	Lead And Asbestos Survey EEME Building		
SHEET TITLE:	Asbestos Sample Locations Ground Floor		
DESIGNER:	CDK	JOB NO.	E08163
DRAWN BY:	CDK	SCALE:	1" = 30'
CHECKED BY:	DJH	FIGURE:	2
DATE:	Feb. 6, 2009	FILE:	Sample Loc.dwg



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PROJECT:	Lead And Asbestos Survey EEME Building		
SHEET TITLE:	Asbestos Sample Locations First Floor		
DESIGNER:	CDK	JOB NO.	E08163
DRAWN BY:	CDK	SCALE:	1" = 30'
CHECKED BY:	DJH	FIGURE:	3
DATE:	Feb. 6, 2009	FILE:	Sample Loc.dwg



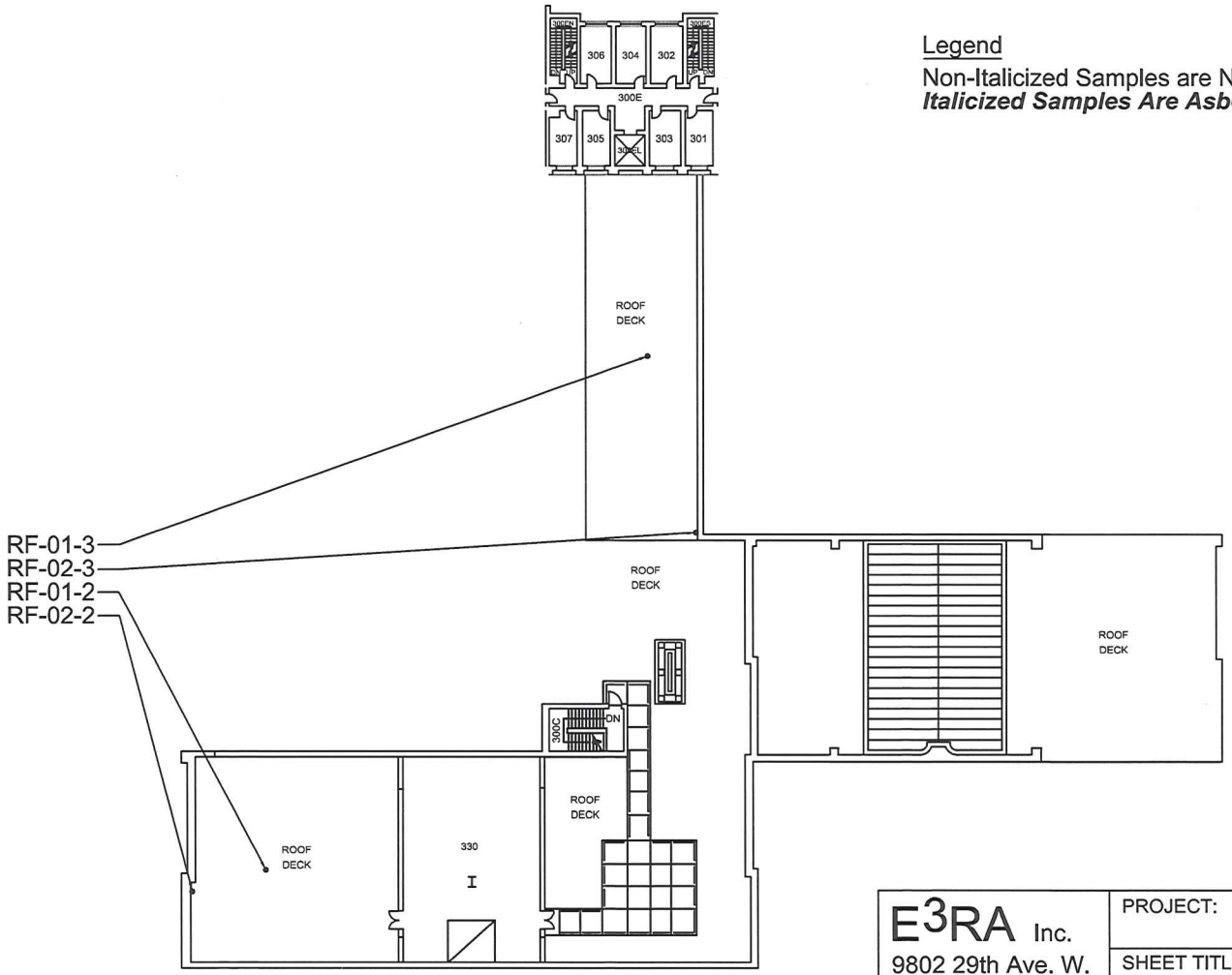
Legend

Non-Italicized Samples are Non Asbestos-Containing

Italicized Samples Are Asbestos-Containing

E3RA Inc.
9802 29th Ave. W.
Suite B102
Everett, WA 98204
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PROJECT:	Lead And Asbestos Survey EEME Building		
SHEET TITLE:	Asbestos Sample Locations Second Floor		
DESIGNER:	CDK	JOB NO.	E08163
DRAWN BY:	CDK	SCALE:	1" = 30'
CHECKED BY:	DJH	FIGURE:	4
DATE:	Feb. 6, 2009	FILE:	Sample Loc.dwg



Legend

Non-Italicized Samples are Non Asbestos-Containing

Italicized Samples Are Asbestos-Containing

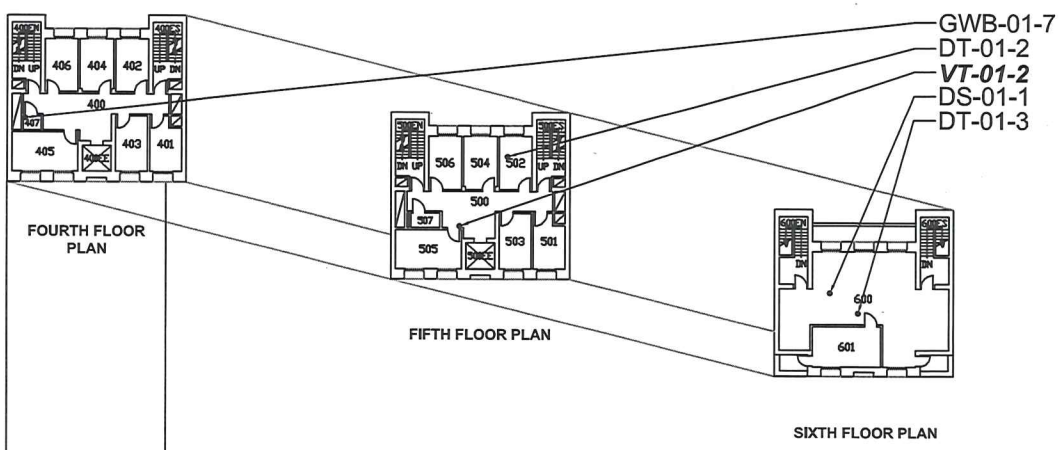
N E W

30 0 30 60

SCALE IN FEET

E3RA Inc.
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425-356-3372
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www.e3ra.com

PROJECT:	Lead And Asbestos Survey EEME Building		
SHEET TITLE:	Asbestos Sample Locations Third Floor		
DESIGNER:	CDK	JOB NO.	E08163
DRAWN BY:	CDK	SCALE:	1" = 30'
CHECKED BY:	DJH	FIGURE:	5
DATE:	Feb. 6, 2009	FILE:	Sample Loc.dwg



Legend

Non-Italicized Samples are Non Asbestos-Containing

Italicized Samples Are Asbestos-Containing

N E W

30 0 30 60

SCALE IN FEET

E3RA Inc.
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Everett, WA 98204
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425-356-3374 fax
www.e3ra.com

PROJECT:	Lead And Asbestos Survey EEME Building		
SHEET TITLE:	Asbestos Sample Locations 4th, 5th and 6th Floors		
DESIGNER:	CDK	JOB NO.	E08163
DRAWN BY:	CDK	SCALE:	1" = 30'
CHECKED BY:	DJH	FIGURE:	6
DATE:	Feb. 6, 2009	FILE:	Sample Loc.dwg

APPENDIX A

SITE PHOTOGRAPHS

SITE PHOTOGRAPHS
Washington State University
Electrical / Mechanical Engineering Building - Asbestos and Lead Survey



Sample No. VT-01-1 and VT-01-2, Mastic (black) associated with non asbestos-containing Vinyl Floor Tile (white 12"x12" w/ black streaks).

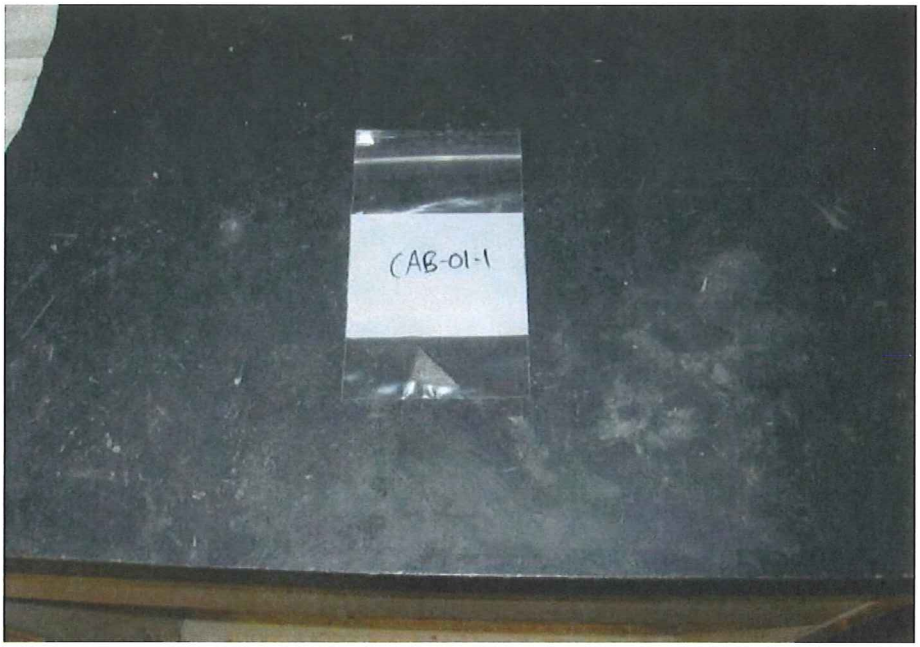


Sample No. VT-03-1, Mastic (black/yellow) associated with non asbestos-containing Vinyl Floor Tile (white 12"x12" w/ grey and white streaks) Under Carpet.

SITE PHOTOGRAPHS
Washington State University
Electrical / Mechanical Engineering Building - Asbestos and Lead Survey



Sample No. VT-04-1, Mastic (black/yellow) associated with non asbestos-containing Vinyl Floor Tile (black 12"x12" w/ white specks) Over Leveling Compound (white).



Sample No. CAB-01-1, Cement Board Counter Top (black).

SITE PHOTOGRAPHS
Washington State University
Electrical / Mechanical Engineering Building - Asbestos and Lead Survey



Sample No. RF-03-1, Asphaltic Sealant (black).

No Picture Available

Sample No. FD-01, Fire Door Lining.

No Picture Available

Sample No. FPG-01, Flange Gaskets.

APPENDIX B

CHAIN-OF-CUSTODY FORMS
AND
LABORATORY ANALYTICAL REPORTS

SEATTLE ASBESTOS TEST, LLC
19711 Scriber Lake Road, Suite D, Lynnwood, WA 98036
Tel: 425.673.9850, Fax: 425.673-9810
www.seattleasbestostest.com, admin@seattleasbestostest.com

NVLAP Accreditation
Lab Code: 200768-0

RECEIVED
FEB 0 3 2009
BY:

Date Analyzed: 1/27/2009

Client Job #: E08163
Laboratory Batch #: 200909046
Samples Received: 39

Mr. Chad Kean
E3RA
9802 29th Avenue West, Suite B102
Everett, WA 98204

Enclosed please find the test results for the bulk samples submitted to our laboratory for asbestos analysis. Analysis was performed using polarized light microscopy (PLM) in accordance with Test Method US EPA/600/R-93/116.

Since variation in data increases as the quantity of asbestos decreases toward the limit of detection, the EPA recommends point counting for samples containing between <1% and 10% asbestos (NESHAP, 40 CFR Part 61). Statistically, point counting is a more accurate method. If you feel a point count might be beneficial, please feel free to call and request one.

The test results refer only to the samples or items submitted and tested. The accuracy with which these samples represent the actual materials is totally dependent on the acuity of the person who took the samples. This report must not be used by the client to claim product certification, approval, or endorsement by Seattle Asbestos Test, LLC, NVLAP, NIST, or any agency of the Federal government.

This report is highly confidential and will not be released without your consent. Samples are archived for two weeks after the analysis, and disposed of as hazardous waste thereafter.

Thank you for using our service and let us know if we can further assist you.

Sincerely

Steve (Fanyao) Zhang
President

SEATTLE ASBESTOS TEST, LLC
Lynnwood Laboratory: 19711 Scriber Lake Rd, Suite D, Lynnwood, WA 98036; Tel: 425.673.9850, Fax:425.673.9810
Bellevue Laboratory: 12727 Northup Way, Suite 24, Bellevue, WA 98005; Tel: 425.861.1111, Fax: 425.861.1118
Website: http://www.seattleasbestostest.com, E-mail: admin@seattleasbestostest.com

NVLAP Accreditation
Lab Code: 200768-0

ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.: Mr. Chad Kean
Client: E3RA
Address: 9802 29th Avenue West, Suite B102
Everett, WA 98204

Client Job #: E08163
Laboratory Batch #: 200909046
Date Received: 1/21/2009
Samples Received: 39
Date Analyzed: 1/27/2009
Samples Analyzed: 39

Project: EME Building

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-Fibrous Components	%	Non-asbestos Fibers
1	VT-01-1	1	White/gray tile		**None detected**	Vinyl/binder, Mineral grains	4	Cellulose
		2	Black mastic	**2**	**Chrysotile**	Mastic/binder	5	Cellulose
2	VT-01-2	1	White/gray tile		**None detected**	Vinyl/binder, Mineral grains	3	Cellulose
		2	Black mastic	**2**	**Chrysotile**	Mastic/binder	7	Cellulose
3	VT-02-1	1	Black tile		**None detected**	Vinyl/binder, Mineral grains	4	Cellulose
		2	Brownish mastic		**None detected**	Mastic/binder	9	Cellulose
4	FC-01-1	1	Light-brown paint		**None detected**	Paint	2	Cellulose
5	CMT-01-1	1	White ceramic		**None detected**	Ceramic/binder		None detected
		2	Gray brittle/sandy material		**None detected**	Binder, Sands	3	Cellulose
		3	White mastic with powdery material and paper		**None detected**	Mastic/binder, Filler	31	Cellulose
6	SVF-01-1	1	Gray vinyl		**None detected**	Vinyl/binder	5	Cellulose

Analyzed by: Leon Li / Weilong Tai

Report reviewed by: Steve (Fanyao) Zhang, President

SEATTLE ASBESTOS TEST, LLC
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ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.: Mr. Chad Kean
Client: E3RA
Address: 9802 29th Avenue West, Suite B102
Everett, WA 98204

Client Job #: E08163
Laboratory Batch #: 200909046
Date Received: 1/21/2009
Samples Received: 39
Date Analyzed: 1/27/2009
Samples Analyzed: 39

Project: EME Building

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-Fibrous Components	%	Non-asbestos Fibers
		2	Yellow mastic		**None detected**	Mastic/binder, Filler	7	Cellulose
7	SVF-01-2	1	Gray vinyl		**None detected**	Vinyl/binder	6	Cellulose
		2	Yellow mastic		**None detected**	Mastic/binder, Filler	5	Cellulose
8	VT-03-1	1	Beige tile		**None detected**	Vinyl/binder, Mineral grains	6	Cellulose
		2	Black/yellow mastic	**2**	**Chrysotile**	Mastic/binder	7	Cellulose
9	FM-01-1	1	Black asphaltic material		**None detected**	Asphalt/binder	6	Cellulose
10	VT-04-1	1	Black tile		**None detected**	Vinyl/binder, Mineral grains	5	Cellulose
		2	Black/yellow mastic	**2**	**Chrysotile**	Mastic/binder	10	Cellulose
		3	White brittle material		**None detected**	Filler, Binder	3	Cellulose
11	SVF-02-1	1	Gray vinyl		**None detected**	Vinyl/binder	6	Cellulose
		2	Gray fibrous material with mastic		**None detected**	Binder/filler, Mastic/binder	67	Cellulose

Analyzed by: Leon Li / Weilong Tai

Report reviewed by: Steve (Fanyao) Zhang, President

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ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.: Mr. Chad Kean
Client: E3RA
Address: 9802 29th Avenue West, Suite B102
Everett, WA 98204

Client Job #: E08163
Laboratory Batch #: 200909046
Date Received: 1/21/2009
Samples Received: 39
Date Analyzed: 1/27/2009
Samples Analyzed: 39

Project: EME Building

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-Fibrous Components	%	Non-asbestos Fibers
12	CT-01-1	1	Gray fibrous material with paint		**None detected**	Filler, Glass beads, Paint	85	Glass fibers, Cellulose
		2	Brown Mastic		**None detected**	Mastic/binder	6	Cellulose
13	CT-02-1	1	Gray fibrous material with paint		**None detected**	Filler, Glass beads, Paint	84	Glass fibers, Cellulose
14	CB-01-1	1	Tan rubbery material		**None detected**	Rubber/binder	4	Cellulose
		2	Brown mastic		**None detected**	Mastic/binder	7	Cellulose
15	CAB-01-1	1	Black hard brittle material	9	**Chrysotile**	Filler, Binder	3	Cellulose
16	SU-01-1	1	Black soft/loose material		**None detected**	Filler, Fine particles	5	Cellulose
17	CB-02-1	1	Gray rubbery material		**None detected**	Rubber/binder	2	Cellulose
		2	White mastic		**None detected**	Mastic/binder	5	Cellulose
		3	White powdery material with paint		**None detected**	Binder/filler, Paint	4	Cellulose
18	GWB-01-1	1	White powdery material with paint		**None detected**	Binder/filler, Paint	5	Cellulose

Analyzed by: Leon Li / Weilong Tai

Report reviewed by: Steve (Fanyao) Zhang, President

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ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.: Mr. Chad Kean
Client: E3RA
Address: 9802 29th Avenue West, Suite B102
Everett, WA 98204

Client Job #: E08163
Laboratory Batch #: 200909046
Date Received: 1/21/2009
Samples Received: 39
Date Analyzed: 1/27/2009
Samples Analyzed: 39

Project: EME Building

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-Fibrous Components	%	Non-asbestos Fibers
		2	White powdery material with paper		**None detected**	Binder/filler	28	Cellulose
		3	White chalky material with paper		**None detected**	Binder/filler Gypsum/binder	23	Cellulose
19	GWB-01-2	1	White powdery material		**None detected**	Binder/filler	3	Cellulose
		2	White powdery material with paper		**None detected**	Binder/filler	34	Cellulose
		3	White chalky material with paper		**None detected**	Binder/filler Gypsum/binder	25	Cellulose, Glass fibers
20	GWB-01-3	1	White powdery material with paint		**None detected**	Binder/filler, Paint	5	Cellulose
		2	White powdery material with paper		**None detected**	Binder/filler	30	Cellulose
		3	White chalky material with paper		**None detected**	Binder/filler Gypsum/binder	22	Cellulose
21	GWB-01-4	1	White powdery material with paint		**None detected**	Binder/filler, Paint	4	Cellulose
		2	White powdery material with paper		**None detected**	Binder/filler	25	Cellulose
		3	White chalky material with paper		**None detected**	Binder/filler Gypsum/binder	24	Cellulose

Analyzed by: Leon Li / Weilong Tai

Report reviewed by: Steve (Fanyao) Zhang, President

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ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.: Mr. Chad Kean
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Address: 9802 29th Avenue West, Suite B102
Everett, WA 98204

Client Job #: E08163
Laboratory Batch #: 200909046
Date Received: 1/21/2009
Samples Received: 39
Date Analyzed: 1/27/2009
Samples Analyzed: 39

Project: EME Building

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-Fibrous Components	%	Non-asbestos Fibers
22	Gwb-01-5	1	White powdery material with paint		**None detected**	Binder/filler, Paint	6	Cellulose
		2	White powdery material with paper		**None detected**	Binder/filler	28	Cellulose
		3	White chalky material with paper		**None detected**	Binder/filler Gypsum/binder	24	Cellulose
23	Gwb-01-6	1	White powdery material with paint		**None detected**	Binder/filler, Paint	4	Cellulose
		2	White powdery material with paper		**None detected**	Binder/filler	32	Cellulose
		3	White chalky material with paper		**None detected**	Binder/filler Gypsum/binder	26	Cellulose
24	Gwb-01-7	1	White powdery material with paint		**None detected**	Binder/filler, Paint	5	Cellulose
		2	White powdery material with paper		**None detected**	Binder/filler	35	Cellulose
		3	White chalky material with paper		**None detected**	Binder/filler Gypsum/binder	26	Cellulose
25	DT-01-1	1	White soft material with woven fibrous material		**None detected**	Filler, Binder	24	Cellulose
26	DT-01-2	1	White soft material with woven fibrous material		**None detected**	Filler, Binder	27	Cellulose

Analyzed by: Leon Li / Weilong Tai

Report reviewed by: Steve (Fanyao) Zhang, President

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Address: 9802 29th Avenue West, Suite B102
Everett, WA 98204

Client Job #: E08163
Laboratory Batch #: 200909046
Date Received: 1/21/2009
Samples Received: 39
Date Analyzed: 1/27/2009
Samples Analyzed: 39

Project: EME Building

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-Fibrous Components	%	Non-asbestos Fibers
27	DT-01-3	1	White/gray soft material with woven fibrous material		**None detected**	Filler, Binder	22	Cellulose
28	CB-03-1	1	Blue rubbery material		**None detected**	Rubber/binder	3	Cellulose
		2	White mastic		**None detected**	Mastic/binder	4	Cellulose
29	CB-04-1	1	Blue rubbery material		**None detected**	Rubber/binder	2	Cellulose
		2	White mastic		**None detected**	Mastic/binder	2	Cellulose
30	DS-01-1	1	Gray soft/elastic material		**None detected**	Binder, Filler	5	Cellulose
31	RF-01-1	1	Silver paint		**None detected**	Paint, Filler	8	Polyethylene fibers
		2	Black asphaltic material		**None detected**	Asphalt/binder	27	Glass fibers
32	RF-01-2	1	Silver paint		**None detected**	Paint, Filler	7	Polyethylene fibers
		2	Multi-layered black asphaltic material		**None detected**	Asphalt/binder	55	Glass fibers
33	RF-01-3	1	Silver paint		**None detected**	Paint, Filler	5	Cellulose

Analyzed by: Leon Li / Weilong Tai

Report reviewed by: Steve (Fanyao) Zhang, President

SEATTLE ASBESTOS TEST, LLC
Lynnwood Laboratory: 19711 Scriber Lake Rd, Suite D, Lynnwood, WA 98036; Tel: 425.673.9850, Fax:425.673.9810
Bellevue Laboratory: 12727 Northup Way, Suite 24, Bellevue, WA 98005; Tel: 425.861.1111, Fax: 425.861.1118
Website: http://www.seattleasbestostest.com, E-mail: admin@seattleasbestostest.com

NVLAP Accreditation
Lab Code: 200768-0

ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.: Mr. Chad Kean
Client: E3RA
Address: 9802 29th Avenue West, Suite B102
Everett, WA 98204

Client Job #: E08163
Laboratory Batch #: 200909046
Date Received: 1/21/2009
Samples Received: 39
Date Analyzed: 1/27/2009
Samples Analyzed: 39

Project: EME Building

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-Fibrous Components	%	Non-asbestos Fibers
		2	Black asphaltic material		**None detected**	Asphalt/binder	21	Synthetic fibers
		3	Black asphaltic material		**None detected**	Asphalt/binder	24	Glass fibers
		4	Brown fibrous material with asphaltic material		**None detected**	Filler, Asphalt/binder	56	Cellulose
		5	White foamy material		**None detected**	Synthetic foam		None detected
34	RF-02-1	1	Silver paint		**None detected**	Paint, Filler	8	Polyethylene fibers
		2	Black asphaltic material with sand		**None detected**	Asphalt/binder, Sand	25	Glass fibers
		3	Multi-layered black asphaltic material		**None detected**	Asphalt/binder	62	Glass fibers
35	RF-02-2	1	Multi-layered black asphaltic material		**None detected**	Asphalt/binder	58	Glass fibers
		2	Tan fibrous material		**None detected**	Filler	75	Cellulose
36	RF-02-3	1	Silver paint		**None detected**	Paint, Filler	5	Cellulose
		2	Black asphaltic material		**None detected**	Asphalt/binder	24	Synthetic fibers

Analyzed by: Leon Li / Weilong Tai

Report reviewed by: Steve (Fanyao) Zhang, President

SEATTLE ASBESTOS TEST, LLC
Lynnwood Laboratory: 19711 Scriber Lake Rd, Suite D, Lynnwood, WA 98036; Tel: 425.673.9850, Fax:425.673.9810
Bellevue Laboratory: 12727 Northup Way, Suite 24, Bellevue, WA 98005; Tel: 425.861.1111, Fax: 425.861.1118
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NVLAP Accreditation
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ANALYTICAL LABORATORY REPORT

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Date Received: 1/21/2009
Samples Received: 39
Date Analyzed: 1/27/2009
Samples Analyzed: 39

Project: EME Building

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-Fibrous Components	%	Non-asbestos Fibers
		3	Silver paint		**None detected**	Paint, Filler	3	Cellulose
		4	Black asphaltic material		**None detected**	Asphalt/binder	22	Glass fibers
37	RF-03-1	1	Black asphaltic material	**6**	**Chrysotile**	Asphalt/binder	14	Cellulose
38	RF-04-1	1	Tan soft/elastic material with sands		**None detected**	Binder, Filler, Sands	5	Cellulose
39	WP-01-1	1	Gray soft/elastic material		**None detected**	Binder, Filler	4	Cellulose

Analyzed by: Leon Li / Weilong Tai

Report reviewed by: Steve (Fanyao) Zhang, President

APPENDIX C

INSPECTOR CERTIFICATIONS

Certificate of Completion

This is to certify that

Casey R. Lowe

has satisfactorily completed
4 hours of refresher training as an

Asbestos Building Inspector

to comply with the training requirements of
TSCA Title II / 40 CFR 763 (AHERA)

Certificate Number: 10302102

Instructor

EPA Provider Cert. Number: 1085

ARGUS PACIFIC
TRAINING • CONSULTING

Sep 3, 2008
Date(s) of Training

Exam Score: NA

Expiration Date: Sep 3, 2009

Argus Pacific, Inc. • 1900 W. Nickerson, Suite 315 • Seattle, Washington • 98119 • (206) 285.3373 • fax (206) 285.3927

Certificate of Completion

This is to certify that

Chad D. Kean

has satisfactorily completed
4 hours of refresher training as an

Asbestos Building Inspector

to comply with the training requirements of
TSCA Title II / 40 CFR 763 (AHERA)

Certificate Number: 1028478

Susan N. Mast
Instructor

EPA Provider Cert. Number: 1085

ARGUS PACIFIC
TRAINING • CONSULTING

Mar 19, 2008
Date(s) of Training

Exam Score: NA

Expiration Date: Mar 19, 2009

Argus Pacific, Inc. • 1900 W. Nickerson, Suite 315 • Seattle, Washington • 98119 • (206) 285.3373 • fax (206) 285.3927

STATE OF WASHINGTON

Department of Community, Trade and Economic Development
Lead-Based Paint Program

Chad Kean

Has fulfilled the certification requirements of Washington Administrative code (WAC) 365-230 and has been certified to conduct lead-based paint activities pursuant to WAC 365-230-200 as a:

Inspector

Certification #	Issuance Date	Expiration Date
0670	1/11/2008	1/11/2011

STATE OF WASHINGTON

Department of Community, Trade and Economic Development
Lead-Based Paint Program

Chad Kean

Has fulfilled the certification requirements of Washington Administrative code (WAC) 365-230 and has been certified to conduct lead-based paint activities pursuant to WAC 365-230-200 as a:

Risk Assessor

Certification #	Issuance Date	Expiration Date
0670	1/11/2008	1/11/2011

APPENDIX D

LABORATORY CERTIFICATIONS

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200768-0

Seattle Asbestos Test, LLC

Lynnwood, WA

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

BULK ASBESTOS FIBER ANALYSIS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated 18 June 2005).

2008-10-01 through 2009-09-30

Effective dates

Sally S. Bruce

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2006-09-13)

PART 1 GENERAL

1.01 SUMMARY

A. Contractor shall perform the entire Work in accordance with the Contract Documents.

B. Without limiting the requirements of the Contract Documents, the Work of the Contract can be summarized as follows:

This project at the Electrical Mechanical Engineering Building will add additional cooling capacity and a UPS system to server room 106 per the approved construction drawings. Construction and demolition will take place in server room 106 and the ground level mechanical room 003A, with a new cooling unit to be placed on the roof of the building. General scope includes removing and reconfiguring existing duct work, installing new duct work to create a hot and cold isle, installing a new DX “ACU-3/CU-3” cooling system, removing an existing power conditioner, and installing owner supplied UPS system per construction drawings. On-site work scheduling must be coordinated with the WSU Construction Manager and IT Systems and Services staff.

1. Please see section 00 11 13 Attachment A: Exhibit 1, 2 & 3 for pictures of the DC generator set that needs to be demoed.

C. Expected Owner-supplied Contractor-installed Work:

1. Department is providing UPS to be installed by contractor.

D. Expected Work by Owner: Not Used

1.02 SCHEDULE OF ALTERNATES

A. Without limiting the requirements of the Contract Documents, the Work of the Alternates can be summarized as follows:

1. Install ACU-3(ALT)/CU-3(ALT) in lieu of ACU-3/CU-3 per the mechanical equipment schedule sheet M0.02.

1.03 SCHEDULE OF ALLOWANCES – NOT USED

1.04 SCHEDULE OF UNIT PRICES – NOT USED

1.05 GENERAL INFORMATION

A. Owner and Owner’s Designated Representative:

1. Owner: Board of Regents

Washington State University
Pullman, WA 99164-1045

2. Owner's Designated Representative:

   a. All Owner capital projects are administered by the Department of Facilities Services, Capital. Project specific designated representatives are listed within the Agreement.

3. Consulting Services: Owner has retained an Architect/Engineer to design the entire Project. The Architect/Engineer is identified below:

   a. Architect/Engineer: MSI Engineers, Spokane, WA

1.06 SPECIAL CONDITIONS

A. Site Access: the workers will need a Cougar Card that can be used to badge into the server room.

B. Schedule and Phasing: On-site work scheduling must be coordinated with the WSU Construction Manager and IT Systems and Services staff. Contract time shall be 190 days from Notice to Proceed to Substantial Completion. Proposals MUST BE based on this Contract time.

C. Owner Occupancy: The servers will be present in the room and running during the duration of the project.

D. Hazardous Material: Asbestos Safety Plan – contractor to mark out needed floor penetration. WSU EH&S to abate the floor tiles.

END OF SECTION 01 11 00

DC Generator Set that needs to be Demoed

Exhibit 1



Exhibit 2



Exhibit 3



PART 1 GENERAL

1.01 SUMMARY

A. This Section includes the administrative and procedural requirements for executing changes in the Work. This Section is subject to and governed by the Agreement and General Conditions. In the event of any conflict, the Agreement and General Conditions will have a higher precedence as established in the General Conditions.

1.02 SUBMITTALS

A. Contractor shall submit a breakdown of its actual wage rates prior to commencement of construction activities. The breakdown must show:

1. Basic wage rate (Based on L&I Intent to Pay Prevailing Wages);
2. Fringe Package (Based on L&I Intent to Pay Prevailing Wages);
3. FUI (Federal Unemployment Insurance);
4. FICA (Federal Insurance Compensation Act);
5. SUI (State Unemployment Compensation Act);
6. Medicare; and
7. WC (Workers Compensation).

B. Contractor shall submit detailed supporting documentation to verify the above rates, if requested by Owner. All such rates shall be subject to audit.

C. Contractor shall submit prior to commencement of construction activities a list of all equipment that it anticipates will be used on the Project and the actual operating cost of each piece of equipment. The General Conditions describe allowable equipment charges. All costs shall be subject to audit.

1.03 CONTRACT CHANGE PROPOSAL PROCEDURES

A. Contractor shall maintain an Issues Log/ CCP Log as described in the General Conditions:

1. The action status shall indicate which party is currently responsible and when it is appropriate to submit a CCP to Owner. Contractor shall submit a Contract Change Proposal (CCP) with Substantiating Documentation, as described in subsection C below, to Owner within 7 Days of this action status change.
2. Upon final agreement and authorization by Owner a CCP may be incorporated into the Contract via Change Order and shall be reflected on the Issues Log.

B. Direction to perform Work:

1. Owner may directly order Work by a written Work Directive (WD). WDs may be unilateral or bilateral as described in the General Conditions and may be issued on a fixed price or on a "cost-not-to-exceed" basis. The WD may include the following:

   a. A detailed description of the proposed change, products, and location of modification to the Work;

   b. Supplementary or revised Drawings and/or Specifications; and

   c. Projected time for making the change and a statement as to whether overtime work is, or is not, acceptable.

C. Substantiating Documentation required with all CCPs:

1. Contractor shall provide back-up documentation required to substantiate any proposed change in the following format:

   a. CCP narrative, including:

      1) Description of proposed change. In order to allow for efficient review of a change proposal Contractor shall provide enough narrative to the line item breakdown to allow Owner to properly assess that the change is fair and reasonable;

      2) Cause of or reason for making change with a statement of why proposed change is not covered by Contract Documents

      3) Both credited and additive elements relating to a change in Contract Sum and/or Contract Time;

      4) A specific period of time during which Contractor's pricing will be considered valid;

      5) Any schedule considerations that may trigger further impact to the Contract Time if acceptance of the proposed change if delayed beyond a specific date; and

      6) Date change Work is to be completed.

   b. Owner supplied Change Proposal Submittal Form.

   c. CCP Cost Estimate Detail Sheet(s), or other form acceptable to Owner, including:

      1) Line-item estimate detailing material, labor, equipment, Subcontractor, and supplier costs and quantities; and

      2) Subcontractor and supplier proposals with supporting line-item estimates.

   d. CCP Progress Schedule with Contemporaneous Period Analysis detailing if any impact to the planned progress of the Work and

critical path.

e. Other supporting documentation, as appropriate.

D. Correlation with Contractor's Submittals:

1. Application for Payment forms shall record each Unilateral and Bilateral Change Order as a separate item of Work.
2. The Progress Schedule shall be revised to reflect changes in the Contract Time.
3. Project Record shall incorporate all changed Work.

END OF SECTION 01 26 00

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes procedures for preparation and submittal of Applications for Payment.

1.02 SUBMITTALS

A. Prior to submitting its first Application for Payment, Contractor shall:

1. Submit a preliminary Progress Schedule per Section 01 32 13 – Progress Schedule.
2. If requested, submit a projected monthly cash-flow analysis for the duration of the Project.
3. Submit an approved Intent to Pay Prevailing Wages form prior to commencing the Work. An approved Intent to Pay Prevailing Wages form must be on file with Owner for each classification of laborers, workers, or mechanics employed by Contractor or Subcontractors whose Work is included in an Application for Payment.
4. "Washington State Prevailing Wage Rates for Public Works Contracts/Whitman County" are made a part of the Contract Documents and are included at the end of this Section. It is Contractor's responsibility to verify with the Washington State Department of Labor and Industries the most current and applicable prevailing wage rates for this Project.
5. Submit and receive approval of the Schedule of Values per Section 01 29 73 – Schedule of Values, and the General Conditions. All Applications for Payment shall be in the same format.
6. Submit a list of all Subcontractors with points of contact and other contact information, including phone number, email address, and mailing address.
7. Submit a list of all major material suppliers with points of contact and other contact information, including phone number, email address, and mailing address.
8. Submit Retainage Option Form to Owner for the disposition of retainage funds.
    a. In accordance with Chapter 60.28 of the Revised Code of Washington (RCW), Owner shall reserve retainage not to exceed 5% of the monies earned by Contractor as a trust fund for the protection and payment of:
        1) The claims of any person and/or Owner arising out of or relating to Work performed on the Project; and
        2) The State with respect to taxes, fees, or penalties that may

be imposed and due from Contractor (see General Conditions).

b. Retainage will be released per Section 01 70 00 - Project Close-Out.

c. At the option of Contractor, the moneys reserved by Owner shall be:

1) Retained in a fund by Owner;

2) Bonded for all of the retainage using a bond form acceptable to Owner;

3) Placed in escrow with a bank or trust company by Owner.

a) Escrow: If the retained funds are to be placed in escrow, Contractor will select the escrow agent, subject to approval by Owner. The selected agent must be a bank or trust company in the State of Washington.

b) Escrow Agent: If Contractor elects the escrow option, an escrow agreement shall be executed by Contractor, Owner, and bank or trust company. Three copies of the agreement should be completed and executed by Contractor and returned to Owner for execution; Owner will forward copies to the bank or trust company for receipt, acceptance, and execution. The bank or trust company will retain one copy and return one copy each to Contractor and Owner. A completed and signed escrow agreement must be on file with Owner before Contractor's first Application for Payment is processed.

c) Escrow Investments: The bank or trust company may invest the retained funds in bonds and other securities selected by Contractor, except stocks, subject to the written approval of Owner.

d) The investments selected must mature on or prior to the date 45 Days following Final Acceptance of the Work. Interest on such investments may be paid to Contractor as it accrues.

e) Escrow Costs and Fees: All escrow costs and fees shall be paid by Contractor.

f) Release of Escrow Investments to Contractor: Retainage will be released per Section 01 70 00 - Project Close-Out. Once Contractor has fully complied with the Contract Documents and statute, Owner shall issue written instructions to the bank or trust company to release to Contractor the investment held in escrow.

B. Draft Application for Payment:

1. Contractor shall submit a draft, itemized Application for Payment within the last 7 Days of the month.

2. The draft application does not constitute a payment request and shall not be signed.

3. Contractor shall carefully check all extensions, totals, and required information for accuracy before submittal.

4. Contractor and Owner may meet to confer regarding the current progress of the Work and the amount of payment to which Contractor is entitled. Owner may request that Contractor provide supporting documentation substantiating its right to payment. Contractor is not entitled to make a final payment request, nor is any payment due Contractor, until such data is furnished. Contractor may include in its Application for Payment projected costs to the end of the month.

    a. Fill in the following information within Owner's Application for Payment form:

        1) Percentage of Work completed based upon the approved schedule of values.

        2) List Change Orders approved by Owner prior to submission date. Use Owner's designations. Do not bill for changed Work until a fully executed Change Order has been received.

        3) Certification of Participation WBE and MBEs, all certification types acceptable, supply this regardless of having firms to report upon.

        4) List all Subcontractors that have performed Work at the site during the pay period.

        5) If applicable, Apprentice/Journeyman Participation.

5. Contractor shall submit or make available for review the following prior to the draft Application for Payment:

    a. Project Record; (see Section 01 78 39 – Project Record)

    b. Updated Progress Schedule in native format (see section 01 32 13 – Progress Schedule);

    c. Contractor Quality Control Reports (see Section 01 45 00 - Quality Control); and

    d. Stored Materials: Requests for payment of stored materials may only be made for materials properly stored on or off-site and in full compliance with the General Conditions.

C. Application for Payment:

1. Contractor may not submit the approved Application for Payment (or payment will be withheld) until all requirements of the draft application for payment are met.
2. Upon approval of the Draft Application for Payment, contractor will be authorized to submit the agreed upon Application for Payment for processing and payment. This application for payment shall be signed by hand by a responsible officer of the Contractor and may be submitted in scanned format electronically.
3. Formal submittal must include all parts of the Application for Payment form.
4. Owner shall make progress payments in such amounts as it determines are properly due within 30 Days of receipt of a properly executed Application for Payment.
5. Owner shall notify Contractor in accordance with Chapter 39.76 RCW if the Application for Payment does not comply with the requirements of the Contract Documents.

D. Disputed Amounts: If Contractor believes it is entitled to payment for Work performed during the prior calendar month in addition to the agreed-upon amount, Contractor may, also within the same period, submit to Owner along with the approved Application for Payment a separate, written payment request specifying the exact additional amount claimed due, the category in the Schedule of Values in which the payment is claimed due, the specific Work for which the additional amount is due, and why the additional payment is due. Furthermore, for the submittal to be considered, Contractor and all Subcontractors shall file with Owner by the same date certified copies of all payroll records relating to the additional amount due, pursuant to WAC 296-127-320.

E. Payments to Subcontractors: Contractor shall pay each Subcontractor no later than 10 Days after receipt of payment from Owner the amount to which the Subcontractor is entitled. Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to lower-tier Subcontractors in a similar manner.

1. Applications for Payment shall not request payment for portions of the Work that Contractor does not intend to pay a Subcontractor, unless such Work has been performed by others whom Contractor intends to pay.
2. If, after making an Application for Payment but before paying a Subcontractor for its performance covered by the Application, Contractor discovers that part or all of the payment otherwise due to the Subcontractor is subject to withholding from the Subcontractor under the Subcontract (such as for unsatisfactory performance or non-payment of lower-tier Subcontractors), Contractor may withhold the amount as allowed under the Subcontract, but it shall:
   a. Give the Subcontractor and Owner written notice of the

withholding as soon as practicable once Contractor determines the cause for the withholding but before the due date of the Subcontractor payment;

b. Include the reasons for the withholding and the actions the Subcontractor must take to release the payment; and

c. Once Subcontractor has taken the required remedial actions, pay Subcontractor within 8 Days.

3. Owner may, at its sole option, issue joint checks to Contractor and to any Subcontractor. If Owner makes payments by joint check, such value shall be reflected on the next Application for Payment.

F. Subcontractor Payment Reporting: Contractor and all tiers of subcontractors will utilize Access Equity accessed at the Office of Minority and Women's Business Enterprises (OMWBE) at https://omwbe.diversitycompliance.com/ to report subcontractor payment information. The Contractor shall:

1. Complete the OMWBE user training.

2. Register and enter all required Subcontractor information into Access Equity upon Owner creation of the contract record.

3. Monitor and report amount and date of all payments:

a. Received from Owner;

4. Made to Subcontractor(s);Resolve any discrepancies between reported and received payments.

5. Require each Subcontractor to:

a. Register in Access Equity and complete the user training.

b. Verify amounts and date of receipt of payments from Prime Contractor or higher tier Subcontractor.

c. Report any payments made to a lower tier Subcontractor.

d. Resolve any discrepancies between reported and received payments.

G. Application for Final Payment:

1. Application for Final Payment will be accepted for processing only after Contractor has completed the requirements of Final Completion as described in Section 01 70 00 – Project Close-Out.

H. Release of Retainage:

1. Retainage will be released per Section 01 70 00 - Project Close-Out.

END OF SECTION 01 29 00

State of Washington
Department of Labor & Industries
Prevailing Wage Section - Telephone 360-902-5335
PO Box 44540, Olympia, WA 98504-4540

Washington State Prevailing Wage

The PREVAILING WAGES listed here include both the hourly wage rate and the hourly rate of fringe benefits. On public works projects, worker's wage and benefit rates must add to not less than this total. A brief description of overtime calculation requirements are provided on the Benefit Code Key.

Journey Level Prevailing Wage Rates for the Effective Date: 05/21/2024

County	Trade	Job Classification	Wage	Holiday	Overtime	Note	*Risk Class
Whitman	Asbestos Abatement Workers	Journey Level	$49.52	7B	1M	8Z	View
Whitman	Boilermakers	Journey Level	$74.29	5N	1C		View
Whitman	Brick Mason	Journey Level	$57.54	5A	1M		View
Whitman	Building Service Employees	Janitor	$16.28		1		View
Whitman	Building Service Employees	Shampooer	$16.28		1		View
Whitman	Building Service Employees	Waxer	$16.28		1		View
Whitman	Building Service Employees	Window Cleaner	$16.28		1		View
Whitman	Cabinet Makers (In Shop)	Journey Level	$16.28		1		View
Whitman	Carpenters	Acoustical Worker	$55.87	7E	4X	8N	View
Whitman	Carpenters	Bridge, Dock & Wharf Carpenter	$61.94	7E	4X	8N	View
Whitman	Carpenters	Floor Layer & Floor Finisher	$55.87	7E	4X	8N	View
Whitman	Carpenters	Form Builder	$55.87	7E	4X	8N	View
Whitman	Carpenters	General Carpenter	$55.87	7E	4X	8N	View
Whitman	Carpenters	Heavy Construction Carpenter	$59.87	7E	4X	9E	View
Whitman	Carpenters	Scaffold/Shoring Erecting & Dismantling	$59.87	7E	4X	8N	View
Whitman	Cement Masons	Journey Level	$54.94	7B	1N		View
Whitman	Divers & Tenders	Assistant Tender	$62.89	7E	4X	8J	View
Whitman	Divers & Tenders	Bell/Vehicle or Submersible Operator Not Under Pressure	$66.15	7E	4X	8J	View
Whitman	Divers & Tenders	Dive Supervisors	$119.70	7E	4X		View
Whitman	Divers & Tenders	Diver	$118.20	7E	4X	8I	View
Whitman	Divers & Tenders	Diver on Standby	$67.15	7E	4X	8J	View
Whitman	Divers & Tenders	Diver Tender	$66.15	7E	4X	8J	View
Whitman	Divers & Tenders	Diving Master	$78.86	7E	4X	8J	View
Whitman	Divers & Tenders	Manifold Operator	$66.15	7E	4X	8J	View
Whitman	Divers & Tenders	Manifold Operator Mixed Gas	$70.15	7E	4X	8J	View
Whitman	Divers & Tenders	Remote Operated Vehicle Operator	$66.15	7E	4X	8J	View

Whitman	Divers & Tenders	Remote Operated Vehicle Tender/Technician	$62.94	7E	4X	8J	View
Whitman	Dredge Workers	Assistant Engineer	$79.62	5D	3F		View
Whitman	Dredge Workers	Assistant Mate (Deckhand)	$79.01	5D	3F		View
Whitman	Dredge Workers	Boatmen	$79.62	5D	3F		View
Whitman	Dredge Workers	Engineer Welder	$81.15	5D	3F		View
Whitman	Dredge Workers	Leverman, Hydraulic	$82.77	5D	3F		View
Whitman	Dredge Workers	Mates	$79.62	5D	3F		View
Whitman	Dredge Workers	Oiler	$79.01	5D	3F		View
Whitman	Drywall Applicator	Journey Level	$56.68	15O	11S		View
Whitman	Drywall Tapers	Journey Level	$56.68	15O	11S		View
Whitman	Electrical Fixture Maintenance Workers	Journey Level	$16.28		1		View
Whitman	Electricians - Inside	Journeyman	$64.10	7G	1E		View
Whitman	Electricians - Motor Shop	Craftsman	$16.28		1		View
Whitman	Electricians - Motor Shop	Journey Level	$16.28		1		View
Whitman	Electricians - Powerline Construction	Cable Splicer	$93.00	5A	4D		View
Whitman	Electricians - Powerline Construction	Certified Line Welder	$85.42	5A	4D		View
Whitman	Electricians - Powerline Construction	Groundperson	$55.27	5A	4D		View
Whitman	Electricians - Powerline Construction	Heavy Line Equipment Operator	$85.42	5A	4D		View
Whitman	Electricians - Powerline Construction	Journey Level Lineperson	$85.42	5A	4D		View
Whitman	Electricians - Powerline Construction	Line Equipment Operator	$73.35	5A	4D		View
Whitman	Electricians - Powerline Construction	Meter Installer	$55.27	5A	4D	8W	View
Whitman	Electricians - Powerline Construction	Pole Sprayer	$85.42	5A	4D		View
Whitman	Electricians - Powerline Construction	Powderperson	$63.50	5A	4D		View
Whitman	Electronic Technicians	Journey Level	$53.20	5I	1B		View
Whitman	Elevator Constructors	Mechanic	$111.26	7D	4A		View
Whitman	Elevator Constructors	Mechanic In Charge	$120.27	7D	4A		View
Whitman	Fabricated Precast Concrete Products	Journey Level	$16.28		1		View
Whitman	Fabricated Precast Concrete Products	Journey Level - In-Factory Work Only	$16.28		1		View
Whitman	Fence Erectors	Fence Erector	$49.52	7B	1M	8Z	View
Whitman	Flaggers	Journey Level	$46.68	7B	1M	8Z	View
Whitman	Glaziers	Journey Level	$43.70	7L	4L		View
Whitman	Heat & Frost Insulators And Asbestos Workers	Journey Level	$62.55	5K	1U		View
Whitman	Heating Equipment Mechanics	Journey Level	$69.36	6Z	1B		View
Whitman	Hod Carriers & Mason Tenders	Journey Level	$51.11	7B	1M	8Z	View
Whitman	Industrial Power Vacuum Cleaner	Journey Level	$16.28		1		View

Whitman	Inland Boatmen	Journey Level	$16.28		1		View
Whitman	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Cleaner Operator, Foamer Operator	$16.28		1		View
Whitman	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Grout Truck Operator	$16.28		1		View
Whitman	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Head Operator	$16.28		1		View
Whitman	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Technician	$16.28		1		View
Whitman	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Tv Truck Operator	$16.28		1		View
Whitman	Insulation Applicators	Journey Level	$55.87	7E	4X	8N	View
Whitman	Ironworkers	Journeyman	$71.42	15K	11N		View
Whitman	Laborers	Air And Hydraulic Track Drill	$50.13	7B	1M	8Z	View
Whitman	Laborers	Asphalt Raker	$50.13	7B	1M	8Z	View
Whitman	Laborers	Asphalt Roller, Walking	$49.83	7B	1M	8Z	View
Whitman	Laborers	Brick Pavers	$49.52	7B	1M	8Z	View
Whitman	Laborers	Brush Hog Feeder	$49.52	7B	1M	8Z	View
Whitman	Laborers	Brush Machine	$50.13	7B	1M	8Z	View
Whitman	Laborers	Caisson Worker, Free AIr	$50.13	7B	1M	8Z	View
Whitman	Laborers	Carpenter Tender	$49.52	7B	1M	8Z	View
Whitman	Laborers	Cement Finisher Tender	$49.83	7B	1M	8Z	View
Whitman	Laborers	Cement Handler	$49.52	7B	1M	8Z	View
Whitman	Laborers	Chain Saw Operator & Faller	$50.13	7B	1M	8Z	View
Whitman	Laborers	Clean-up Laborer	$49.52	7B	1M	8Z	View
Whitman	Laborers	Compaction Equipment	$49.83	7B	1M	8Z	View
Whitman	Laborers	Concrete Crewman	$49.52	7B	1M	8Z	View
Whitman	Laborers	Concrete Saw, Walking	$49.83	7B	1M	8Z	View
Whitman	Laborers	Concrete Signalman	$49.52	7B	1M	8Z	View
Whitman	Laborers	Concrete Stack	$50.13	7B	1M	8Z	View
Whitman	Laborers	Confined Space Attendant	$49.52	7B	1M	8Z	View
Whitman	Laborers	Construction Specialist	$50.33	7B	1M	8Z	View
Whitman	Laborers	Crusher Feeder	$49.52	7B	1M	8Z	View
Whitman	Laborers	Demolition	$49.52	7B	1M	8Z	View
Whitman	Laborers	Demolition Torch	$49.83	7B	1M	8Z	View
Whitman	Laborers	Dope Pot Fireman, Non-mechanical	$49.83	7B	1M	8Z	View
Whitman	Laborers	Driller Helper (when Required To Move & Position Machine)	$49.83	7B	1M	8Z	View
Whitman	Laborers	Drills With Dual Masts	$50.44	7B	1M	8Z	View
Whitman	Laborers	Dry Stack Walls	$49.52	7B	1M	8Z	View
Whitman	Laborers	Dumpman	$49.52	7B	1M	8Z	View
Whitman	Laborers	Erosion Control Laborer	$49.52	7B	1M	8Z	View
Whitman	Laborers	Firewatch	$49.52	7B	1M	8Z	View

Whitman	Laborers	Form Cleaning Machine Feeder, Stacker	$49.52	7B	1M	8Z	View
Whitman	Laborers	Form Setter, Paving	$49.83	7B	1M	8Z	View
Whitman	Laborers	General Laborer	$49.52	7B	1M	8Z	View
Whitman	Laborers	Grade Checker	$52.34	7B	1M	8Z	View
Whitman	Laborers	Grout Machine Header Tender	$49.52	7B	1M	8Z	View
Whitman	Laborers	Guard Rail	$49.52	7B	1M	8Z	View
Whitman	Laborers	Gunite	$50.13	7B	1M	8Z	View
Whitman	Laborers	Hazardous Waste Worker (level A)	$50.44	7B	1M	8Z	View
Whitman	Laborers	Hazardous Waste Worker (level B)	$50.13	7B	1M	8Z	View
Whitman	Laborers	Hazardous Waste Worker (level C)	$49.83	7B	1M	8Z	View
Whitman	Laborers	Hazardous Waste Worker (level D)	$49.52	7B	1M	8Z	View
Whitman	Laborers	Hdpe Or Similar Liner Installer	$49.52	7B	1M	8Z	View
Whitman	Laborers	High Scaler	$50.13	7B	1M	8Z	View
Whitman	Laborers	Industrial Technician	$67.55	7B	1M	8Z	View
Whitman	Laborers	Jackhammer Operator Miner, Class "b"	$49.83	7B	1M	8Z	View
Whitman	Laborers	Laser Beam Operator	$50.13	7B	1M	8Z	View
Whitman	Laborers	Miner, Class "a"	$49.52	7B	1M	8Z	View
Whitman	Laborers	Miner, Class "c"	$50.13	7B	1M	8Z	View
Whitman	Laborers	Miner, Class "d"	$50.44	7B	1M	8Z	View
Whitman	Laborers	Monitor Operator, Air Track Or Similar Mounting	$50.13	7B	1M	8Z	View
Whitman	Laborers	Mortar Mixer	$50.13	7B	1M	8Z	View
Whitman	Laborers	Nipper	$49.52	7B	1M	8Z	View
Whitman	Laborers	Nozzleman	$50.13	7B	1M	8Z	View
Whitman	Laborers	Nozzleman, Water (to Include Fire Hose), Air Or Steam	$49.83	7B	1M	8Z	View
Whitman	Laborers	Pavement Breaker, 90 Lbs. & Over	$50.13	7B	1M	8Z	View
Whitman	Laborers	Pavement Breaker, Under 90 Lbs.	$49.83	7B	1M	8Z	View
Whitman	Laborers	Pilot Car	$46.68	7B	1M	8Z	View
Whitman	Laborers	Pipelayer	$50.13	7B	1M	8Z	View
Whitman	Laborers	Pipelayer, Corrugated Metal Culvert And Multi-Plate	$50.13	7B	1M	8Z	View
Whitman	Laborers	Pipewrapper	$50.13	7B	1M	8Z	View
Whitman	Laborers	Plasterer Tenders	$50.13	7B	1M	8Z	View
Whitman	Laborers	Pot Tender	$49.83	7B	1M	8Z	View
Whitman	Laborers	Powderman	$51.97	7B	1M	8Z	View
Whitman	Laborers	Powederman Helper	$49.83	7B	1M	8Z	View
Whitman	Laborers	Power Buggy Operator	$49.83	7B	1M	8Z	View
Whitman	Laborers	Power Tool Operator, Gas, Electric, Pneumatic	$49.83	7B	1M	8Z	View
Whitman	Laborers	Rad-Con Technician	$67.55	7B	1M	8Z	View

Whitman	Laborers	Railroad Equipment, Power Driven, Except Dual Mobile	$49.83	7B	1M	8Z	View
Whitman	Laborers	Railroad Power Spiker Or Puller, Dual Mobile	$49.83	7B	1M	8Z	View
Whitman	Laborers	Remote Equipment Operator	$50.44	7B	1M	8Z	View
Whitman	Laborers	Remote Equipment Operator (i.e Compaction And Demolition)	$49.83	7B	1M	8Z	View
Whitman	Laborers	Rigger/signal Person	$49.83	7B	1M	8Z	View
Whitman	Laborers	Riprap Person	$49.52	7B	1M	8Z	View
Whitman	Laborers	Rodder & Spreader	$49.83	7B	1M	8Z	View
Whitman	Laborers	Sand Hogs Under Compressed Air Conditions	$282.20	7B	1M	8Z	View
Whitman	Laborers	Sandblast Tailhoseman	$49.52	7B	1M	8Z	View
Whitman	Laborers	Scaffold Erector, Wood Or Steel	$49.52	7B	1M	8Z	View
Whitman	Laborers	Scaleman	$46.68	7B	1M	8Z	View
Whitman	Laborers	Stake Jumper	$49.52	7B	1M	8Z	View
Whitman	Laborers	Structural Mover	$49.52	7B	1M	8Z	View
Whitman	Laborers	Tailhoseman (water Nozzle)	$49.52	7B	1M	8Z	View
Whitman	Laborers	Timber Bucker & Faller (by Hand)	$49.52	7B	1M	8Z	View
Whitman	Laborers	Track Laborer (rr)	$49.52	7B	1M	8Z	View
Whitman	Laborers	Traffic Control Laborer	$46.68	7B	1M	8Z	View
Whitman	Laborers	Traffic Control Supervisor	$49.52	7B	1M	8Z	View
Whitman	Laborers	Trencher, Shawnee	$49.83	7B	1M	8Z	View
Whitman	Laborers	Trenchless Technology Technician	$50.13	7B	1M	8Z	View
Whitman	Laborers	Truck Loader	$49.52	7B	1M	8Z	View
Whitman	Laborers	Truck Mounted Attenuator	$46.68	7B	1M	8Z	View
Whitman	Laborers	Tugger Operator	$49.83	7B	1M	8Z	View
Whitman	Laborers	Vibrators, All	$50.13	7B	1M	8Z	View
Whitman	Laborers	Wagon Drills	$49.83	7B	1M	8Z	View
Whitman	Laborers	Water Pipe Liner	$49.83	7B	1M	8Z	View
Whitman	Laborers	Welder, Electrical, Manual Or Automatic (hdpe Or Similar Pipe And Liner)	$50.44	7B	1M	8Z	View
Whitman	Laborers	Well-point Person	$49.52	7B	1M	8Z	View
Whitman	Laborers	Wheelbarrow, Power Driven	$49.83	7B	1M	8Z	View
Whitman	Laborers	Window Washer, Cleaner	$46.68	7B	1M	8Z	View
Whitman	Laborers - Underground Sewer & Water	General Laborer & Topman	$50.13	7B	1M	8Z	View
Whitman	Laborers - Underground Sewer & Water	Pipe Layer	$50.13	7B	1M	8Z	View
Whitman	Landscape Construction	Landscape Laborer	$46.68	7B	1M	8Z	View
Whitman	Landscape Construction	Landscape Operator	$57.61	7Z	4S	9A	View
Whitman	Landscape Maintenance	Groundskeeper	$16.28		1		View
Whitman	Lathers	Journey Level	$56.68	15O	11S		View
Whitman	Marble Setters	Journey Level	$57.54	5A	1M		View

Whitman	Metal Fabrication (In Shop)	Fitter	$16.28		1		View
Whitman	Metal Fabrication (In Shop)	Laborer	$16.28		1		View
Whitman	Metal Fabrication (In Shop)	Machine Operator	$16.28		1		View
Whitman	Metal Fabrication (In Shop)	Painter	$16.28		1		View
Whitman	Metal Fabrication (In Shop)	Welder	$16.28		1		View
Whitman	Millwright	Journey Level	$76.28	5A	1B		View
Whitman	Modular Buildings	Journey Level	$16.28		1		View
Whitman	Painters	Commercial Painter	$45.51	6Z	1W		View
Whitman	Painters	Industrial Painter	$52.42	6Z	1W	9D	View
Whitman	Pile Driver	Journey Level	$61.94	7E	4X	8N	View
Whitman	Plasterers	Journey Level	$54.62	7K	1N		View
Whitman	Playground & Park Equipment Installers	Journey Level	$16.28		1		View
Whitman	Plumbers & Pipefitters	Journey Level	$92.81	6Z	1Q		View
Whitman	Power Equipment Operators	A-frame Truck (2 Or More Drums)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	A-frame Truck (single Drum)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	All Tower Cranes	$61.92	7Z	4S	9A	View
Whitman	Power Equipment Operators	Asphalt Plant Operator	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Assistant Plant Operator, Fireman Or Pugmixer (asphalt)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Assistant Refrigeration Plant & Chiller Operator (over 1000 Ton)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Assistant Refrigeration Plant (under 1000 Ton)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Automatic Subgrader (ditches & Trimmers)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Backfillers (cleveland & Similar)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Backhoe & Hoe Ram (under 3/4 Yd.)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators	Backhoe (45,000 Gw & Under)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators	Backhoe (45,000 Gw To 110,000 Gw)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Backhoe (over 110,000 Gw)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Backhoes & Hoe Ram (3 Yds & Over)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Backhoes & Hoe Ram (3/4 Yd. To 3 Yd.)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Bagley Or Stationary Scraper	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Batch & Wet Mix Operator (multiple Units, 2 & Incl. 4)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Batch Plant & Wet Mix Operator, Single Unit (concrete)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Batch Plant (over 4 Units)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Belt Finishing Machine	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Belt Loader (kocal Or Similar)	$57.43	7Z	4S	9A	View

Whitman	Power Equipment Operators	Belt-crete Conveyors With Power Pack Or Similar	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Bending Machine	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Bit Grinders	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Blade (finish & Bluetop), Automatic, Cmi, Abc, Finish Athey & Huber & Similar When Used As Automatic	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Blade Operator (motor Patrol & Attachments)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Blower Operator (cement)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Boat Operator	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Bob Cat (skid Steer)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Bolt Threading Machine	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Boom Cats (side)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Boring Machine (earth)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Boring Machine (Rock Under 8 inch Bit - Quarry Master, Joy Or Similar)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Bump Cutter (wayne, Saginau Or Similar)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Cableway Controller (dispatcher)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Cableway Operators	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Canal Lining Machine (concrete)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Carrydeck & Boom Truck (under 25 Tons)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators	Cement Hog	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Chipper (Without Crane)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Clamshell, Dragline	$60.22	7Z	4S	9A	View
Whitman	Power Equipment Operators	Cleaning & Doping Machine (Pipeline)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Compactor (self-propelled With Blade)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Compressor (2000 Cfm Or Over, 2 Or More, Gas Diesel Or Electric Power)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Compressors (under 2000 Cfm, Gas, Diesel Or Electric Power)	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Concrete Cleaning / Decontamination Machine Operator	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Concrete Pump Boom Truck	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Concrete Pumps (squeeze-crete, Flow-crete, Whitman & Similar)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators	Concrete Saw (multiple Cut)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Concrete Slip Form Paver	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Conveyor Aggregate Delivery Systems (c.a.d.)	$58.11	7Z	4S	9A	View

Whitman	Power Equipment Operators	Crane Oiler & Cable Tender, Mucking Machine	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Crane Oiler - Driver (cdl Required)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Cranes (100 to 299 Tons) All Attachments	$61.12	7Z	4S	9A	View
Whitman	Power Equipment Operators	Cranes (25 Tons & Under), All Attachments Incl. Clamshell, Dragline	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators	Cranes (25 Tons To And Including 44 Tons), All Attachments Incl. Clamshell, Dragline	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Cranes (300 Tons and Over) All Attachments	$61.92	7Z	4S	9A	View
Whitman	Power Equipment Operators	Cranes (45 Tons To 55 Tons), All Attachments Incl. Clamshell And Dragline	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Cranes (56 to 99 tons) and overhead, rail and Quick Tower. All attachment incl. Clamshell, Dragline	$60.22	7Z	4S	9A	View
Whitman	Power Equipment Operators	Crusher Feeder	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Crusher, Grizzle & Screening Plant Operator	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Curb Extruder (asphalt Or Concrete)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators	Deck Engineer	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Deck Hand	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Derricks & Stifflegs (65 Tons & Over)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Derricks & Stifflegs (under 65 Tons)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators	Distributor Leverman	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Ditch Witch Or Similar	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Dope Pots (power Agitated	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Dozer / Tractor (up To D-5 Or Equivalent) And Traxcavator	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Dozer / Tractors (d-6 & Equivalent & Over)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Dozer, 834 R/t & Similar	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Drill Doctor	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Driller Licensed	$60.22	7Z	4S	9A	View
Whitman	Power Equipment Operators	Drillers Helper	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Drilling Equipment (8 inch Bit & Over - Robbins, Reverse Circulation & Similar)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators	Drills (churn, Core, Calyx Or Diamond)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators	Elevating Belt (holland Type)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Elevating Belt-type Loader (euclid, Barber Green &	$57.43	7Z	4S	9A	View

		Similar)					
Whitman	Power Equipment Operators	Elevating Grader-type Loader (dumor, Adams Or Similar)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Elevator Hoisting Materials	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Equipment Serviceman, Greaser & Oiler	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators	Fireman & Heater Tender	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Fork Lift Or Lumber Stacker, Hydra-life & Similar	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Generator Plant Engineers (diesel Or Electric)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Gin Trucks (pipeline)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Grade Checker	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators	Gunite Combination Mixer & Compressor	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	H.d. Mechanic	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	H.d. Welder	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Heavy Equipment Robotics Operator	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Helicopter Pilot	$60.22	7Z	4S	9A	View
Whitman	Power Equipment Operators	Helper, Mechanic Or Welder, H.D	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Hoe Ram	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators	Hoist (2 Or More Drums Or Tower Hoist)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators	Hoist, Single Drum	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Hydraulic Platform Trailers (goldhofer, Shaurerly And Similar)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Hydro-seeder, Mulcher, Nozzleman	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Lime Batch Tank Operator (recycle Train)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Lime Brain Operator (recycle Train)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Loader (360 Degrees Revolving Koehring Scooper Or Similar)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Loader Operator (front-end & Overhead, 4 Yds. Incl. 8 Yds.)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Loaders (bucket Elevators And Conveyors)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Loaders (overhead & Front-end, Over 8 Yds.)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Loaders (overhead & Front-end, Under 4 Yds.. R/t)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators	Loaders (overhead And Front-end, 10 Yds. & Over)	$60.22	7Z	4S	9A	View
Whitman	Power Equipment Operators	Locomotive Engineer	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Longitudinal Float	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Master Environmental Maintenance Technician	$58.42	7Z	4S	9A	View

Whitman	Power Equipment Operators	Mixer (portable - Concrete)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Mixermobile	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Mobile Crusher Operator (recycle Train)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Mucking Machine	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Multiple Dozer Units With Single Blade	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Pavement Breaker, Hydra-hammer & Similar	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Paving (dual Drum)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators	Paving Machine (asphalt And Concrete)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Piledriving Engineers	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators	Plant Oiler	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Posthole Auger Or Punch	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Power Broom	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Pump (grout Or Jet)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Pumpman	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Quad-track Or Similar Equipment	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Railroad Ballast Regulation Operator (self-propelled)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Railroad Power Tamper Operator (self-propelled)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Railroad Tamper Jack Operator (self-propelled)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Railroad Track Liner Operator (self-propelled)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators	Refrigeration Plant Engineer (1000 Tons & Over)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators	Refrigeration Plant Engineer (under 1000 Ton)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators	Rollerman (finishing Asphalt Pavement)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Rollers, All Types On Subgrade, Including Seal And Chip Coating (farm Type, Case, John Deere And Similar,or Compacting Vibrator), Except When Pulled B	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Roto Mill (pavement Grinder)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Rotomill Groundsman	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators	Rubber-tired Scrapers (multiple Engine With Three Or More Scrapers)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Rubber-tired Skidders (r/t With Or Without Attachments)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators	Scrapers, All, Rubber-tired	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Screed Operator	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Shovels (3 Yds. & Over)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Shovels (under 3 Yds.)	$58.11	7Z	4S	9A	View

Whitman	Power Equipment Operators	Signalman (whirleys, Highline, Hammerheads Or Similar)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators	Soil Stabilizer (p & H Or Similar)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Spray Curing Machine (concrete)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Spreader Box (self-propelled)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Spreader Machine	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Steam Cleaner	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Straddle Buggy (ross & Similar On Construction Job Only)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Surface Heater & Planer Machine	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators	Tractor (farm Type R/t With Attachments, Except Backhoe)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Traverse Finish Machine	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Trenching Machines (7 Ft. Depth & Over)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Trenching Machines (under 7 Ft. Depth Capacity)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators	Tug Boat Operator	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Tugger Operator	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators	Turnhead (with Re-screening)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators	Turnhead Operator	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators	Ultra High Pressure Wateriet Cutting Tool System Operator, (30,000 Psi)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Vactor Guzzler, Super Sucker	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators	Vacuum Blasting Machine Operator	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators	Vacuum Drill (reverse Circulation Drill Under 8 Inch Bit)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators	Welding Machine	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators	Whirleys & Hammerheads, All	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	A-frame Truck (2 Or More Drums)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	A-frame Truck (single Drum)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	All Tower Cranes	$61.92	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Asphalt Plant Operator	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Assistant Plant Operator, Fireman Or Pugmixer (asphalt)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Assistant Refrigeration Plant & Chiller Operator (over 1000 Ton)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Assistant Refrigeration Plant (under 1000 Ton)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-	Automatic Subgrader (ditches	$58.11	7Z	4S	9A	View

	Underground Sewer & Water	& Trimmers)					
Whitman	Power Equipment Operators-Underground Sewer & Water	Backfillers (cleveland & Similar)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Backhoe & Hoe Ram (under 3/4 Yd.)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Backhoe (45,000 Gw & Under)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Backhoe (45,000 Gw To 110,000 Gw)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Backhoe (over 110,000 Gw)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Backhoes & Hoe Ram (3 Yds & Over)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Backhoes & Hoe Ram (3/4 Yd. To 3 Yd.)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Bagley Or Stationary Scraper	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Batch & Wet Mix Operator (multiple Units, 2 & Incl. 4)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Batch Plant & Wet Mix Operator, Single Unit (concrete)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Batch Plant (over 4 Units)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Belt Finishing Machine	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Belt Loader (kocal Or Similar)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Belt-crete Conveyors With Power Pack Or Similar	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Bending Machine	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Bit Grinders	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Blade (finish & Bluetop), Automatic, Cmi, Abc, Finish Athey & Huber & Similar When Used As Automatic	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Blade Operator (motor Patrol & Attachments)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Blower Operator (cement)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Boat Operator	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Bob Cat (skid Steer)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Bolt Threading Machine	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Boom Cats (side)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Boring Machine (earth)	$57.43	7Z	4S	9A	View

Whitman	Power Equipment Operators-Underground Sewer & Water	Boring Machine (Rock Under 8 inch Bit - Quarry Master, Joy Or Similar)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Bump Cutter (wayne, Saginau Or Similar)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Cableway Controller (dispatcher)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Cableway Operators	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Canal Lining Machine (concrete)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Carrydeck & Boom Truck (under 25 Tons)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Cement Hog	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Chipper (Without Crane)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Clamshell, Dragline	$60.22	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Cleaning & Doping Machine (Pipeline)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Compactor (self-propelled With Blade)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Compressor (2000 Cfm Or Over, 2 Or More, Gas Diesel Or Electric Power)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Compressors (under 2000 Cfm, Gas, Diesel Or Electric Power)	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Concrete Cleaning / Decontamination Machine Operator	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Concrete Pump Boom Truck	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Concrete Pumps (squeeze-crete, Flow-crete, Whitman & Similar)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Concrete Saw (multiple Cut)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Concrete Slip Form Paver	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Conveyor Aggregate Delivery Systems (c.a.d.)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Crane Oiler & Cable Tender, Mucking Machine	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Crane Oiler - Driver (cdl Required)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Cranes (100 to 299 Tons) All Attachments	$61.12	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Cranes (25 Tons & Under), All Attachments Incl. Clamshell, Dragline	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Cranes (25 Tons To And Including 44 Tons), All	$58.11	7Z	4S	9A	View

		Attachments Incl. Clamshell, Dragline					
Whitman	Power Equipment Operators-Underground Sewer & Water	Cranes (300 Tons and Over) All Attachments	$61.92	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Cranes (45 Tons To 55 Tons), All Attachments Incl. Clamshell And Dragline	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Cranes (56 to 99 tons) and overhead, rail and Quick Tower. All attachment incl. Clamshell, Dragline	$60.22	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Crusher Feeder	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Crusher, Grizzle & Screening Plant Operator	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Curb Extruder (asphalt Or Concrete)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Deck Engineer	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Deck Hand	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Derricks & Stifflegs (65 Tons & Over)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Derricks & Stifflegs (under 65 Tons)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Distributor Leverman	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Ditch Witch Or Similar	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Dope Pots (power Agitated	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Dozer / Tractor (up To D-5 Or Equivalent) And Traxcavator	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Dozer / Tractors (d-6 & Equivalent & Over)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Dozer, 834 R/t & Similar	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Drill Doctor	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Driller Licensed	$60.22	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Drillers Helper	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Drilling Equipment (8 inch Bit & Over - Robbins, Reverse Circulation & Similar)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Drills (churn, Core, Calyx Or Diamond)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Elevating Belt (holland Type)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Elevating Belt-type Loader (euclid, Barber Green & Similar)	$57.43	7Z	4S	9A	View

Whitman	Power Equipment Operators-Underground Sewer & Water	Elevating Grader-type Loader (dumor, Adams Or Similar)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Elevator Hoisting Materials	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Equipment Serviceman, Greaser & Oiler	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Fireman & Heater Tender	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Fork Lift Or Lumber Stacker, Hydra-life & Similar	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Generator Plant Engineers (diesel Or Electric)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Gin Trucks (pipeline)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Grade Checker	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Gunite Combination Mixer & Compressor	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	H.d. Mechanic	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	H.d. Welder	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Heavy Equipment Robotics Operator	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Helicopter Pilot	$60.22	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Helper, Mechanic Or Welder, H.D	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Hoe Ram	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Hoist (2 Or More Drums Or Tower Hoist)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Hoist, Single Drum	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Hydraulic Platform Trailers (goldhofer, Shaurerly And Similar)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Hydro-seeder, Mulcher, Nozzleman	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Lime Batch Tank Operator (recycle Train)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Lime Brain Operator (recycle Train)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Loader (360 Degrees Revolving Koehring Scooper Or Similar)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Loader Operator (front-end & Overhead, 4 Yds. Incl. 8 Yds.)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Loaders (bucket Elevators And Conveyors)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Loaders (overhead & Front-end, Over 8 Yds.)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Loaders (overhead & Front-end, Under 4 Yds.. R/t)	$57.61	7Z	4S	9A	View

Whitman	Power Equipment Operators-Underground Sewer & Water	Locomotive Engineer	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Longitudinal Float	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Master Environmental Maintenance Technician	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Mixer (portable - Concrete)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Mixermobile	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Mobile Crusher Operator (recycle Train)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Mucking Machine	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Multiple Dozer Units With Single Blade	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Pavement Breaker, Hydra-hammer & Similar	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Paving (dual Drum)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Paving Machine (asphalt And Concrete)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Piledriving Engineers	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Plant Oiler	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Posthole Auger Or Punch	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Power Broom	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Pump (grout Or Jet)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Pumpman	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Quad-track Or Similar Equipment	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Railroad Ballast Regulation Operator (self-propelled)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Railroad Power Tamper Operator (self-propelled)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Railroad Tamper Jack Operator (self-propelled)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Railroad Track Liner Operator (self-propelled)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Refrigeration Plant Engineer (1000 Tons & Over)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Refrigeration Plant Engineer (under 1000 Ton)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Rollerman (finishing Asphalt Pavement)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Rollers, All Types On Subgrade, Including Seal And Chip Coating (farm Type, Case,	$56.39	7Z	4S	9A	View

		John Deere And Similar,or Compacting Vibrator), Except When Pulled B					
Whitman	Power Equipment Operators-Underground Sewer & Water	Roto Mill (pavement Grinder)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Rotomill Groundsman	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Rubber-tired Scrapers (multiple Engine With Three Or More Scrapers)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Rubber-tired Skidders (r/t With Or Without Attachments)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Scrapers, All, Rubber-tired	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Screed Operator	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Shovels (3 Yds. & Over)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Shovels (under 3 Yds.)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Signalman (whirleys, Highline, Hammerheads Or Similar)	$57.80	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Soil Stabilizer (p & H Or Similar)	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Spray Curing Machine (concrete)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Spreader Box (self-propelled)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Spreader Machine	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Steam Cleaner	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Straddle Buggy (ross & Similar On Construction Job Only)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Surface Heater & Planer Machine	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Tractor (farm Type R/t With Attachments, Except Backhoe)	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Traverse Finish Machine	$57.43	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Trenching Machines (7 Ft. Depth & Over)	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Trenching Machines (under 7 Ft. Depth Capacity)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Tug Boat Operator	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Tugger Operator	$56.74	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Turnhead (with Re-screening)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Turnhead Operator	$57.43	7Z	4S	9A	View

Whitman	Power Equipment Operators-Underground Sewer & Water	Ultra High Pressure Wateriet Cutting Tool System Operator, (30,000 Psi)	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Vactor Guzzler, Super Sucker	$58.11	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Vacuum Blasting Machine Operator	$58.42	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Vacuum Drill (reverse Circulation Drill Under 8 Inch Bit)	$57.61	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Welding Machine	$56.39	7Z	4S	9A	View
Whitman	Power Equipment Operators-Underground Sewer & Water	Whirleys & Hammerheads, All	$58.42	7Z	4S	9A	View
Whitman	Power Line Clearance Tree Trimmers	Journey Level In Charge	$57.22	5A	4A		View
Whitman	Power Line Clearance Tree Trimmers	Spray Person	$54.32	5A	4A		View
Whitman	Power Line Clearance Tree Trimmers	Tree Equipment Operator	$57.22	5A	4A		View
Whitman	Power Line Clearance Tree Trimmers	Tree Trimmer	$51.18	5A	4A		View
Whitman	Power Line Clearance Tree Trimmers	Tree Trimmer Groundperson	$38.99	5A	4A		View
Whitman	Refrigeration & Air Conditioning Mechanics	Journey Level	$92.81	6Z	1Q		View
Whitman	Residential Brick Mason	Journey Level	$57.54	5A	1M		View
Whitman	Residential Carpenters	Journey Level	$25.00		1		View
Whitman	Residential Cement Masons	Journey Level	$16.28		1		View
Whitman	Residential Drywall Applicators	Journey Level	$25.64		1		View
Whitman	Residential Drywall Tapers	Journey Level	$51.18	7E	1P		View
Whitman	Residential Electricians	Journey Level	$31.82		1		View
Whitman	Residential Glaziers	Journey Level	$20.72		1		View
Whitman	Residential Insulation Applicators	Journey Level	$16.28		1		View
Whitman	Residential Laborers	Journey Level	$22.44		1		View
Whitman	Residential Marble Setters	Journey Level	$57.54	5A	1M		View
Whitman	Residential Painters	Journey Level	$25.08		1		View
Whitman	Residential Plumbers & Pipefitters	Journey Level	$43.33		1		View
Whitman	Residential Refrigeration & Air Conditioning Mechanics	Journey Level	$18.40		1		View
Whitman	Residential Sheet Metal Workers	Journey Level (Field or Shop)	$69.36	5I	1B		View
Whitman	Residential Soft Floor Layers	Journey Level	$17.62		1		View
Whitman	Residential Sprinkler Fitters (Fire Protection)	Journey Level	$18.40		1		View
Whitman	Residential Stone Masons	Journey Level	$57.54	5A	1M		View
Whitman	Residential Terrazzo Workers	Journey Level	$20.61		1		View
Whitman	Residential Terrazzo/Tile Finishers	Journey Level	$17.92		1		View
Whitman	Residential Tile Setters	Journey Level	$20.61		1		View

Whitman	Roofers	Journey Level	$46.79	5I	1R		View
Whitman	Roofers	Using Irritable Bituminous Materials	$48.79	5I	1R		View
Whitman	Sheet Metal Workers	Journey Level (Field or Shop)	$77.36	6Z	1B		View
Whitman	Sign Makers & Installers (Electrical)	Journey Level	$16.28		1		View
Whitman	Sign Makers & Installers (Non-Electrical)	Journey Level	$16.28		1		View
Whitman	Soft Floor Layers	Journey Level	$57.11	5A	3J		View
Whitman	Solar Controls For Windows	Journey Level	$16.28		1		View
Whitman	Sprinkler Fitters (Fire Protection)	Journey Level	$67.41	7J	1R		View
Whitman	Stage Rigging Mechanics (Non Structural)	Journey Level	$16.28		1		View
Whitman	Stone Masons	Journey Level	$57.54	5A	1M		View
Whitman	Street And Parking Lot Sweeper Workers	Journey Level	$16.28		1		View
Whitman	Surveyors	Chain Person	$16.28	0	1	9H	View
Whitman	Surveyors	Instrument Person	$16.28	0	1	9H	View
Whitman	Surveyors	Party Chief	$16.28	0	1	9H	View
Whitman	Telecommunication Technicians	Journey Level	$53.20	5I	1B		View
Whitman	Telephone Line Construction - Outside	Cable Splicer	$40.36	5A	2B		View
Whitman	Telephone Line Construction - Outside	Hole Digger/Ground Person	$26.92	5A	2B		View
Whitman	Telephone Line Construction - Outside	Telephone Equipment Operator (Light)	$33.74	5A	2B		View
Whitman	Telephone Line Construction - Outside	Telephone Lineperson	$38.15	5A	2B		View
Whitman	Terrazzo Workers	Journey Level	$43.81	5A	1M		View
Whitman	Tile Setters	Journey Level	$43.81	5A	1M		View
Whitman	Tile, Marble & Terrazzo Finishers	Journey Level	$35.93	5A	1M		View
Whitman	Traffic Control Stripers	Journey Level	$89.54	15L	1K		View
Whitman	Truck Drivers	Asphalt Mix Over 20 Yards	$56.35	5D	1V	8M	View
Whitman	Truck Drivers	Asphalt Mix To 20 Yards	$56.15	5D	1V	8M	View
Whitman	Truck Drivers	Dump Truck	$56.15	5D	1V	8M	View
Whitman	Truck Drivers	Dump Truck & Trailer	$56.35	5D	1V	8M	View
Whitman	Truck Drivers	Other Trucks	$56.04	5D	1V	8M	View
Whitman	Truck Drivers - Ready Mix	Transit Mixers 20 yards and under	$56.35	5D	1V	8M	View
Whitman	Truck Drivers - Ready Mix	Transit Mixers over 20 yards	$56.69	5D	1V	8M	View
Whitman	Well Drillers & Irrigation Pump Installers	Irrigation Pump Installer	$16.28		1		View
Whitman	Well Drillers & Irrigation Pump Installers	Oiler	$16.28		1		View
Whitman	Well Drillers & Irrigation Pump Installers	Well Driller	$18.00		1		View

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Overtime Codes

Overtime calculations are based on the hourly rate actually paid to the worker. On public works projects, the hourly rate must be not less than the prevailing rate of wage minus the hourly rate of the cost of fringe benefits actually provided for the worker.

1. ALL HOURS WORKED IN EXCESS OF EIGHT (8) HOURS PER DAY OR FORTY (40) HOURS PER WEEK SHALL BE PAID AT ONE AND ONE-HALF TIMES THE HOURLY RATE OF WAGE.

B. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

C. The first two (2) hours after eight (8) regular hours Monday through Friday and the first ten (10) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other overtime hours and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

D. The first two (2) hours before or after a five-eight (8) hour workweek day or a four-ten (10) hour workweek day and the first eight (8) hours worked the next day after either workweek shall be paid at one and one-half times the hourly rate of wage. All additional hours worked and all worked on Sundays and holidays shall be paid at double the hourly rate of wage.

E. The first two (2) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other hours worked Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

F. The first two (2) hours after eight (8) regular hours Monday through Friday and the first ten (10) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other overtime hours worked, except Labor Day, shall be paid at double the hourly rate of wage. All hours worked on Labor Day shall be paid at three times the hourly rate of wage.

G. The first ten (10) hours worked on Saturdays and the first ten (10) hours worked on a fifth calendar weekday in a four-ten hour schedule, shall be paid at one and one-half times the hourly rate of wage. All hours worked in excess of ten (10) hours per day Monday through Saturday and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

H. All hours worked on Saturdays (except makeup days if work is lost due to inclement weather conditions or equipment breakdown) shall be paid at one and one-half times the hourly rate of wage. All hours worked Monday through Saturday over twelve (12) hours and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

I. All hours worked on Sundays and holidays shall also be paid at double the hourly rate of wage.

J. The first two (2) hours after eight (8) regular hours Monday through Friday and the first ten (10) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked over ten (10) hours Monday through Saturday, Sundays and holidays shall be paid at double the hourly rate of wage.

K. All hours worked on Saturdays and Sundays shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid at double the hourly rate of wage.

M. All hours worked on Saturdays (except makeup days if work is lost due to inclement weather conditions) shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

Overtime Codes Continued

1. N. All hours worked on Saturdays (except makeup days) shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

O. The first ten (10) hours worked on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays, holidays and after twelve (12) hours, Monday through Friday and after ten (10) hours on Saturday shall be paid at double the hourly rate of wage.

P. All hours worked on Saturdays (except makeup days if circumstances warrant) and Sundays shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid at double the hourly rate of wage.

Q. The first two (2) hours after eight (8) regular hours Monday through Friday and up to ten (10) hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked in excess of ten (10) hours per day Monday through Saturday and all hours worked on Sundays and holidays (except Christmas day) shall be paid at double the hourly rate of wage. All hours worked on Christmas day shall be paid at two and one-half times the hourly rate of wage.

R. All hours worked on Sundays and holidays shall be paid at two times the hourly rate of wage.

U. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays (except Labor Day) shall be paid at two times the hourly rate of wage. All hours worked on Labor Day shall be paid at three times the hourly rate of wage.

V. All hours worked on Sundays and holidays (except Thanksgiving Day and Christmas day) shall be paid at one and one-half times the hourly rate of wage. All hours worked on Thanksgiving Day and Christmas day shall be paid at double the hourly rate of wage.

W. All hours worked on Saturdays and Sundays (except make-up days due to conditions beyond the control of the employer)) shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid at double the hourly rate of wage.

X. The first four (4) hours after eight (8) regular hours Monday through Friday and the first twelve (12) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked over twelve (12) hours Monday through Saturday, Sundays and holidays shall be paid at double the hourly rate of wage. When holiday falls on Saturday or Sunday, the day before Saturday, Friday, and the day after Sunday, Monday, shall be considered the holiday and all work performed shall be paid at double the hourly rate of wage.

Y. All hours worked outside the hours of 5:00 am and 5:00 pm (or such other hours as may be agreed upon by any employer and the employee) and all hours worked in excess of eight (8) hours per day (10 hours per day for a 4 x 10 workweek) and on Saturdays and holidays (except labor day) shall be paid at one and one-half times the hourly rate of wage. (except for employees who are absent from work without prior approval on a scheduled workday during the workweek shall be paid at the straight-time rate until they have worked 8 hours in a day (10 in a 4 x 10 workweek) or 40 hours during that workweek.) All hours worked Monday through Saturday over twelve (12) hours and all hours worked on Sundays and Labor Day shall be paid at double the hourly rate of wage.

Z. All hours worked on Saturdays and Sundays shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid the straight time rate of pay in addition to holiday pay.

Overtime Codes Continued

2. ALL HOURS WORKED IN EXCESS OF EIGHT (8) HOURS PER DAY OR FORTY (40) HOURS PER WEEK SHALL BE PAID AT ONE AND ONE-HALF TIMES THE HOURLY RATE OF WAGE.

   B. All hours worked on holidays shall be paid at one and one-half times the hourly rate of wage.

   F. The first eight (8) hours worked on holidays shall be paid at the straight hourly rate of wage in addition to the holiday pay. All hours worked in excess of eight (8) hours on holidays shall be paid at double the hourly rate of wage.

   M. This code appears to be missing. All hours worked on Saturdays, Sundays and holidays shall be paid at double the hourly rate of wage.

   R. All hours worked on Sundays and holidays and all hours worked over sixty (60) in one week shall be paid at double the hourly rate of wage.

   U. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked over 12 hours in a day or on Sundays and holidays shall be paid at double the hourly rate of wage.

3. ALL HOURS WORKED IN EXCESS OF EIGHT (8) HOURS PER DAY OR FORTY (40) HOURS PER WEEK SHALL BE PAID AT ONE AND ONE-HALF TIMES THE HOURLY RATE OF WAGE.

   F. All hours worked on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sunday shall be paid at two times the hourly rate of wage. All hours worked on paid holidays shall be paid at two and one-half times the hourly rate of wage including holiday pay.

   H. All work performed on Sundays between March 16th and October 14th and all Holidays shall be compensated for at two (2) times the regular rate of pay. Work performed on Sundays between October 15th and March 15th shall be compensated at one and one half (1-1/2) times the regular rate of pay.

   J. All hours worked between the hours of 10:00 pm and 5:00 am, Monday through Friday, and all hours worked on Saturdays shall be paid at a one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   K. Work performed in excess of eight (8) hours of straight time per day, or ten (10) hours of straight time per day when four ten (10) hour shifts are established, or forty (40) hours of straight time per week, Monday through Friday, or outside the normal 5 am to 6pm shift, and all work on Saturdays shall be paid at one and one-half times the hourly rate of wage. All work performed after 6:00 pm Saturday to 5:00 am Monday and Holidays, and all hours worked in excess of twelve (12) hours in a single shift shall be paid at double the hourly rate of wage.

   After an employee has worked eight (8) hours at an applicable overtime rate, all additional hours shall be at the applicable overtime rate until such time as the employee has had a break of eight (8) hours or more. When an employee returns to work without at least eight (8) hours time off since their previous shift, all such time shall be a continuation of shift and paid at the applicable overtime rate until he/she shall have the eight (8) hours rest period.

Overtime Codes Continued

4. ALL HOURS WORKED IN EXCESS OF EIGHT (8) HOURS PER DAY OR FORTY (40) HOURS PER WEEK SHALL BE PAID AT ONE AND ONE-HALF TIMES THE HOURLY RATE OF WAGE.

A. All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at double the hourly rate of wage. All hours worked on Saturdays, Sundays and holidays shall be paid at double the hourly rate of wage

C. On Monday through Friday, the first four (4) hours of overtime after eight (8) hours of straight time work shall be paid at one and one half (1-1/2) times the straight time rate of pay, unless a four (4) day ten (10) hour workweek has been established. On a four (4) day ten (10) hour workweek scheduled Monday through Thursday, or Tuesday through Friday, the first two (2) hours of overtime after ten (10) hours of straight time work shall be paid at one and one half (1-1/2) times the straight time rate of pay. On Saturday, the first twelve (12) hours of work shall be paid at one and one half (1-1/2) times the straight time rate of pay, except that if the job is down on Monday through Friday due to weather conditions or other conditions outside the control of the employer, the first ten (10) hours on Saturday may be worked at the straight time rate of pay. All hours worked over twelve (12) hours in a day and all hours worked on Sunday and Holidays shall be paid at two (2) times the straight time rate of pay.

D. All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at double the hourly rate of wage. All hours worked on Saturday, Sundays and holidays shall be paid at double the hourly rate of pay. Rates include all members of the assigned crew.

EXCEPTION:
On all multipole structures and steel transmission lines, switching stations, regulating, capacitor stations, generating plants, industrial plants, associated installations and substations, except those substations whose primary function is to feed a distribution system, will be paid overtime under the following rates:

The first two (2) hours after eight (8) regular hours Monday through Friday of overtime on a regular workday, shall be paid at one and one-half times the hourly rate of wage. All hours in excess of ten (10) hours will be at two (2) times the hourly rate of wage. The first eight (8) hours worked on Saturday will be paid at one and one-half (1-1/2) times the hourly rate of wage. All hours worked in excess of eight (8) hours on Saturday, and all hours worked on Sundays and holidays will be at the double the hourly rate of wage.

All overtime eligible hours performed on the above described work that is energized, shall be paid at the double the hourly rate of wage.

E. The first two (2) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other hours worked Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

On a four-day, ten-hour weekly schedule, either Monday thru Thursday or Tuesday thru Friday schedule, all hours worked after ten shall be paid at double the hourly rate of wage. The Monday or Friday not utilized in the normal four-day, ten hour work week, and Saturday shall be paid at one and one half (1½) times the regular shift rate for the first eight (8) hours. All other hours worked Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

G. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked Monday through Saturday over twelve (12) hours and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

I. The First eight (8) hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked in excess of eight (8) per day on Saturdays shall be paid at double the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

Overtime Codes Continued

4. J. The first eight (8) hours worked on a Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked in excess of eight (8) hours on a Saturday shall be paid at double the hourly rate of wage. All hours worked over twelve (12) in a day, and all hours worked on Sundays and Holidays shall be paid at double the hourly rate of wage.

K. All hours worked on a Saturday shall be paid at one and one-half times the hourly rate of wage, so long as Saturday is the sixth consecutive day worked. All hours worked over twelve (12) in a day Monday through Saturday, and all hours worked on Sundays and Holidays shall be paid at double the hourly rate of wage.

L. The first twelve (12) hours worked on a Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked on a Saturday in excess of twelve (12) hours shall be paid at double the hourly rate of pay. All hours worked over twelve (12) in a day Monday through Friday, and all hours worked on Sundays shall be paid at double the hourly rate of wage. All hours worked on a holiday shall be paid at one and one-half times the hourly rate of wage, except that all hours worked on Labor Day shall be paid at double the hourly rate of pay.

S. On a four (4) day ten (10) hour workweek scheduled Monday through Thursday, or Tuesday through Friday, work performed in excess of (10) hours shall be paid at one and one half (1-1/2) times the hourly rate of pay. On Monday through Friday, work performed outside the normal work hours of 6:00 a.m. and 6:00 p.m. shall be paid at one and one-half (1-1/2) times the straight time rate, (except for special shifts or multiple shift operations).

All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All work performed on Sundays and holidays shall be paid at double the hourly rate of wage. When an employee returns to work without at least eight (8) hours time off since their previous shift, all such time shall be a continuation of shift and paid at the applicable overtime rate until such time as the employee has had a break of eight (8) hours.

Multiple Shift Operations: When the first shift of a multiple shift (a two or three shift) operation is started at the basic straight time rate or at a specific overtime rate, all shifts of that day's operation shall be completed at that rate. Special Shifts: The Special Shift Premium is the basic hourly rate of pay plus $2.00 an hour. When due to conditions beyond the control of the employer or when an owner (not acting as the contractor), a government agency or the contract specifications require more than four (4) hours of a special shift can only be performed outside the normal 6am to 6pm shift then the special shift premium will be applied to the basic straight time for the entire shift. When an employee works on a special shift, they shall be paid the special shift premium for each hour worked unless they are in overtime or double-time status. (For example, the special shift premium does not waive the overtime requirements for work performed on Saturday or Sunday).

U. The first four (4) hours after eight (8) regular hours Monday through Friday and the first twelve (12) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. (Except on makeup days if work is lost due to inclement weather, then the first eight (8) hours on Saturday may be paid the regular rate.) All hours worked over twelve (12) hours Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

Overtime Codes Continued

4. X. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage. Work performed outside the normal shift of 6 am to 6pm shall be paid at one and one-half the straight time rate, (except for special shifts or three shift operations). All work performed on Sundays and holidays shall be paid at double the hourly rate of wage. Shifts may be established when considered necessary by the Employer.

   The Employer may establish shifts consisting of eight (8) or ten (10) hours of work (subject to WAC 296-127-022), that shall constitute a normal forty (40) hour work week. The Employer can change from a 5-eight to a 4-ten hour schedule or back to the other. All hours of work on these shifts shall be paid for at the straight time hourly rate. Work performed in excess of eight hours (or ten hours per day (subject to WAC 296-127-022) shall be paid at one and one-half the straight time rate.

   When due to conditions beyond the control of the Employer, or when contract specifications require that work can only be performed outside the regular day shift, then by mutual agreement a special shift may be worked at the straight time rate, eight (8) hours work for eight (8) hours pay. The starting time shall be arranged to fit such conditions of work.

   When an employee returns to work without at a break of eight (8) hours since their previous shift, all such time shall be a continuation of shift and paid at the applicable overtime rate until such time as the employee has had a break of eight (8) hours.

Overtime Codes Continued

11. ALL HOURS WORKED IN EXCESS OF EIGHT (8) HOURS PER DAY OR FORTY (40) HOURS PER WEEK SHALL BE PAID AT ONE AND ONE-HALF TIMES THE HOURLY RATE OF WAGE.

   B After an employee has worked eight (8) hours, all additional hours worked shall be paid at the applicable overtime rate until such time as the employee has had a break of eight (8) hours or more.

   C The first two (2) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other overtime hours worked, except Labor Day, and all hours on Sunday shall be paid at double the hourly rate of wage. All hours worked on Labor Day shall be paid at three times the hourly rate of wage. All non-overtime and non-holiday hours worked between 4:00 pm and 5:00 am, Monday through Friday, shall be paid at a premium rate of 15% over the hourly rate of wage.

   D. All hours worked on Saturdays and holidays shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays shall be paid at double the hourly rate of wage.

   After an employee has worked eight (8) hours, all additional hours worked shall be paid at the applicable overtime rate until such time as the employee has had a break of eight (8) hours or more.

   E. The first two (2) hours after eight (8) regular hours Monday through Friday, the first ten (10) hours on Saturday, and the first ten (10) hours worked on Holidays shall be paid at one and one-half times the hourly rate of wage. All hours worked over ten (10) hours Monday through Saturday, and Sundays shall be paid at double the hourly rate of wage.

   After an employee has worked eight (8) hours, all additional hours worked shall be paid at the applicable overtime rate until such time as the employee has had a break of eight (8) hours or more.

Overtime Codes Continued

11. F. The first two (2) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other hours worked Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

On a four-day, ten-hour weekly schedule, either Monday thru Thursday or Tuesday thru Friday schedule, all hours worked after ten shall be paid at double the hourly rate of wage. The Monday or Friday not utilized in the normal four-day, ten hour work week, and Saturday shall be paid at one-half times the hourly rate of wage for the first eight (8) hours. All other hours worked Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

G. Work performed in excess of eight (8) hours of straight time per day, or ten (10) hours of straight time per day when four ten (10) hour shifts are established, or forty (40) hours of straight time per week, Monday through Friday, or outside the normal 5 am to 6pm shift, and all work on Saturdays shall be paid at one and one-half times the hourly rate of wage.

All work performed after 6:00 pm Saturday to 5:00 am Monday and Holidays, and all hours worked in excess of twelve (12) hours in a single shift shall be paid at double the hourly rate of wage.

After an employee has worked eight (8) hours at an applicable overtime rate, all additional hours shall be at the applicable overtime rate until such time as the employee has had a break of nine (9) hours or more. When an employee returns to work without at least nine (9) hours time off since their previous shift, all such time shall be a continuation of shift and paid at the applicable overtime rate until he/she shall have the nine (9) hours rest period.

H. Work performed in excess of eight (8) hours of straight time per day, or ten (10) hours of straight time per day when four ten (10) hour shifts are established, or forty (40) hours of straight time per week, Monday through Friday, or outside the normal 5 am to 6pm shift, and all work on Saturdays shall be paid at one and one-half times the hourly rate of wage.

All work performed after 6:00 pm Saturday to 5:00 am Monday and Holidays, and all hours worked in excess of twelve (12) hours in a single shift shall be paid at double the hourly rate of wage.

After an employee has worked eight (8) hours at an applicable overtime rate, all additional hours shall be at the applicable overtime rate until such time as the employee has had a break of ten (10) hours or more. When an employee returns to work without at least ten (10) hours time off since their previous shift, all such time shall be a continuation of shift and paid at the applicable overtime rate until he/she shall have the ten (10) hours rest period.

J. All hours worked on holidays shall be paid at double the hourly rate of wage.

K. On Monday through Friday hours worked outside 4:00 am and 5:00 pm, and the first two (2) hours after eight (8) hours worked shall be paid at one and one-half times the hourly rate. All hours worked over 10 hours per day Monday through Friday, and all hours worked on Saturdays, Sundays, and Holidays worked shall be paid at double the hourly rate of wage.

L. An employee working outside 5:00 am and 5:00 pm shall receive an additional two dollar ($2.00) per hour for all hours worked that shift. All hours worked on holidays shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid at one and one-half times the hourly rate of wage.

Overtime Codes Continued

11. M. On Monday through Friday, the first four (4) hours of overtime after eight (8) hours of straight time work shall be paid at one and one half (1-1/2) times the straight time rate of pay, unless a four (4) day ten (10) hour workweek has been established. On a four (4) day ten (10) hour workweek scheduled Monday through Thursday, or Tuesday through Friday, the first two (2) hours of overtime after ten (10) hours of straight time work shall be paid at one and one half (1-1/2) times the straight time rate of pay.

Work performed outside the normal work hours of 5:00 a.m. and 6:00 p.m. shall be paid at one and one-half (1-1/2) times the straight time rate, (except for special shifts or multiple shift operations). When the first shift of a multiple shift (a two or three shift) operation is started at the basic straight time rate or at a specific overtime rate, all shifts of that day's operation shall be completed at that rate. When due to conditions beyond the control of the Employer or when contract specifications require that work can only be performed outside the regular day shift of 5:00 am to 6:00 pm, then a special shift may be worked at the straight time rate, plus the shift pay premium when applicable. The starting time of work will be arranged to fit such conditions of work. Such shift shall consist of eight (8) hours work for eight (8) hours pay or ten (10) hours work for ten (10) hours pay for four ten shifts.

On Saturday, the first twelve (12) hours of work shall be paid at one and one half (1-1/2) times the straight time rate of pay. All work performed after 6:00 pm Saturday to 5:00 am Monday, all work performed over twelve (12) hours, and all work performed on holidays shall be paid at double the straight time rate of pay.

Shift Pay Premium: In an addition to any overtime already required, all hours worked between the hours of 6:00 pm and 5:00 am shall receive an additional two dollars ($2.00) per hour.

N. All work performed over twelve hours in a shift and all work performed on Sundays and Holidays shall be paid at double the straight time rate.

Any time worked over eight (8) hours on Saturday shall be paid double the straight time rate, except employees assigned to work six 10-hour shifts per week shall be paid double the straight time rate for any time worked on Saturday over 10 hours.

O. All work performed on Saturdays, Sundays, and Holidays shall be paid at one and one half (1-1/2) times the straight time rate of pay.

Overtime Codes Continued

11. P. Work performed in excess of ten (10) hours of straight time per day when four ten (10) hour shifts are established and all work on Saturdays, except for make-up days shall be paid at time and one-half (1 ½) the straight time rate.

Work performed outside the normal work hours of 5:00 a.m. and 6:00 p.m. shall be paid at one and one-half (1-1/2) times the straight time rate, (except for special shifts or multiple shift operations). When the first shift of multiple shift (a two or three shift) operation is started at the basic straight time rate or at a specific overtime rate, all shifts of that day's operation shall be completed at that rate. When due to conditions beyond the control of the Employer or when contract specifications require that work can only be performed outside the regular day shift of 5:00 a.m. to 6:00 p.m., then a special shift may be worked at the straight time rate, plus the shift pay premium when applicable. The starting time of work will be arranged to fit such conditions of work. Such shifts shall consist of eight (8) hours work for eight (8) hours pay or ten (10) hours work for ten (10) hours pay for four ten-hour shifts.

In the event the job is down due to weather conditions, then Saturday may, be worked as a voluntary make-up day at the straight time rate. However, Saturday shall not be utilized as a make-up day when a holiday falls on Friday. All work performed on Sundays and holidays and work in excess of twelve (12) hours per day shall be paid at double (2x) the straight time rate of pay.

After an employee has worked eight (8) hours at an applicable overtime rate, all additional hours shall be at the applicable overtime rate until such time as the employee has had a break of eight (8) hours.

When an employee returns to work without a break of eight (8) hours since their previous shift, all such time shall be a continuation of shift and paid at the applicable overtime rate until such time as the employee has had a break of eight (8) hours.

Q. All hours worked between the hours of 6:00 pm and 6:00 am, Monday through Saturday, shall be paid at a premium rate of 35% over the hourly rate of wage. Work performed on Sundays shall be paid at double time. All hours worked on holidays shall be paid at double the hourly rate of wage.

R On Monday through Saturday hours worked outside 6:00 am and 7:00 pm, and all hours after eight (8) hours worked shall be paid at one and one-half times the hourly rate. All hours worked on Sundays and Holidays shall be paid at double the hourly rate of wage.

When a holiday falls on a Saturday, the Friday before shall be the observed holiday. When a holiday falls on a Sunday, the following Monday shall be the observed holiday.

S. The first ten (10) hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. In the event the job is down due to weather conditions, or other conditions beyond the control of the Employer, then Saturday may be worked at the straight time rate, for the first eight (8) hours, or the first ten (10) hours when a four day ten hour workweek has been established.

All hours worked Monday through Saturday over twelve (12) hours and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

When an employee returns to work without a break of eight (8) hours since their previous shift, all such time shall be a continuation of shift and paid at the applicable overtime rate until such time as the employee has had a break of eight (8) hours.

Holiday Codes

5. A. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday after Thanksgiving Day, and Christmas Day (7).

B. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday after Thanksgiving Day, the day before Christmas, and Christmas Day (8).

C. Holidays: New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, And Christmas Day (8).

D. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, And Christmas Day (8).

H. Holidays: New Year's Day, Memorial Day, Independence Day, Thanksgiving Day, the Day after Thanksgiving Day, And Christmas (6).

I. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day (6).

K. Holidays: New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday After Thanksgiving Day, The Day Before Christmas, And Christmas Day (9).

L. Holidays: New Year's Day, Martin Luther King Jr. Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday after Thanksgiving Day, And Christmas Day (8).

N. Holidays: New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, The Friday After Thanksgiving Day, And Christmas Day (9).

P. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday And Saturday After Thanksgiving Day, The Day Before Christmas, And Christmas Day (9). If A Holiday Falls On Sunday, The Following Monday Shall Be Considered As A Holiday.

Q. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day (6).

R. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Day After Thanksgiving Day, One-Half Day Before Christmas Day, And Christmas Day. (7 1/2).

S. Paid Holidays: New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, And Christmas Day (7).

Z. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, the Friday after Thanksgiving Day, And Christmas Day (8).

Holiday Codes Continued

6. G. Paid Holidays: New Year's Day, Martin Luther King Jr. Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, and Christmas Eve Day (11).

H. Paid Holidays: New Year's Day, New Year's Eve Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday After Thanksgiving Day, Christmas Day, The Day After Christmas, And A Floating Holiday (10).

T. Paid Holidays: New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, The Friday After Thanksgiving Day, The Last Working Day Before Christmas Day, And Christmas Day (9).

Z. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday after Thanksgiving Day, And Christmas Day (7). If a holiday falls on Saturday, the preceding Friday shall be considered as the holiday. If a holiday falls on Sunday, the following Monday shall be considered as the holiday.

Holiday Codes Continued

7. A. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, And Christmas Day (8). Any Holiday Which Falls On A Sunday Shall Be Observed As A Holiday On The Following Monday. If any of the listed holidays falls on a Saturday, the preceding Friday shall be a regular work day.

B. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, And Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

C. Holidays: New Year's Day, Martin Luther King Jr. Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, And Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

D. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, the Friday after Thanksgiving Day, And Christmas Day (8). Unpaid Holidays: President's Day. Any paid holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any paid holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

E. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, And Christmas Day (7). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

F. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, the last working day before Christmas day and Christmas day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

Holiday Codes Continued

7. G. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day (6). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday.

H. Holidays: New Year's Day, Martin Luther King Jr. Day, Independence Day, Memorial Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, the Last Working Day before Christmas Day and Christmas Day (9). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

I. Holidays: New Year's Day, President's Day, Independence Day, Memorial Day, Labor Day, Thanksgiving Day, The Friday After Thanksgiving Day, The Day Before Christmas Day And Christmas Day (9). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

J. Holidays: New Year's Day, Independence Day, Memorial Day, Labor Day, Thanksgiving Day and Christmas Day (6). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

K. Holidays: New Year's Day, Memorial Day, Independence Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, And Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

L. Holidays: New Year's Day, Memorial Day, Labor Day, Independence Day, Thanksgiving Day, the Last Work Day before Christmas Day, And Christmas Day (7). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

N. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, And Christmas Day (7). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. When Christmas falls on a Saturday, the preceding Friday shall be observed as a holiday.

P. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday after Thanksgiving Day, And Christmas Day (7). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday.

Q. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, the Last Working Day before Christmas Day and Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. If any of the listed holidays falls on a Saturday, the preceding Friday shall be a regular work day.

S. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday after Thanksgiving Day, Christmas Day, the Day after Christmas, and A Floating Holiday (9). If any of the listed holidays falls on a Sunday, the day observed by the Nation shall be considered a holiday and compensated accordingly.

V. Holidays: New Year's Day, President's Birthday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, the day before or after Christmas, and the day before or after New Year's Day. If any of the above listed holidays falls on a Sunday, the day observed by the Nation shall be considered a holiday and compensated accordingly.

W. Holidays: New Year's Day, Day After New Year's, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Eve Day, Christmas Day, the day after Christmas, the day before New Year's Day, and a Floating Holiday.

Holiday Codes Continued

7. X. Holidays: New Year's Day, Day before or after New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, and the day before or after Christmas day. If a holiday falls on a Saturday or on a Friday that is the normal day off, then the holiday will be taken on the last normal workday. If the holiday falls on a Monday that is the normal day off or on a Sunday, then the holiday will be taken on the next normal workday.

Y. Holidays: New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, and Christmas Day. (8) If the holiday falls on a Sunday, then the day observed by the federal government shall be considered a holiday and compensated accordingly.

Z. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, Christmas Eve, and Christmas Day (9). Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday. Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday.

Holiday Codes Continued

15. G. New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, The Friday After Thanksgiving Day, the last scheduled workday before Christmas, and Christmas Day (9). If any of the listed holidays falls on a Sunday, the day observed by the Nation shall be considered a holiday and compensated accordingly.

H. Holidays: New Year's Day, Martin Luther King Jr. Day, Independence Day, Memorial Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, the Last Working Day before Christmas Day and Christmas Day (9). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

I. Holidays: New Year's Day, President's Day, Independence Day, Memorial Day, Labor Day, Thanksgiving Day, The Friday After Thanksgiving Day, The Day Before Christmas Day And Christmas Day (9). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

J. Holidays: New Year's Day, Martin Luther King Jr. Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, and Christmas Day (9). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. If any of the listed holidays falls on a Saturday, the preceding Friday shall be a regular work day.

K. Holidays: New Year's Day, Memorial Day, Independence Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, And Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

L. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, the Friday after Thanksgiving Day, and Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. If any of the listed holidays falls on a Saturday, the preceding Friday shall be a regular work day.

M. Holidays: New Year's Day, Martin Luther King Jr. Day, Independence Day, Memorial Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Eve Day and Christmas Day (9). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. If any of the listed holidays falls on a Saturday, the preceding Friday shall be a regular work day.

Holiday Codes Continued

15. N. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, the Friday after Thanksgiving Day, and Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday.

O. Holidays: New Year's Day, Martin Luther King Jr. Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, the day before Christmas day, and Christmas Day (10). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday.

Note Codes

8. D. Workers working with supplied air on hazmat projects receive an additional $1.00 per hour.

L. Workers on hazmat projects receive additional hourly premiums as follows -Level A: $0.75, Level B: $0.50, And Level C: $0.25.

M. Workers on hazmat projects receive additional hourly premiums as follows: Levels A & B: $1.00, Levels C & D: $0.50.

N. Workers on hazmat projects receive additional hourly premiums as follows -Level A: $1.00, Level B: $0.75, Level C: $0.50, And Level D: $0.25.

S. Effective August 31, 2012 – A Traffic Control Supervisor shall be present on the project whenever flagging or spotting or other traffic control labor is being utilized. Flaggers and Spotters shall be posted where shown on approved Traffic Control Plans or where directed by the Engineer. All flaggers and spotters shall possess a current flagging card issued by the State of Washington, Oregon, Montana, or Idaho. This classification is only effective on or after August 31, 2012.

T. Effective August 31, 2012 – A Traffic Control Laborer performs the setup, maintenance and removal of all temporary traffic control devices and construction signs necessary to control vehicular, bicycle, and pedestrian traffic during construction operations. Flaggers and Spotters shall be posted where shown on approved Traffic Control Plans or where directed by the Engineer. All flaggers and spotters shall possess a current flagging card issued by the State of Washington, Oregon, Montana, or Idaho. This classification is only effective on or after August 31, 2012.

U. Workers on hazmat projects receive additional hourly premiums as follows – Class A Suit: $2.00, Class B Suit: $1.50, And Class C Suit: $1.00. Workers performing underground work receive an additional $0.40 per hour for any and all work performed underground, including operating, servicing and repairing of equipment. The premium for underground work shall be paid for the entire shift worked. Workers who work suspended by a rope or cable receive an additional $0.50 per hour. The premium for work suspended shall be paid for the entire shift worked. Workers who do "pioneer" work (break open a cut, build road, etc.) more than one hundred fifty (150) feet above grade elevation receive an additional $0.50 per hour.

Note Codes Continued

8. V. In addition to the hourly wage and fringe benefits, the following depth and enclosure premiums shall be paid. The premiums are to be calculated for the maximum depth and distance into an enclosure that a diver reaches in a day. The premiums are to be paid one time for the day and are not used in calculating overtime pay.

   Depth premiums apply to depths of fifty feet or more. Over 50' to 100' - $2.00 per foot for each foot over 50 feet. Over 101' to 150' - $3.00 per foot for each foot over 101 feet. Over 151' to 220' - $4.00 per foot for each foot over 220 feet. Over 221' - $5.00 per foot for each foot over 221 feet.

   Enclosure premiums apply when divers enter enclosures (such as pipes or tunnels) where there is no vertical ascent and is measured by the distance travelled from the entrance. 25’ to 300’ - $1.00 per foot from entrance. 300’ to 600’ - $1.50 per foot beginning at 300’. Over 600’ - $2.00 per foot beginning at 600’.

   W. Meter Installers work on single phase 120/240V self-contained residential meters. The Lineman/Groundmen rates would apply to meters not fitting this description.

   X. Workers on hazmat projects receive additional hourly premiums as follows - Class A Suit: $2.00, Class B Suit: $1.50, Class C Suit: $1.00, and Class D Suit: $0.50. Special Shift Premium: Basic hourly rate plus $2.00 per hour.

   When due to conditions beyond the control of the Employer or when an owner (not acting as the contractor), a government agency or the contract specifications requires that work can only be performed outside the normal 5 am to 6pm shift, then the special shift premium will be applied to the basic hourly rate. When an employee works on a special shift, they shall be paid a special shift premium for each hour worked unless they are in OT or Double-time status. (For example, the special shift premium does not waive the overtime requirements for work performed on Saturday or Sunday.)

   Y. Tide Work: When employees are called out between the hours of 6:00 p.m. and 6:00 a.m. to work on tide work (work located in the tide plane) all time worked shall be at one and one-half times the hourly rate of pay.

   Swinging Stage/Boatswains Chair: Employees working on a swinging state or boatswains chair or under conditions that require them to be tied off to allow their hands to be free shall receive seventy-five cents ($0.75) per hour above the classification rate.

   Z. Workers working with supplied air on hazmat projects receive an additional $1.00 per hour.

   Special Shift Premium: Basic hourly rate plus $2.00 per hour. When due to conditions beyond the control of the Employer or when an owner (not acting as a contractor), a government agency or the contract specifications require that more than (4) hours of a special shift can only be performed outside the normal 6 am to 6pm shift, then the special shift premium will be applied to the basic straight time for the entire shift. When an employee works on a special shift, they will be paid a special shift premium for each hour worked unless they are in overtime or double-time status. (For example, the special shift premium does not waive the overtime requirements for work performed on Saturday or Sunday.)

Note Codes Continued

9. A. Workers working with supplied air on hazmat projects receive an additional $1.00 per hour.

Special Shift Premium: Basic hourly rate plus $2.00 per hour. When due to conditions beyond the control of the Employer or when an owner (not acting as the contractor), a government agency or the contract specifications require that more than four (4) hours of a special shift can only be performed outside the normal 6 am to 6pm shift, then the special shift premium will be applied to the basic straight time for the entire shift. When an employee works on a special shift, they shall be paid a special shift premium for each hour worked unless they are in overtime or double-time status. (For example, the special shift premium does not waive the overtime requirements for work performed on Saturday or Sunday.)

Certified Crane Operator Premium: Crane operators requiring certifications shall be paid $0.50 per hour above their classification rate.

Boom Pay Premium: All cranes including tower shall be paid as follows based on boom length:

(A) – 130’ to 199’ – $0.50 per hour over their classification rate.
(B) – 200’ to 299’ – $0.80 per hour over their classification rate.
(C) – 300’ and over – $1.00 per hour over their classification rate.

B. The highest pressure registered on the gauge for an accumulated time of more than fifteen (15) minutes during the shift shall be used in determining the scale paid.

Tide Work: When employees are called out between the hours of 6:00 p.m. and 6:00 a.m. to work on tide work (work located in the tide plane) all time worked shall be at one and one-half times the hourly rate of pay. Swinging Stage/Boatswains Chair: Employees working on a swinging stage or boatswains chair or under conditions that require them to be tied off to allow their hands to be free shall receive seventy-five cents ($0.75) per hour above the classification rate.

C. Tide Work: When employees are called out between the hours of 6:00 p.m. and 6:00 a.m. to work on tide work (work located in the tide plane) all time worked shall be at one and one-half times the hourly rate of pay. Swinging Stage/Boatswains Chair: Employees working on a swinging stage or boatswains chair or under conditions that require them to be tied off to allow their hands to be free shall receive seventy-five cents ($0.75) per hour above the classification rate.

Effective August 31, 2012 – A Traffic Control Supervisor shall be present on the project whenever flagging or spotting or other traffic control labor is being utilized. A Traffic Control Laborer performs the setup, maintenance and removal of all temporary traffic control devices and construction signs necessary to control vehicular, bicycle, and pedestrian traffic during construction operations. Flaggers and Spotters shall be posted where shown on approved Traffic Control Plans or where directed by the Engineer. All flaggers and spotters shall possess a current flagging card issued by the State of Washington, Oregon, Montana, or Idaho. These classifications are only effective on or after August 31, 2012.

D. Industrial Painter wages are required for painting within industrial facilities such as treatment plants, pipelines, towers, dams, bridges, power generation facilities and manufacturing facilities such as chemical plants, etc., or anywhere abrasive blasting is necessary to prepare surfaces, or hazardous materials encapsulation is required.

E. Heavy Construction includes construction, repair, alteration or additions to the production, fabrication or manufacturing portions of industrial or manufacturing plants, hydroelectric or nuclear power plants and atomic reactor construction. Workers on hazmat projects receive additional hourly premiums as follows -Level A: $1.00, Level B: $0.75, Level C: $0.50, And Level D: $0.25.

Note Codes Continued

9. F. Industrial Painter wages are required for painting within industrial facilities such as treatment plants, pipelines, towers, dams, power generation facilities and manufacturing facilities such as chemical plants, etc., or anywhere abrasive blasting is necessary to prepare surfaces, or hazardous materials encapsulation is required.

H. One (1) person crew shall consist of a Party Chief. (Total Station or similar one (1) person survey system). Two (2) person survey party shall consist of a least a Party Chief and a Chain Person. Three (3) person survey party shall consist of at least a Party Chief, an Instrument Person, and a Chain Person.

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Procedures for preparation and submittal of the Schedule of Values.

1.02 SUBMITTALS

A. Contractor shall submit an initial Schedule of Values per the Pre-Construction Submittal Requirements of Section 01 33 00.

B. Contractor shall submit supporting documentation justifying the amounts in the Schedule of Values if requested by Owner.

1.03 SCHEDULE OF VALUES

A. Contractor shall submit a typed schedule on Owner's form. Once approved, Contractor shall not revise the Schedule of Values without prior approval by Owner.

B. Format:

1. Separate each category of Work into a separate line item.
2. List all major Work activities indicated on the Progress Schedule.
3. Separate floors, phases, and other easily recognized building divisions when appropriate.
4. Separate labor, materials and equipment for each item.
5. Identify site mobilization, demobilization, bonds, and insurance as individual line items.
6. Include a line item for close-out Work between Substantial Completion and Final Completion.
7. If applicable, include a line item for allowances. For unit cost allowances, give quantities measured from the Contract Documents multiplied by the unit cost.
8. When required by Owner, include separate line items for "separately funded Work."

END OF SECTION 01 29 73

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Preconstruction Meeting;
2. Progress Meetings; and
3. Other meetings, as requested by Owner.

1.02 PRECONSTRUCTION MEETING

A. Meeting Location: Owner will schedule a meeting prior to the start of construction. The purpose of this meeting is to review Contract administration requirements and mobilization procedures. Attendance is required for the following:

1. Architect/Engineer and design Subconsultants;
2. Contractor's Superintendent and Project Manager;
3. Representative of major Subcontractors, as appropriate;
4. Others, as appropriate.

B. Owner’s Designated Representative shall:

1. Preside over and conduct meeting.
2. Record, reproduce, and distribute copies of minutes within 7 Days of the meeting to all meeting participants.

C. Agenda for the meeting will include at a minimum:

1. The Work;
2. Progress Schedule, including Work sequence, phasing, and occupancy requirements;
3. Communications chain and persons authorized to direct changes;
4. Use of the Project site;
5. Special Project procedures;
6. Procedures and processing:
    a. Application for Payments and Schedule of Values;
    b. Contract Change Proposals (CCP), Work Directive (WD);
    c. Change Orders (CO);

d. Requests for Information (RFI);

e. Submittals; and

f. Others as appropriate.

7. Project Record;
8. Construction facilities, controls, and construction aids;
9. Temporary utilities;
10. Security procedures;
11. Safety and first-aid procedures;
12. Environmental Health and Safety;
13. Housekeeping procedures;
14. AHJ representative(s) and inspection procedures;
15. Utility shutdowns;
16. Parking;
17. Existing conditions;
18. Subcontractor list;
19. Emergency phone and keys to site;
20. Progress meeting scheduling;
21. Shipment and deliveries; and
22. Other(s) as appropriate.

1.03 PROGRESS MEETINGS

A. Progress meetings will occur as required.

B. Meeting Location: Contractor's Project field office, unless otherwise agreed.

C. Attendance: Representatives attending meetings must be qualified and authorized to act on behalf of their firms. Attendance shall include:

1. Architect/Engineer and Subconsultants, as appropriate;
2. Owner’s Designated Representatives;
3. Contractor's Superintendent and Project Manager;
4. Subcontractors, as appropriate;
5. Suppliers, as appropriate; and
6. Others, as appropriate.

D. Owner’s Designated Representative shall:

1. Administer progress and other specially scheduled meetings;

2. Record, reproduce, and distribute copies of minutes within 6 Days of meeting to all meeting participants; and

E. Contractor shall, at each meeting, provide each meeting attendant with:

1. Short-interval (look-ahead) schedule coordinated with the Progress Schedule;
2. Updated Progress Schedule, if appropriate;
3. Updated submittal log and schedules;
4. Updated RFI log;
5. Issues Log;
6. Quality Control Log; and
7. Any applicable tracking mechanisms.

F. Agenda for these meetings will include at a minimum:

1. Project safety;
2. Review and approval of minutes from previous meeting;
3. Review Work progress since previous meeting;
4. Review plans for progress for subsequent Work period and short-interval (look-ahead) schedule;
5. Review Progress Schedule;
6. Present corrective measures and procedures to regain Progress Schedule, as applicable;
7. Present field observations, problems, and conflicts;
8. Discuss RFIs;
9. Review quality control;
10. Review submittal log and schedules and present methods to expedite as required;
11. Review off-site fabrication;
12. Review delivery schedules;
13. Review coordination issues;
14. Review proposed changes for:
    a. Effect on Progress Schedule and on completion date.
    b. Effect on any other contracts of the Project.
15. Review Issues Log;

16. Review draft Application for Payment (at end of month);
17. Review Project Record; and
18. Review any other issues.

1.04 OTHER MEETINGS

A. Owner may call additional Project meetings as appropriate.

B. Meetings as required by other sections.

C. Format and agenda of these meetings will follow that of Progress Meetings unless Owner determines otherwise.

END OF SECTION 01 31 19

PART 1 GENERAL

1.01 GENERAL COMMUNICATION

A. Subcontractors: Informal communication between Owner, Owner's consultants, and other Subcontractors is permitted. If written clarification or direction is required to resolve questions, transmit questions in writing using a Request for Information (RFI) through the Contractor to Owner.

B. In case of an EMERGENCY, dial 9-1-1 if appropriate; otherwise, contact Owner's Designated Representative. If he or she is not available contact Facilities Services, Capital at 509-335-9000.

1.02 CORRESPONDENCE

A. Address all correspondence to Owner's Designated Representative.

B. Contractor shall copy Architect/Engineer on all correspondence to and from Owner.

C. Include Project title and Owner Project number on all correspondence.

1.03 REQUEST FOR INFORMATION

A. When field conditions or Contract Document require clarification, a written Request for Information (RFI) must be submitted per the following:

1. Identify the nature and location of each clarification/verification using a RFI form and provide at least the following information:
    a. Project name and number;
    b. Date;
    c. Date response requested;
    d. RFI number;
    e. Subject;
    f. Initiator of the question;
    g. Indication of costs;
    h. Indication of schedule impact;
    i. Location on site;
    j. Contract Drawing reference;
    k. Contract Specification section and paragraph reference;
    l. Descriptive text;
    m. Recommended solution(s); and

n. Space for reply on same page as questions.

B. Each RFI must be limited to a single issue, but shall reference other related RFI's.

C. Route and copy RFIs in same manner as correspondence.

D. Allow a minimum of 14 Days for Owner response to RFI.

1.04 NONCONFORMANCE REPORT

A. Reference Document: Owner Nonconformance Report (NCR).

B. Procedure: If Contractor proceeds to install deficient Work or fails to correct Work that in the opinion of Owner fails to conform to the Contract Documents, an NCR may be issued. Upon receipt of a NCR, Contractor shall take immediate action to correct nonconforming Work. Correction of nonconforming Work will be reviewed at progress meetings.

1.05 COORDINATION

A. Special Coordination: Contractor shall:

1. On-site work scheduling must be coordinated with WSU Construction Manager and IT Systems staff.
2. Cougar Card will be required to badge into room 106. Escort will not be required for this area.
3. Protection of existing servers in room 106 to be coordinated with WSU Construction Manager and IT Systems staff.
4. Short term parking and usage of the loading dock is acceptable.
5. Elevator is available for contractor use.
6. Asbestos Safety Plan – contractor to mark out needed floor penetration. WSU EH&S to abate the floor tiles.

B. General Coordination: Contractor shall:

1. Coordinate with Work of other sections to ensure that all fixtures, devices, switches, outlets, ducts, pipes, and similar items can be installed as shown without modifications to framing. Provide all blockouts, raceways and similar framing, as required;
2. Coordinate the Work and not delegate responsibility for coordination to any Subcontractor. Contractor must make available to each Subcontractor, prior to the execution of each Subcontract, copies of the Contract Documents to which the Subcontractor will be bound. Subcontractor will similarly make copies of the Contract Documents available to their respective lower-tier Subcontractors. Contractor must provide Owner copies of the written agreements between Contractor and

any Subcontractor upon request;

3. Anticipate interrelationship of all Subcontractors and their relationship with the total Work;

4. Resolve differences or disputes between Subcontractors and materials suppliers concerning coordination, interference, or extent of Work between sections;

5. Be in charge of and responsible for the Work and the Project site, including directing and scheduling all Work; and

6. Cooperate with Separate Contractors. Work by others may be occurring within the building or at locations adjacent or near to the Project site. Contractor must cooperate with all such work.

C. Mechanical and Electrical Coordination: Contractor shall:

1. Resolve all “tight”, restricted, or inaccessible areas involving Work of various disciplines in advance of installation.

2. If necessary, and before Work proceeds in these areas, prepare coordination drawings for review showing all Work in “tight”, restricted, or inaccessible areas.

3. Provide coordination drawings necessary to resolve “tight”, restricted, or inaccessible areas, at no increase in Contract Sum.

D. Job Site Field Measurements and Templates: Contractor shall:

1. Obtain field measurements required for accurate fabrication and installation of Work. Exact measurements are Contractor’s responsibility.

2. Furnish or obtain templates, patterns, and setting instructions as required for installation of all Work. Contractor shall verify in field, as needed.

E. Contractor Badging:

1. All employees of Contractor and Subcontractors, vendors, or consultants retained by Contractor must obtain a Facilities Services Contractor Identification (ID) badge if they will be performing Work on the Pullman campus of Washington State University.

   a. ID badges issued for prior Facilities Services projects are valid provided the employee/employer information is still correct and the ID badge has not expired.

2. Facilities Services will issue the Contractor an authorization memorandum necessary to obtain ID badges. Contractor will be responsible for providing copies of the authorization letter to appropriate Subcontractors, consultants, and vendors for use in procuring ID badges for their employees.

3. ID badges will be issued by the Cougar Card Center located on the

ground floor of the Compton Union Building (CUB). Employees are required to appear in person so pictures and signatures may be obtained.

a. To receive an ID badge, each employee will be required to present a copy of the authorization letter issued by Facilities Services, a form of picture identification, the name of their current employer and a payment of $10.00.

b. The maximum effective period for an ID badge is 24 months.

c. When ID badges expire, if they are lost or stolen, or if the individual changes employers, the ID badge is no longer valid and the employee is required to obtain a new ID badge through the standard authorization process.

4. A valid ID badge must be worn by all employees in full view above the waist at all times when working at the Pullman campus of Washington State University.

   a. Contractor shall enforce Owner's ID badge policy at all times at the Project site.

5. Subject to Owner review and approval, Contractor may acquire and maintain a limited number of temporary ID badges from Owner to utilize for short duration visits by employees for whom repeat visits are not anticipated. Contractor shall maintain a log indicating the date, time issued/returned, employee name, and employer for all temporary badges. The temporary ID badges shall display "Facilities Services Contractor, Temporary Badge", Contractor's name, and a number unique to that particular temporary ID badge.

6. Contractor ID badges will not function as Cougar Cards. Individuals may obtain a Cougar Card as a "community member" but those cards will not be considered an acceptable substitute for the requirement to obtain and display an ID badge.

7. ID badge expenses:

   a. On projects with a Guaranteed Maximum Price (GMP) the expense for ID badges may be considered a Cost of the Work.

   b. On fixed price contracts, Contractor shall include any and all expenses related to ID badges in its bid, including the actual cost of each badge. These costs will be included in the Contract Sum and not separately reimbursable.

END OF SECTION 01 31 23

PART 1 GENERAL

1.01 SUMMARY

A. This Section specifies the administrative and procedural requirements to comply with the requirements of the General Conditions regarding preparation of Contractor's Progress Schedules, monthly update to the Progress Schedules, and other schedules as specified herein. The purposes of these schedules and reports are to:

1. Ensure adequate planning and execution of the Work by Contractor;
2. Establish a standard against which progress of the Work can be tracked;
3. Assist in monitoring progress;
4. Evaluate the impact of any changes to the Contract; and
5. Support the basis for progress payments.

B. All schedule submittals including updated Progress Schedules will be reviewed by Owner for compliance with Contract terms and the needs of the University. Review of any schedule does not constitute approval or acceptance of Contractor's construction means, methods, or sequencing, or an assessment by Owner of Contractor's ability to complete the Work within the Contract Time.

1.02 WORK INCLUDED

A. Contractor shall submit a preliminary Progress Schedule, as required by the Pre-Construction Submittal Requirements of Section 01 33 00.

B. Contractor shall prepare and submit Progress Schedules and reports as required by this Section. NOTE: Processing and payment of the second Application for Payment is contingent upon receipt, review, and subsequent acceptance of the updated Progress Schedule.

C. Contractor shall participate in monthly scheduling meetings and provide updated Progress Schedules as require by this Section.

D. Contractor shall perform Contemporaneous Period Analysis (CPA) of any delays associated with the critical path schedule as required by this Section.

E. Contractor shall provide weekly Short-Interval (look-ahead) schedules as required by this Section.

F. Contractor shall submit a Submittal Schedule as required by this Section.

1.03 PRELIMINARY PROGRESS SCHEDULE

A. Contractor shall submit a preliminary Progress Schedule as part of the Pre-

Construction Submittal Requirements in Section 01 33 00 - Submittals. The schedule shall include activity description, activity start and end dates. The schedule shall emphasize milestone dates and date of Substantial Completion. Schedule shall clearly identify the critical path schedule elements.

B. Progress Schedule shall be in Bar Chart format.

C. Schedule activities longer than 14 days shall be sufficiently detailed.

D. Participate in schedule update meetings and provide updated Progress Schedules.

1.04 CONTRACTOR'S PROGRESS SCHEDULE

A. Within three calendar days of receiving WSU comments on the preliminary Progress (Bar Chart) Schedule, the Contractor shall prepare and submit a detailed Progress (Bar Chart) Schedule. This schedule shall be the Contractor's as-planned schedule and shall be used to plan, organize, and execute the Work, record and report actual performance and progress through updates, as well as show how the Contractor plans to complete all remaining Work. The accepted Contractor's Progress (Bar Chart) Schedule and subsequent updates shall be the basis for consideration and analysis of requests for time extensions.

B. The Contractor shall submit the Progress Schedule, consisting of the reports and diagrams as specified by this subsection, in the following formats quantities:

1. Electronic PDF file of all reports, schedules, etc.
2. Native electronic copy of the CPM Progress Schedule.

C. Float: Contractor is not entitled to any adjustment in the Contract Time or the Contract Sum, or to any additional payment or equitable adjustment of any sort, by reason of the loss or the use of any float time, including time between Contractor’s anticipated completion date and the end of the Contract Time, whether or not the float time is described as such on the Progress Schedule.

D. Qualifications: Contractor shall submit the resume(s) of the person(s) designated as responsible for schedules and reports (the Contractor's scheduler) Prior to commencing construction activities. Contractor's scheduler shall have demonstrable capability to plan, coordinate, execute, and monitor a CPM schedule as required for this Project. Owner’s Designated Representative will approve or disapprove the Contractor's proposed scheduler. In the event of disapproval, a new scheduler shall be proposed within 7 Days and be subject to the same consideration criteria as noted above.

1.05 MONTHLY UPDATES

A. Contractor shall prepare and submit updated Progress Schedules and participate in schedule update meetings with the Owner each month. Participation in the meeting and submission of the monthly update is a condition precedent for

payment of the line item value for scheduling Work.

1. Updated monthly schedule submittals:
   a. A PDF electronic version of complete Project schedule showing the critical path accompanied by a narrative of any deviations from the previous month.
   b. Electronic schedule file in native format.
   c. Short-interval schedules or look-ahead schedules shall not be an acceptable submittal.

B. Contractor shall prepare an update of the current Progress Schedule each month to reflect Work progress achieved since the previous update. Progress updating shall be performed without changes to the schedule logic or the original duration of activities. Monthly progress updating is required and necessary prior to performing a Contemporaneous Period Analysis of any change to the calculated completion date from the prior update.

C. Contractor may, in a second report, incorporate any logic and duration changes that represent revised planning. All such changes must be clearly identified and submitted for acceptance.

D. The Progress Schedule must clearly identify the current Substantial and Final Completion dates.

E. Contractor shall account for all adverse weather days and similar excusable noncompensable delays. By whatever method Contractor chooses to account for such delays and events, a narrative description and CPA of the accounting shall be included with the narrative report.

F. Monthly schedule update meetings:

1. Monthly schedule update meetings shall be held at Contractor's Project field office one week prior to the due date of Contractor’s monthly Application for Payment, unless otherwise agreed.
2. The Contractor shall provide updated Project schedule submittals.
3. The Contractor shall also provide a narrative report including:
   a. A description of the Work accomplished during the preceding period;
   b. A discussion of the Work that had been scheduled to be performed during the previous period but was not, and explain why it was not performed; and
   c. A discussion of the Work scheduled for the upcoming period noting any issues or events that could impact this Work. If Contractor intends to make logic or original activity duration changes, the report must specifically identify such changes.
4. Contractor, Owner, and Architect/Engineer will review these reports and will discuss any differences or issues raised. No contractual completion

dates will be modified except by approved Change Order.

G. Timely submission of updates is of significant and crucial importance to the Project. Owner may withhold payment as per Section 01 29 00 Applications for Payment.

1.06 THE CONTEMPORANEOUS PERIOD ANALYSIS

A. It is Owner's intent to resolve all issues affecting the Contract completion date in a timely, efficient and effective manner. To achieve this goal, and in addition to contractor's obligation to follow the contractual dispute resolution procedure, Contractor shall analyze any delays to the critical path or completion date by application of the Contemporaneous Period Analysis method. A CPA shall normally coincide with the monthly schedule update meetings.

B. Assessment of impacts due to changes or other events, in accordance with the CPA method, must be based on the most recent accepted updated Progress Schedule. No logic or duration changes shall be made to updates until progress related data has been incorporated into the Progress Schedule and the Progress Schedule is updated to reflect actual progress for the period. All data shall be provided to Owner.

C. Submission of an accurate and properly updated Progress Schedule and completion of the Contemporaneous Period Analysis are conditions precedent to the review and approval of any request for an extension in the Contract Time. Owner may assess liquidated damages, if any, regardless of the status of any requests for time extensions pending, until any such requests are resolved.

D. The process for preparing and submitting a CPA is as follows:

1. Contractor will notify Owner in writing of event(s) or occurrence(s) which constitute a delay of the critical path or completion date affecting progress of the Work.
2. Contractor shall evaluate the event(s) or occurrence(s) and produce a narrative of the resulting delay describing the effect upon concurrent or logically connected subsequent activities.
3. Consistent with the narrative, Contractor shall produce a subnet to graphically describe the event(s) or occurrence(s) and the effect upon the Progress Schedule.
4. Contractor will recalculate the Progress Schedule and provide an updated PDF and Native Progress Schedule.

E. The CPA will be reviewed at the monthly schedule update meeting or at a special meeting scheduled with Owner. At the CPA review meeting, Contractor shall present the CPA and respond to questions.

F. Until and unless substantiated delay is accepted by Owner, the time effect shall not be incorporated into any monthly update. If accepted after a monthly update

in which the event(s) or occurrence(s) took place, that monthly update may be recalculated, resubmitted and shall be included in an approved Change Order.

1.07 SHORT-INTERVAL SCHEDULE

A. Prepare a weekly Short-Interval (look-ahead) Schedule based upon the Contractor's Work plan and the updated Progress Schedule.

B. Format for the Short-Interval (look-ahead) Schedule shall be acceptable to Owner. The format shall include comment annotation as necessary.

C. Content of the Short-Interval (look-ahead) Schedule shall include the Work planned for the next 3-week period and the Work that was performed in the previous week.

D. Copies of the Short-Interval (look-ahead) Schedule shall be provided at the weekly progress meetings to be used as a basis for discussion of progress and of planned Work.

1.08 SUBMITTAL SCHEDULE

A. Provide a Submittal Schedule within 10 Days of Owner’s Acceptance of the Project Schedule per Section 01 33 00 - Submittals.

PART 2 PRODUCTS

2.01 SCHEDULING SOFTWARE

A. Contractor shall utilize Microsoft Project or Primavera P6 unless otherwise agreed to by Owner.

B. Contractor shall provide a licensed and royalty pre-paid copy of the mutually agreed upon scheduling software. The selected software must be capable of performing target-to-current schedule comparisons, cost and resource loading functions and have the option of executing calculations in retained logic. Activities must be able to process lead and lag time relationships, start-to-finish or finish-to-finish relationships, and be capable of being hammocked, if required. The software must be registered with Owner and be provided in a format compatible with Owner's systems.

END OF SECTION 01 32 13

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction photography.

B. Construction photography of Work-in-progress.

1.02 GENERAL

A. Contractor shall provide photographs taken from locations coordinated with Owner.

B. Photographer: Experienced in taking construction photography.

C. Equipment: All photos shall be in digital format.

D. Video images may be acceptable for certain operations. Confirm with Owner.

PART 2 PRODUCTS

2.01 PRECONSTRUCTION PHOTOGRAPHS

A. Contractor shall provide electronic files containing photographs of the existing conditions at the site, surroundings, and haul routes per the Pre-Construction Submittal Requirements of Section 01 33 00. Coordinate with Owner the extent of the preconstruction photographic record that is required.

2.02 CONSTRUCTION PHOTOGRAPHS

A. Contractor shall provide electronic files containing photographs of construction progress on a monthly basis.

2.03 PHOTOGRAPHIC SUBMITTALS

A. Photographs shall be submitted each month during the Contract Time, or as otherwise agreed upon by Owner. The number of photographs shall be sufficient to document the site to the satisfaction of the Owner and Contractor.

B. Photographs shall be representative of Project progress, showing all major Work and any critical concealed conditions.

C. The files in each monthly photograph submittal must each be labeled with the Project name, Project number, and submittal date. Additionally, each photograph shall be dated, labeled, and accompanied by a brief description identifying the location and direction the photo was taken. Date stamp using month/date/year format.

PART 3 EXECUTION

3.01 PRECONSTRUCTION PHOTOGRAPHS

A. Coordinate the scope of preconstruction photographic record survey with Owner.

B. Take preconstruction photographs to identify and establish a baseline record of existing conditions.

C. A preconstruction photographic record survey shall include, but not be limited to, all areas that may be impacted or damaged by construction phase activities.

D. The extent or nature of the existing site and adjacent surroundings shall be thoroughly documented.

3.02 CONSTRUCTION PHOTOGRAPHS

A. Contractor shall take construction photographs each month during construction of the Project.

B. Contractor shall document concealed conditions (once exposed) that differ from expectations.

1. It is critical that Contractor photographically document concealed conditions that may benefit Owner's future maintenance and operations activities. Take photographs (with a reference point) prior to cover or concealment. For example:
    a. Underground pipe arrangements/valves/structures.
    b. Under-slab utility rough-in.
    c. Wall cavity utility routing.
    d. Above-ceiling installation after ceiling support system installed, but prior to cover.
2. The photograph record described above shall be considered minimum and shall not be deemed to limit the quantity or quality of the photographic record.

END OF SECTION 01 32 33

PART 1 GENERAL

1.01 SUMMARY

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

1. Pre-Construction Submittal Requirements;
2. Shop Drawings;
3. Product data;
4. Samples; and
5. Mock-ups.

1.02 SUBMITTAL PROCEDURES

A. Provide submittal schedule as required by Section 01 32 13 – Progress Schedule. The Submittal Schedule shall meet all of the requirements below.

B. Coordination: Review of the submittals by Owner is not for the purpose of determining their accuracy and/or completeness, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of Contractor as required by the Contract Documents.

1. Owner reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are provided.
2. Allow at least 14 Days for review of each submittal by Owner. Complex or interrelated submittals, or the submission of multiple submittals at or near the same time, will require additional time. Provide a "priority list" when submitting multiple submittals at or near the same time. Submittal sequencing should coincide with the submittal schedule (see Section 01 32 13 – Progress Schedule).

C. Submittal Preparation: Place a permanent label or title block on each submittal for identification.

1. Include the following information on the label or title block:
    a. Project name, Project number, and date;
    b. Name and address of Owner;
    c. Name and address of Contractor and submitting Subcontractor, if applicable;
    d. Name and address of supplier and manufacturer, if applicable;
    e. Number and title of appropriate Specification section; and
    f. Drawing number and detail references, as appropriate.

2. Provide adequate space for action stamps to record review.

D. Submittal Transmittal: Package submittals in manageable quantities and transmit to Owner and Architect/Engineer, if applicable, simultaneously. Submittals received from sources other than Contractor will be returned without action. By submitting submittals, Contractor represents to Owner that Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements, and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within each submittal with the requirements of the Work and of the Contract Documents.

1. Address one topic or related set of topics in each transmittal based upon Specification sections (i.e., mechanical items should not be submitted under same transmittal with electrical items).
2. Clearly call out relevant information, deviations, and requests for data, including minor variations from the Contract Documents on both the transmittal and all copies of a submittal.
3. Shop drawings, product data, samples, and mock-ups shall be submitted to Owner's Designated Representative for review/approval. The minimum number of submittals to be provided are:
    a. Pre-Construction, Shop Drawings, Product Data: Electronic copies.
    b. Samples: As required by the technical Specification section.
    c. Mock-ups: As required by the technical Specification section.
    d. Demonstrations: As required to facilitate installation and inspection.
    e. Reference technical Specifications for additional submittal requirements.
4. Owner may modify the required submittal quantities.

E. Material and Color Submittal: Submit samples of actual colors and/or materials.

F. Number submittals by Specification section number and revision letter.

G. In the event of the need to "revise and resubmit" a submittal, resubmit same in acceptable form/content, clearly identifying deviations from the previous rejected submittal. Contractor shall also keep accurate records of the receipt, review, and delivery of all submittals and shall submit to Owner, as requested, status reports.

H. Provide a final electronic copy of all approved submittals.

1.03 PRE-CONSTRUCTION SUBMITTAL REQUIREMENTS

A. All Pre-Construction Submittals are required before onsite construction activities may commence. Contractor shall submit the following Pre-

Construction Submittals within 14 days of Notice to Proceed. Submittal review for these items only shall be supplied within 14 days of receipt by Owner.

1. Indoor Air Quality Management Plan
2. Site Safety and Health Plan (for information only)
3. Quality Control / Quality Assurance Plan
4. Waste Management Plan
5. Progress Schedule
6. Schedule of Values
7. Pre-Construction Photographs
8. Emergency Points of Contact
9. List of Subs and Suppliers
10. Demolition Plan
11. Asbestos Safety Plan
12. List of Long Lead Items

1.04 SHOP DRAWINGS

A. Submit Shop Drawings drawn to accurate scale. Do not reproduce Contract Documents or copy standard information for use as Shop Drawings. Standard information prepared without specific references to the Project will not be accepted as a Shop Drawing.

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

1. Dimensions;
2. Products and materials;
3. Compliance with specified standards;
4. Coordination requirements;
5. Notation of dimensions established by field measurements;
6. Any deviation from Drawings or Specifications; and
7. Date when review is requested to maintain Progress Schedule.

1.05 PRODUCT DATA

A. Product data includes: Manufacturer's printed installation instructions, catalog cuts, standard color charts, rough-in diagrams and templates, standard wiring diagrams, and performance curves.

1. Where product data must be specially prepared because standard printed data is not suitable, the submittal must be provided as a Shop Drawing.

B. Requirements: Mark each copy to show applicable options. Include the

following information:

1. Manufacturer's printed recommendations;
2. Compliance with recognized trade-association standards;
3. Compliance with recognized testing-agency standards;
4. Application of testing-agency labels and seals;
5. Notation of dimensions verified by field measurement;
6. Notation of coordination requirements;
7. Any deviation from Drawings or Specifications; and
8. Date when review requested to maintain Progress Schedule.

1.06 SAMPLES AND MOCK-UPS

A. Submit samples and mock-ups that are identical to the material or product proposed. Samples include partial sections of components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.

1. Package samples to facilitate review. Include the following:
   a. Generic description of the sample;
   b. Source;
   c. Product name or name of manufacturer;
   d. Compliance with recognized standards;
   e. Availability and delivery time; and
   f. Specification section.

B. Requirements: Submit samples and mock-ups for review of kind, color, pattern, and texture for a comparison of these characteristics before actual installation.

1. Where variation in color, pattern, texture or other characteristics are inherent in the material, submit not less than four units to show limits of variation.

C. Submittals: Where samples are for selection of appearance from a range of standard choices, submit a full set of choices for the material or products.

D. Maintain sets of approved samples and mock-ups at the Project site for quality comparisons throughout the course of construction.

E. Demolish and remove all samples and mock-ups prior to Substantial Completion but not sooner than directed by Owner.

1.07 OWNER's ACTION

A. Review: Except for submittals for information or a similar purpose, Owner will review each submittal, mark to indicate action taken, and return promptly.

B. Owner approval of submittals does not supersede or alter Contract Document requirements.

END OF SECTION 01 33 00

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes the administrative and procedural requirements for any general alterations to be performed during the Project, including but not limited to products, transition and adjustments, cutting, patching, and repair and cleaning.

1.02 SUBMITTALS

A. Contractor shall submit a written request in advance of cutting or alteration that impacts:

1. Structural integrity of any element of Project.
2. Integrity of weather-exposed or moisture-resistant elements.
3. Efficiency, maintenance, or safety of any operational elements.
4. Visual qualities of sight exposed elements.
5. Work of Owner or a separate contractor.

B. Contractor must include in its written request, when required:

1. Identification of Project.
2. Location and description of affected Work.
3. Necessity for cutting or alteration.
4. Description of proposed Work and products to be used.
5. Alternatives to cutting and patching.
6. Effect on Work of Owner or separate contractor.
7. Written permission of affected separate contractor.
8. Date and time Work will be executed.

1.03 QUALITY ASSURANCE

A. Limits of Work:

1. Contractor shall maintain existing building structure (including structural floor and roof decking) and envelope (exterior skin and framing, excluding window assemblies and nonstructural roofing material) not indicated to be removed; do not cut such existing conditions beyond indicated limits.
2. Contractor shall maintain existing interior nonstructural elements (interior walls, doors, floor coverings, and ceiling systems) not indicated to be removed; do not cut such existing conditions beyond indicated limits.
3. Contractor shall maintain existing nonshell, nonstructural components (walls, flooring, and ceilings) not indicated to be removed; do not cut such existing conditions beyond indicated limits.

B. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

C. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:

1. Primary operational systems and equipment.
2. Air or smoke barriers.
3. Fire-suppression systems.
4. Mechanical systems piping and ducts.
5. Control systems.
6. Communication systems.
7. Conveying systems.
8. Electrical wiring systems.
9. All low voltage systems.
10. Operating systems of special construction in Division 13.
11. Other operating systems as appropriate.

D. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended that result in increased maintenance or decreased operational life or void of warranty, or could adversely affect safety. Miscellaneous elements include the following:

1. Water, moisture, or vapor barriers.
2. Firestopping or fire barriers.
3. Membranes and flashings.
4. Exterior curtain-wall construction.
5. Equipment supports.
6. Piping, ductwork, vessels, and equipment.
7. Noise and vibration-control elements and systems.
8. Other miscellaneous systems as appropriate.

E. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exterior conditions or in occupied spaces in a manner that would, in Owner's opinion, reduce the building's aesthetic qualities. Contractor shall remove and replace conditions that have been cut and patched in a visually unsatisfactory manner.

PART 2 PRODUCTS

2.01 PRODUCTS FOR PATCHING AND EXTENDING WORK

A. New Materials: Match existing products and Work when patching and extending Work.

B. Type and Quality of Existing Products: Determine by inspection and testing products where necessary; refer to existing Work as a standard.

PART 3 EXECUTION

3.01 EXAMINATION

A. Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents related to that portion of the Work, as well as other information available to Contractor, take field measurements, and inspect any existing conditions, including elements subject to damage or movement during cutting and patching.

B. After uncovering existing Work, inspect conditions affecting performance of Work.

C. By beginning any cutting or patching, Contractor represents and warrants its acceptance of existing conditions.

D. Contractor shall verify that demolition is complete and areas are ready for installation of new Work.

3.02 PREPARATION

A. Contractor shall cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.

B. Contractor shall remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, deteriorated masonry, concrete, and disturbed subgrade material. Replace materials as specified for finished Work.

C. Contractor shall remove debris and abandoned items from area and from concealed spaces.

D. Contractor shall prepare surface and remove surface finishes to provide for proper installation of new Work and finishes.

E. Contractor shall close openings in exterior surfaces to protect existing Work. Contractor shall insulate ductwork and piping to prevent moisture and condensation in exposed areas.

F. Contractor shall provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect Work from damage.

3.03 PERFORMANCE

A. Contractor shall coordinate alterations and renovations to expedite completion of the Work.

B. Remove, cut, and patch Work in a manner to minimize damage. Provide a means of restoring products and finishes to their original or specified condition.

C. Refinish remaining existing surfaces in renovated rooms and spaces, to specified condition for each material, with a neat and clean transition to adjacent finishes.

D. In addition to specified replacement of equipment and fixtures, restore existing plumbing, heating, ventilation, air conditioning, and electrical systems to full original operational condition.

E. Install products as specified in individual sections.

F. Remove samples of installed Work for testing when requested.

G. Provide openings in the Work for penetration of mechanical and electrical Work.

H. Cut rigid materials using the appropriate equipment and tool. Pneumatic tools not allowed without prior approval.

1. Concrete Walls: Saw-cut walls using accurately located straight lines, unless directed otherwise. Minimize overcuts.
2. Masonry Walls: Saw-cut along mortar joints, cutting block uniformly in accurately located straight lines, unless otherwise directed. Remove all mortar adhering to edges. Overcuts not allowed.
3. Wood Framed Walls: Demolish plaster or gypsum wallboard, removing wall framing only as required. Cut wall finish materials in straight uniform lines.
4. Concrete Floors: Saw-cut floors and remove. Core drill as required.

I. Restore Work with new products in accordance with requirements of Contract Documents.

J. Fit Work to existing pipes, sleeves, ducts, conduit, and other penetrations through surfaces, while maintaining assemblies.

K. At penetrations of fire rated walls, partitions, ceilings, or floors, completely seal voids with firestopping material to full thickness of the penetrated element, while maintaining assemblies.

L. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 01 35 16

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements pertaining to regulatory requirements.

B. List of regulatory requirements.

1.02 CONTRACTOR RESPONSIBILITY

A. Contractor is solely responsible for compliance with all codes, laws, or regulatory requirements.

B. Inspections performed or not performed by the City of Pullman, Labor and Industries, Owner, Owner Designated Representative, or others who are under contract to Owner do not waive or change Contractor's obligations, nor do such inspections constitute approval or acceptance of portions of the Work.

1.03 CONTRACTOR REQUIREMENTS

A. Contractor shall perform the Work in accordance with the requirements of governing agencies and applicable regulatory requirements, including those included in this Section and elsewhere in the Contract Documents. Contractor must comply with all applicable laws, building codes, regulations, and rules, including, when applicable, the Washington State University campus code.

B. Contractor shall schedule and coordinate inspections and gain approvals required by the City of Pullman and other governing agencies in a timely manner and as required for Owner occupancy of the Project within the Contract Time.

C. Contractor shall inform the City of Pullman Building and Fire Departments, Labor and Industries, and other governing agencies of changes in the Work affecting regulatory requirements in a timely manner.

D. Contractor shall promptly forward to Owner all inspection reports, orders, permits, and other directives and correspondence received from the City of Pullman inspectors or other governing agencies having jurisdiction over the Work.

E. Contractor shall promptly notify Owner when the Contract Documents appear to be in conflict with Regulatory Requirements.

F. Contractor shall, at all times, use its best efforts and exercise its judgment as an experienced contractor to adopt and implement policies and practices designed to avoid work stoppages, slowdowns, disputes, or strikes where reasonably possible and practical under the circumstances, and shall, at all times, maintain Project-wide labor harmony.

1.04 REGULATORY REQUIREMENTS

A. Authority Having Jurisdiction (AHJ) shall be the organization, office, or individual responsible for enforcing the requirements of the applicable code(s) or standard(s), and or for approving equipment, materials, installation(s), or procedure(s).

B. Regulatory authorities establish minimum requirement levels. Where provisions of the Contract Documents and regulatory requirements differ or conflict, the more stringent requirement governs.

C. Regulatory requirements added by other sections of the Contract Documents or otherwise applicable are binding upon the Work in accordance with the provisions of this Section. The regulatory-requirements list provided below is intended to assist Contractor in determining the regulatory requirements for the Project, but neither the inclusion nor omission of any item from the list shall be construed to relieve Contractor of obligations that otherwise exist under the law or the Contract.

1.05 LIST OF REGULATORY REQUIREMENTS

A. International Building Code (IBC), current adopted edition.

B. International Fire Code (IFC), current adopted edition.

C. National Fire Protection Association (NFPA) Codes.

D. American Society of Mechanical Engineers (ASME), ASME A17.1 Safety Code for Elevators and Escalators, current adopted edition.

E. American Society of Mechanical Engineers (ASME), ASME A18.1 Safety Standard for Platform Lifts and Stairway Chairlifts, current adopted edition.

F. State of Washington, WAC-51-50-1101, Accessibility, as adopted by the State of Washington.

G. International Code Council (ICC)/American National Standards Institute (ANSI) A117.1 Accessible and Usable Buildings and Facilities, current adopted edition.

H. State of Washington, WAC Chapters 173, 246, and 296, as applicable.

I. U.S. Environmental Protection Agency 40 CFR, as applicable.

J. U.S. Transportation Department Title 49, Parts Pertaining to Transportation of Hazardous Materials.

K. U.S. Nuclear Regulatory Commission Title 10, Parts Pertaining To Radioactive Materials Management.

L. Washington State Ventilation and Indoor Air Quality Code, WAC 51-13.

M. Washington State Energy Code, WAC 51-11C. Shortened

N. Mechanical Work: International Mechanical Code (IMC), current adopted edition.

O. Plumbing Work: Uniform Plumbing Code (UPC) as amended and adopted by the State of Washington, in the Washington Administrative Code (WAC).

P. Federal Emergency Management Agency (FEMA) requirements for floodway/floodplain development.

Q. Electrical Work:

1. NFPA 70, National Electrical Code (NEC), most recent adopted edition.
2. Underwriters' Laboratories (UL).
3. National Electrical Manufacturer's Association (NEMA).
4. National Electric Safety Code (NESC).

1.06 PERMITS REQUIRED

A. Contractor shall obtain and pay for all required building permits, including any renewals. Contractor shall identify costs for permits on the Schedule of Values for permits obtained.

B. All trade permits (e.g. electrical, pressure vessel, elevator, etc.) must be included in each Subcontractor bid.

C. Owner obtains permits for the following facilities and activities.

1. U.S. Army Corps of Engineers:
   a. Wetlands (404).
2. Permits and/or Approvals from the DOE or local environmental authority:
   a. Stormwater from Construction Sites (Notice of Intent).
   b. Wastewater Discharge Facilities.
   c. Well Construction (including Well Abandonment).
   d. Water Rights.
   e. Notice of Construction (Air Pollution Sources).
   f. SEPA.
   g. Floodway/Floodplain development.

1.07 APPRENTICESHIP REQUIREMENTS – NOT USED

END OF SECTION 01 41 00

PART 1 GENERAL

1.01 SUMMARY

A. Conduct portions of the Work requiring special procedures due to hazardous materials and conditions in accordance with regulatory standards and guidance provided in this Section.

1.02 SUBMITTALS

A. Contractor shall deliver a current copy of its site specific Health and Safety Plan to the Owner per the Pre-Construction Submittal Requirements of Section 01 33 00. The submittal must include each Subcontractor's site specific Health and Safety Plan. Submittal to Owner is for information only, not for review, acceptance, or approval of the Health and Safety Plan, nor for analysis of content or completeness.

1.03 QUALIFICATIONS OF HEALTH AND SAFETY PERSONNEL

A. Contractor shall employ a competent person for each hazardous construction task in accordance with the requirements of WAC 296-155.

B. Contractor shall submit to Owner the names of its employees performing duties as competent persons, as well as the names of Subcontractor employees performing duties as competent persons.

1.04 HAZARDOUS MATERIALS MANAGEMENT

A. Dangerous Waste Management:

1. Contractor agrees and acknowledges that:

   a. Contractor has direct and exclusive control over the Work and operations at the Project site and is responsible for any Contractor generated, created, or disturbed Washington State dangerous waste and its collection, labeling, accumulation, transportation, and disposal. Owner's EH&S department will provide assistance to Contractor upon request, and will coordinate transportation and disposal of Project-generated Washington State dangerous waste.

   b. Contractor must provide Owner immediate notification of any pre-existing unanticipated Washington State dangerous waste or site contamination.

2. Contractor is responsible for securing its own waste generator identification number, and Contractor shall sign all manifests associated with the Contractor-generated waste.

   a. Contractor shall obtain an EPA/State ID number in accordance with WAC 173-303-360 before conducting activities generating chemical waste designated as Washington State dangerous waste.

b. Contractor shall cancel the EPA/State ID number when:

1) All activities generating or managing waste have ceased;

2) All regulated wastes have been removed from the Project site under proper manifests, and all site contamination is remediated; and

3) All annual dangerous-waste reporting requirements are complete.

c. Contractor may call the Washington State Department of Ecology (DOE) to request a reporting package for early submittal.

d. Contractor shall furnish to Owner's EH&S Department, Pullman, WA, within 3 Days from submittal or receipt, copies of the following documents:

1) Form 2 Notification of Dangerous Waste Activities;

2) All signed Uniform Hazardous Waste Manifests (original copy when shipping wastes and copy returned from the treatment, storage, disposal, or recycling facility), Land Disposal Restriction Notification forms, Certificates of Recycling/Disposal/Destruction, and Exception Reports;

3) All Annual Reports; and

4) All correspondence from the DOE.

3. Owner remains responsible for Washington State dangerous waste and site contamination: (1) pre-existing Contractor's activities at the site, (2) not listed in the Contract Documents, and (3) not disturbed by Contractor through improper construction activities.

4. For waste identified in contract document and for unanticipated Washington State dangerous waste or site contamination discovered during the course of the Work on the site, Contractor shall:

a. Collect, containerize, and accumulate all Washington State dangerous waste or site contamination in accordance with applicable Federal, State, and local regulations.

b. Coordinate all transportation and disposal activities through Owner's EH&S department, who will utilize the Washington State Hazardous Waste Disposal Services contract or equivalent pre-approved contractor. Owner's disposal contractor shall complete all applicable dangerous waste shipping papers including all Uniform Hazardous Waste Manifests, Land Disposal Restriction Notification forms, profiles and barrel packing lists.

B. Hazardous Materials Spills and Releases:

1. Contractor and Subcontractor(s) shall immediately report all hazardous materials spills at the Project site to Owner. If a hazardous material spill occurs at a Project site in Whitman County, and if any individual may be affected by the spill, Contractor and/or Subcontractor(s) must immediately

report the spill to Whitcom (emergency dispatch). In other counties, Contractor and Subcontractor(s) must report spills to the appropriate emergency response agency in that area.

2. Contractor shall be responsible for spill containment, cleanup, decontamination, post-cleanup monitoring, disposal of any wastes generated from cleanup activities, and generation of any reports required by regulatory agencies and/or regulations including, but not limited to, WAC 173-303 and WAC 173-340.

C. Spill Prevention Control and Countermeasures:

1. Owner's EH&S department is responsible for Owner's SPCC Plan. Any of Contractor's on-site activities involving the handling and/or storage of materials meeting the definition of oil per 40 CFR 112 in containers and/or equipment with a capacity greater than 42 gallons must be included in the Owner's SPCC Plan. Contractor shall provide Owner's EH&S department with an inventory of this equipment or containers at least 14 Days prior to the equipment or containers being brought to the Project site.

2. Contractor shall provide and utilize secondary containment for containers and tanks of oil with a capacity greater than 42 gallons. Owner may waive this requirement in its sole discretion upon Contractor's request after Owner reviews Contractor's written explanation as to why secondary containment is unnecessary for a particular container or tank.

D. Asbestos:

1. All Contractor employees involved in excavation or demolition shall be asbestos awareness trained. Contractor shall submit to Owner the name of Contractor's competent trainer, the names of each of Contractor's trained personnel, and the date of each training. Contractor's submittal must also state that the training was conducted for asbestos awareness for the Work.

2. All asbestos abatement Work shall be performed by persons trained in Washington State-approved courses and certified by the State of Washington.

3. All asbestos abatement Work performed shall be overseen by a consultant hired by the Owner to ensure the Work meets regulatory standards and Owner requirements.

4. All asbestos cement pipe Work shall be performed by persons trained in an asbestos cement pipe procedures course whose content is reviewed and approved by the Washington State Department of Labor and Industries, per WAC 296-62-07722(3)(ii)(C).

5. If suspected asbestos-containing material is discovered during Contractor's execution of the Work, and abatement of the material is not a requirement of the Contract, Contractor shall suspend any Work that affects the material and immediately notify Owner. Contractor shall safeguard the area to prevent entry until certified personnel determine

whether the material is non-asbestos containing or the material is abated, at which time the Work in that area may resume.

E. Lead:

1. Owner shall inform Contractor of lead-containing coatings and materials that the Contractor may encounter while performing the Work. These materials or coatings may release lead into the air, soil, or water, or may be a source of contamination due to skin contact. Owner shall provide general data about the percentage of lead content of each suspected lead-containing material or coating and/or provide Contractor with data showing the amount of lead per surface area.
2. Contractor is responsible for protecting its employees from lead exposure, as required by Washington law.
3. Contractor shall manage all paint chips, building components, soil, and/or other material considered by Owner to be dangerous waste according to the Dangerous Waste Management paragraph.

F. Polychlorinated Biphenyls:

1. Owner may survey oil-filled equipment prior to commencement of construction. This equipment includes, but is not limited to, transformers, electrical switches, hydraulic elevators, emergency generators, capacitors and light ballasts. Owner's survey shall usually determine if the equipment is filled with oil containing polychlorinated biphenyl (PCB). Owner shall remove, or arrange for the removal of, any equipment that contains oil in concentrations qualifying the equipment as dangerous waste per WAC 173-303.
2. If oil-filled equipment is discovered during Contractor's execution of the Work, Contractor shall suspend any Work that may affect the equipment and immediately notify Owner. Owner shall test the equipment and determine the appropriate management method for the equipment and the oil it contains.

G. Mercury:

1. Owner may survey all equipment suspected of containing mercury prior to commencement of construction. This equipment includes, but is not limited to, switches and thermostats. Owner's survey shall determine if the equipment contains mercury. Owner shall remove, or arrange for the removal of, any such equipment.
2. If mercury-containing equipment is discovered during Contractor's execution of the Work, Contractor shall suspend any Work that may affect the equipment and immediately notify Owner. Owner shall test the equipment and determine the appropriate management method for the equipment and the mercury it contains.

H. Hazardous Materials or Equipment:

1. Fixed equipment such as fume hoods, safety cabinets, and vacuum systems, and related ductwork, fans, and appurtenances, may contain or be contaminated with hazardous materials. Owner may test this equipment to determine what, if any, hazards are present. If equipment contains a hazard, or if the equipment itself is a dangerous waste, Owner shall inform Contractor of the nature of the hazard including any information necessary for Contractor to protect its workers. If the equipment is a dangerous waste, Contractor shall dispose of, or make arrangements for the disposal of, the equipment per the above Dangerous Waste Management paragraph.

I. Underground Storage Tanks (USTs):

1. Removal of USTs shall be performed in accordance with DOE regulations. Removal of existing USTs shall be performed by a DOE-certified UST removal company following the submittal of required forms. Copies of forms must be provided to Owner's EH&S department at the same time they are submitted to DOE.
2. Installation of any UST must be done by DOE-certified UST installers. The installation shall be permitted by DOE following the submittal of completed UST installation forms. Copies of forms must be provided to Owner at the same time they are submitted to DOE.
3. Retrofits and upgrades of existing USTs must be completed by DOE certified companies. Records of the retrofit or upgrade must be submitted to DOE following the retrofit or upgrade. Copies of such records must be provided to Owner at the same time they are submitted to DOE.
4. If a UST is discovered during Contractor's execution of the Work, Contractor shall suspend any Work that may affect the UST and immediately notify Owner. Owner will determine if UST must be sampled and/or removed. If necessary, Owner shall engage a certified company to remove UST.

J. Department of Homeland Security (DHS) Chemicals of Interest (COI)

1. Contractor and Subcontractors shall report any COI to Owner as required by the DHS. Contractor may contact Owner's Representative in conjunction with the University's EH&S Department for the specific means of reporting.

1.05 WATER AND STORMWATER POLLUTION PREVENTION:

A. Water Pollution:

1. Discharge of any pollutants (including sewage and chlorinated water from water line disinfection) into surface or ground waters of the Sate (including storm drains, ditches and any other water conveyances) is prohibited.

2. Contractor removal of snow, ice, soil, and mud from roadways and sidewalks shall be accomplished without polluting storm drains or surface waters. Mud and soil removal shall be undertaken on a full-time basis, not just once or twice a day. Soil or mud that is dropped onto streets and sidewalks by vehicles at the Project site shall immediately be cleaned by Contractor. Contractor may not use water to clean streets and sidewalks. Under no circumstances may dust mitigation cause soil erosion or pollution of surface waters.

3. If a discharge to surface or ground waters does occur, Contractor shall immediately notify Owner.

B. Stormwater Pollution Prevention Plan (SWPPP):

1. For projects that disturb a soil surface area of one acre or greater:

   a. Contractor shall prepare a written SWPPP that meets DOE regulations and the requirements of Owner's Municipal Stormwater Permit.

   b. Owner shall apply for a DOE NPDES Construction Stormwater General Permit for stormwater discharge, and then transfer the permit to Contractor. Contractor shall comply with all provisions of the permit.

   c. Contractor shall maintain a copy of the NPDES permit and the SWPPP on-site at all times.

   d. Contractor shall maintain on-site or on call, at all times, a Certified Erosion and Sediment Control Lead (CESCL).

   e. Contractor's SWPPP shall identify all management practices used to prevent stormwater pollution and the location(s) at which each practice will be utilized on the Project site.

   f. Contractor shall obtain approval from Owner of the SWPPP prior to groundbreaking. Contractor shall construct approved BMP's and the site inspected and approved, per permit requirements, prior to groundbreaking.

   g. Contractor shall use best management practices (BMPs) and shall inspect BMPs at least once a week. In addition, Contractor shall inspect BMPs immediately following each rainfall event of 0.1 inches or greater.

   h. Contractor shall maintain a written log detailing the results of inspections beginning with the first day of construction. Contractor's written log shall describe all erosion control activities resulting from inspections. In addition, the following dates and events shall be included in the written log:

      1) The beginning and completion of major grading activities.

      2) Rainfall events of 0.1 inches or greater.

3) When construction activities temporarily or permanently cease on-site, or on a portion of the site.

4) When stabilization measures are initiated for portions of the site.

5) Stormwater sampling results.

i. Contractor shall maintain and/or repair all BMPs as necessary to ensure continued performance of their intended function. Contractor's maintenance and repair activities shall include, but are not limited to:

1) Removal of sediment from silt fences before it reaches approximately one third the height of the fence, especially if heavy rains are expected; and

2) Cleaning or removal and replacement of drain inlet protection devices at least once every 7 Days, and once daily during storm events or before 6 inches of sediment can accumulate.

j. Contractor shall remove all temporary erosion and sedimentation control measure from the Project site within 30 Days after final site stabilization is achieved, or after the temporary BMPs are no longer necessary. Contractor shall remove any trapped sediment from the Project site. Contractor shall permanently stabilize any areas of soil disturbed by sediment removal.

k. In addition to sediment control, Contractor shall prevent other pollutant discharges from contaminating stormwater, groundwater, or soils.

1) Any maintenance or repair of heavy equipment and vehicles involving oil changes, hydraulic system draining and removal, solvent and degreasing cleaning operations, fuel tank draining and removal, and other activities that may result in discharge or spillage of pollutants to the ground or into stormwater runoff must be conducted using spill prevention measures, such as drip pans. Contractor shall immediately clean any contaminated surfaces following any discharge or spill incident. Emergency repairs may be performed on-site using temporary plastic placed beneath and, if raining, over the vehicle.

2) Wheel wash or tire bath wastewater shall be discharged to a separate on-site treatment system.

3) Application of agricultural chemicals including fertilizers and pesticides shall be conducted in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Manufacturers' recommendations for application rates and procedures shall be followed.

4) Use of lime, flyash, or other soil amendments that could alter the pH of discharge waters is prohibited.

5) Highly turbid or contaminated dewatering water from construction equipment operation shall be handled separately from stormwater. Management options include infiltration, transportation off-site for legal disposal, or use of a sedimentation bag with outfall to a ditch or swale for small volumes of localized dewatering.

l. Contractor shall provide to Owner all notifications/reports required by permit to DOE.

1) If stormwater sampling results show turbidity greater than or equal to 250 NTU, Contractor shall immediately report to DOE and shall notify Owner of the report.

2) Contractor shall file monthly Discharge Monitoring Reports (DMR's) with DOE as required. Contractor shall provide copies of all DMR's to Owner.

2. For projects that disturb a soil surface area of 5,000 square feet or greater, but less than one acre, provisions shall be made to meet applicable local regulations, as necessary.

a. Contractor shall make provisions for inspection and approval by the local authority prior to groundbreaking.

3. For projects that create additional impervious surfaces, provisions shall be made to meet stormwater flow control and treatment requirements, as applicable.

C. Wetlands:

1. Contractor must follow all Federal, State and local regulations including but not limited to WAC 173-201 regarding protection of wetlands.

1.06 AIR POLLUTION

A. Contractor shall comply with all provisions of the Owner's Air Operating Permit, WAC 173-400 and WAC 173-401 requirements as applicable.

B. Contractor shall control pollutants, such as diesel emissions, chemical emissions, and dust generated by the Project, so that pollutants do not adversely impact the Project site or the surrounding-area air quality.

C. Contractor shall submit to Owner within 30 Days of the Notice to Proceed a list of any stationary air emission-generating equipment included in the Work, such as: fuel-powered electrical generators, internal combustion engines, boilers, paint booths, CFC-containing equipment, or other regulated emission sources. Contractor shall assist Owner in the preparation of necessary permit applications, and Owner shall obtain necessary permits. Contractor shall abide by any conditions or requirements of permits.

D. Per WAC 173-400, Contractor shall mitigate all fugitive emissions (such as dust, vehicle exhausts, and other emissions that do not pass through a stack, chimney,

or vent) generated by the Work. Contractor shall mitigate dust at the Project site throughout the entire duration of the Work. Dust mitigation may include application of specific chemical compounds approved by Owner, or may be accomplished with intermittent watering and sprinkling at such a frequency as will satisfactorily settle dust (excluding paved surfaces). Paved surfaces shall be cleaned mechanically without the discharge of water or chemicals to storm drains and/or surface waters. Under no circumstances shall Contractor permit dust mitigation cause soil erosion or pollution of surface waters.

E. No materials shall be burned without required permits. If permitted burning is done, odors shall be minimized in accordance with the Owner's Air Operating Permit.

F. CFCs (chlorofluorocarbons) or HCFCs (hydrochlorofluorocarbons) are not permitted as refrigerants in new or renovation projects. New permanently installed refrigeration equipment, such as chillers, temperature controlled chambers, air conditioning equipment, compressors, etc., must contain HFC (hydrofluorocarbon) refrigerants only (i.e., R-134A, R-404A, or R-507). At the completion of the Project, Contractor must provide detailed documentation to Owner about the refrigeration equipment installed, including identifying markings, capacity, and type of refrigerant. Refrigerant must be installed only by persons certified to do so.

G. Indoor Air Quality:

1. Owner shall notify Contractor of the location of fresh air supply intakes for buildings in the immediate area of the Work, and of fresh air supply intakes for buildings that may be affected by emissions from Contractor operations.
2. Contractor shall notify Owner 3 Days prior to commencing Work in which Contractor must operate vehicles or equipment in areas where fresh air supply intakes are located.
3. Contractor shall notify Owner 3 Days prior to commencing Work in which Contractor will be using solvents or other volatile chemicals, or processes which emit fumes, smoke, or strong odors that may affect fresh air supply intakes, or may enter Owner's buildings through doorways or windows.
4. Contractor shall not allow its activities that emit vapors, fumes, smoke or strong odors to negatively affect fresh air supply intakes.
5. If air releases of hazardous chemicals must occur, Contractor shall submit no later than 30 Days after the Notice to Proceed a chemical release plan detailing how such incidents may adversely affect Owner. Such a plan shall also specify protection to be provided to the employees of Owner and Contractor actions required to minimize chemical overexposure.
6. During welding activity, Contractor shall confine fumes to the Project site, and the fumes must not adversely affect Owner's employees or students.

1.07 PUBLIC HEALTH

A. Solid Waste Disposal:

1. Contractor shall legally dispose of or recycle all solid waste at an off-site location. Contractor shall not burn, dump, or bury waste materials, debris, or rubbish on Owner property. Contractor shall clean the Project site at the end of each work shift. Contractor is liable for any and all damage resulting from improper waste handling and disposal (see Section 07 74 19 - Construction Waste Management).

B. Environmental Noise:

1. Per WAC 173-60, and applicable local requirements, Contractor shall not exceed maximum permissible environmental noise levels for the duration of the Work.

C. General Sanitation:

1. Per WAC 246-203, Contractor shall supply adequate water for drinking and hand washing purposes. The use of common drinking cups or towels is prohibited. For hand washing purposes, Contractor shall supply hot running water, soap, disposable towels, and a waste receptacle.

D. Drinking Water Protection:

1. Per WAC 246-290 and 246-291, Contractor shall protect all public water supplies. No portion of a public water system containing potable water shall be put into service nor shall service be resumed until the facility has been effectively disinfected and a satisfactory bacteriological sample has been obtained from a DOE-certified laboratory. Results of sampling shall be sent to Owner. The procedure used for disinfection shall conform to current standards of the American Water Works Association.
2. A minimum sanitary control area around all wells shall be maintained at all times. The sanitary control area shall extend at least 100 feet from any well. No source of contamination may be constructed, stored, disposed or applied within the sanitary control area.
3. If wells are being constructed or abandoned, Owner shall procure the appropriate water rights and construction permits per WAC 173-160. Owner shall provide copies of these documents to Contractor. Wells shall be constructed/abandoned properly by a licensed well driller. Contractor shall submit a plan to Owner detailing how all disinfection shall be accomplished.
4. Backflow Prevention:
    a. Any connection made by Contractor to Owner's drinking water system, including connection to a fire hydrant, must be made through a backflow prevention assembly approved by a Washington State certified cross connection control specialist

(CCS) engaged by Owner and inspected and tested by a Washington State certified backflow assembly tester (BAT).

b. Contractor shall label all non-potable water outlets, in a manner acceptable to the Owner, “Non-potable Water / Do Not Drink”.

E. Vector Control:

1. Buildings shall be constructed so as to minimize the attraction and/or harborage of pests and vectors such as birds and rodents. Minimize bird roosting areas by not constructing exposed pipes, beams, or flat ledges on openings, especially underneath covered areas directly accessible to the outside. Openings 1/4-inch or larger shall be sealed. Leave a minimum of a 3-foot swath around the building that is bare. Do not plant trees, shrubs and grass immediately adjacent to building.

2. The presence of standing water shall be minimized or eliminated to prevent mosquito breeding.

F. On-Site Sewage Disposal:

1. Contractor is responsible for fully complying with WAC 246-272. A construction permit application shall be submitted to the appropriate jurisdictional authority for approval. The jurisdictional authority shall issue a construction permit prior to the commencement of construction and shall perform pre-opening inspections. Contractor shall ensure that the appropriate authority inspects and approves the site prior to construction and when the project is substantially complete.

G. Water Recreation Facilities:

1. Contractor is responsible for fully complying with WAC 246-260. A construction permit application shall be submitted to the appropriate jurisdictional authority for approval prior to the commencement of construction. WSU EH&S shall be consulted prior to the development of a construction permit application. Contractor shall ensure that the appropriate regulatory authority inspects and approves the site prior to operation.

H. Food Service Facilities:

1. Contractor is responsible for fully complying with WAC 246-215. A construction permit application shall be submitted to the appropriate jurisdictional authority for approval prior to the commencement of construction. WSU EH&S shall be consulted prior to the development of a construction permit application. Contractor shall ensure that the appropriate regulatory authority inspects and approves the food service prior to operation.

1.08 OCCUPATIONAL HAZARD MANAGEMENT

A. Chemical Hazard Communication:

1. If any hazardous chemicals will be used in the Work or present at the Project site, copies of applicable Material Safety Data Sheets (MSDS) shall be made immediately available to Owner prior to use by Contractor and during any use of the hazardous chemicals in the Work.

2. If the use or presence of hazardous chemicals at the Project site may affect the health of individuals outside the Project site, Contractor shall submit a written plan to Owner at least 30 Days prior to such use or presence detailing how Owner can avoid exposure to the products. Contractor shall submit MSDS / SDS to Owner for any hazardous chemical to which persons outside the project site may be exposed. The exposure avoidance plan shall also specify actions that should be taken if inadvertent exposure occurs. Owner shall provide Contractor with a written plan detailing how Contractor employees can avoid exposure to hazardous chemicals used by Owner that may impact the Project site, and shall specify actions which should be taken if inadvertent exposure occurs. Owner shall submit MSDS / SDS to Contractor for any hazardous chemical to which persons inside the project site may be exposed.

B. Lock-Out/Tag-Out:

1. When Owner and Contractor are to be engaged in coordinated activities requiring the control of hazardous energy, Owner and Contractor shall inform each other of their respective lock-out or tag-out procedures.

C. Confined Space:

1. When Contractor employees are to enter permit-required confined spaces, Owner shall:

a. Inform Contractor that the Project site contains permit required spaces and that permit-space entry is allowed only through compliance with a confined-space program meeting WAC 296-809.

b. Inform Contractor of hazards that have been identified.

c. Coordinate entry operations with Contractor when both Owner and Contractor personnel will be working in or near permit spaces.

d. Debrief Contractor at the conclusion of the entry operations regarding any hazards confronted or created in permit spaces during entry operations.

END OF SECTION 01 41 19

PART 1 GENERAL

1.01 SUMMARY

A. Contractor shall perform all Work in a skillful and workmanlike manner. Materials and equipment furnished by Contract and any Subcontractor(s) must be of good quality and new unless the Contract Documents require or permit otherwise. Materials shall conform to the manufacturer's standards in effect at the date of execution of the Contractor and shall be installed in accordance with the manufacturer's instructions, specifications, and directions. Contractor shall, if requested by Owner, furnish satisfactory evidence regarding the kind and quality of any materials identifying thereon the source, and warranting their quality and compliance with the Contract Documents.

B. Section includes:

1. Contractor's Quality Control Program;
2. Field samples;
3. Mock-ups;
4. Manufacturer's instructions;
5. Manufacturer's field services;
6. Testing laboratory services; and
7. Contractor tests and inspections.

1.02 QUALITY CONTROL PROGRAM SUBMITTALS

A. Contractor shall submit a written Quality Control Program for the Project per the Pre-Construction Submittal Requirements of Section 01 33 00. This submittal shall include but not be limited to the following:

1. An overview of Contractor's Quality Control Program.
2. Identification and resume of Contractor's on-site Quality Control Manager (QCM) .
3. A description of the activities, record keeping, and correspondence that the QCM will perform and be accountable for throughout the duration of the Project.
4. A description of the quality control meetings to be conducted, sample inspection check lists (i.e., samples of actual inspection check list forms that will be submitted to Owner when scheduling inspections), and Subcontractors' quality control representatives. All forms that Contractor intends to use in its Quality Control Program shall be part of the submittal.
5. A description of the QCM activities when inspections fail to verify compliance with the Contract Documents.
    a. These activities are to include, as a minimum, follow-up with

applicable Subcontractors, correction and/or completion of Work required for re-inspection, and the re-inspection.

b. Contractor shall submit its weekly Non-Compliance Logs at least 2 Days prior to each Progress Meeting.

6. A description of the QCM activities to provide the required notifications for inspections.

7. A description of record keeping and information turn-over to Owner as a component of the Operating and Maintenance data (i.e. factory representative's start-up reports and permission to energize, verification of correct voltage and phasing to motors, etc.).

8. Contractor will submit a daily report within 3-business days for any day work is performed. The daily report should include the following information; the list may be adjusted or relaxed with Owners Representative approval depending on size and scope of the project requirements:
   a. progress photo's,
   b. list of contractor's and work-force #'s for each contractor,
   c. RFI's or questions,
   d. equipment quantities in use or idle,
   e. weather (if work is being performed outside),
   f. construction delays or likely delays,
   g. 3rd part inspections or city visits,
   h. safety issues,
   i. meetings conducted,
   j. substantive material deliveries, and
   k. any other relevant facts occurring on the site.

1.03 CONTRACTOR'S QUALITY CONTROL PROGRAM

A. Contractor shall establish and maintain a written Quality Control Program which shall be issued by Contractor to Subcontractors performing Work on the Project and utilized to verify that the execution of the Work is consistent with the requirements of the Contract Documents.

B. The Quality Control Program shall include, but not be limited to the following:

1. Preparatory Phase:

   a. Prior to beginning Work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. Contractor shall:

   b. Review of each paragraph of applicable specifications, reference codes, and standards. Make a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field at the preparatory inspection. Maintain these copies in the field, available for use by Owner's Designated Representative until final acceptance of the work.

c. Review the Drawings.

d. Check to assure that all materials and/or equipment have been tested, submitted, and approved.

e. Review provisions that have been made to provide required control inspection and testing.

f. Examine the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

g. Perform a physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

h. Review appropriate accident safety procedures.

i. Discuss procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

j. Check to ensure that the portion of the plan for the work to be performed has been accepted by the Owner's Designated Representative.

k. Schedule, manage and record the minutes of each preparatory meeting.

l. Review all RFIs associated with the Work.

2. Initial Phase:

a. At the beginning of the Work, Contractor shall:

b. Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

c. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing. Resolve all differences and deficiencies.

d. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

e. Check safety to include compliance with and upgrading of the Safety Plan. Review with each worker. Particular attention should be given to high hazard work.

f. Prepare and attach to the daily CQC report separate minutes of this phase.

g. Repeat the initial phase any time acceptable specified quality standards are not being met.

3. Follow Up Phase:

a. Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract

requirements, until completion of the Work. The checks shall be made a matter of record in the QC documentation. Conduct final follow-up checks and correct deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work.

C. Contractor's Quality Control Program shall be independent of any inspections and testing performed by Owner or by any independent testing and inspection agencies hired by Owner.

D. Within the Quality Control Program, Contractor shall have available on the jobsite at all times a written report of quality control activities. At a minimum, the report shall note Project site quality control inspections, performance of scheduled tests and follow-up testing, other required inspections, deficiency log, and examinations of workmanship and quality.

E. Test results shall identify applicable Contract (including Specification) requirements, the test or analysis procedures used, and the actual test results. A statement shall be included that the item tested or analyzed conforms or fails to conform to the Contract Documents. Each report shall be conspicuously stamped on the cover sheet "CONFORMS" or "DOES NOT CONFORM" as the case may be. All test reports shall be signed by a testing laboratory representative authorized to sign certified test reports. Copies of all test reports shall be available on the jobsite at all times.

F. If the Quality Control Program is found to be defective and Contractor does not promptly correct the deficiency, Owner may:

1. Withhold payment until satisfactory corrective action has been taken, or
2. Issue a stop work order until satisfactory corrective action has been taken.

G. Pre-Inspections: Contractor shall pre-inspect Work that requires normal, special, and additional inspections as indicated in the Contract Documents.

1.04 FIELD SAMPLES

A. Field samples are defined as the partial installation of selected materials at the Project site for Owner's review and acceptance of visual features and workmanship. Generally, accepted field samples are incorporated into the Work.

B. Contractor shall provide field samples as required by the Contract Documents at location acceptable to Owner.

C. Perform Work in accordance with the Contract Documents.

D. Approved samples will serve as an acceptable standard of quality and workmanship.

E. Maintain samples until completion of relevant Work.

F. Upon completion of relevant Work or when directed by Owner, demolish and remove samples from Project site unless sample is accepted as part of completed Work.

1.05 MOCK-UPS

A. Contractor shall provide mock-ups as required by the Contract Documents. Provide additional mock-ups, as required by Owner, until approval is obtained.

B. Do not proceed with subsequent Work until approval of the mock-up is obtained.

C. The approved mock-up shall be the standard of workmanship and materials for the Work that is represented by the mock-up.

D. Maintain mock-up in approved condition, until directed otherwise by Owner.

E. Unless specified otherwise, remove mock-up at completion of the Work or when directed by Owner.

F. Unless specified or approved otherwise, mock-ups shall be completed and approved prior to the pre-installation meeting at which the Work represented by the mock-up will be discussed.

G. Notify Owner a minimum of 7 Days prior to requesting mock-up approval.

1.06 MANUFACTURERS' INSTRUCTIONS

A. Contractor shall comply with manufacturers' instructions in full detail, including each step in sequence. Do not omit preparatory steps or installation procedures unless specifically modified or exempted by Contract Documents.

B. Should instructions conflict with Contract Documents, Contractor shall request clarification before proceeding.

1.07 MANUFACTURERS' FIELD SERVICES

A. When specified, Contractor must require product manufacturer to furnish a qualified representative to observe field conditions and quality of workmanship, and to provide recommendations, certifications, and other specified services.

B. Representative shall submit written report to Owner listing observations and recommendations.

1.08 TESTING LABORATORY SERVICES

A. Owner will arrange for services of an independent Testing Laboratory to inspect and test the Work to verify compliance with Contract Documents.

B. Contractor's Responsibilities:

1. Cooperate with Testing Laboratory personnel, and furnish access, tools, samples, certifications, test reports, design mixes, equipment, storage, and assistance as requested by the Testing Laboratory.
2. Notify Owner and Testing Laboratory a minimum of 7 Days in advance of all required tests and 48 hours in advance of all required inspections. When tests or inspections cannot be performed, through fault of Contractor, Contractor shall reimburse Owner for costs incurred by Owner.
3. Contractor shall remove and replace Work found to not comply with Contract Documents.
4. If initial tests and inspections indicate deficient work, Contractor shall reimburse Owner for costs of all subsequent tests and inspections related to such deficiency.
5. All damage to Work as a result of normal testing operations shall be repaired by Contractor to match surrounding surfaces.
6. Schedule testing and inspection so that work of testing and inspection personnel will be as continuous and brief as possible.
7. Contractor shall reimburse Owner for travel and lodging expenses incurred for testing and inspection services performed outside a radius of 100 miles of the Project site.

1.09 CONTRACTOR TESTS AND INSPECTIONS

A. Inspection and testing performed exclusively for Contractor's convenience shall be the Contractor's sole responsibility.

B. Earthwork Compaction Testing Requirements:

1. Owner will engage the services of a Testing Laboratory to perform all soil and structural fill compaction testing. Compactions of any fill material shall be equal to or exceed the specified percentage of maximum dry density as defined by ASTM test procedure D1557 (modified proctor). Obtaining such specified compaction performance is the sole responsibility of Contractor.
2. During any of Contractor's operations, Owner reserves the right to perform compaction tests for its own information only. At Owner's discretion, copies of such tests may be made available to Contractor. The taking of any such tests by Owner in no way relieves Contractor from testing to assure itself of compliance with the Contract Documents.

C. Approved Structural Steel Fabricators:

1. Contractor shall pay for any required structural steel fabrication special inspections.

D. Cast-in-Place Concrete Strength Testing Requirements:

1. Concrete test cylinders will be made by Owner or Owner's Testing Laboratory. Contractor shall be responsible for proper care of cast cylinders while on the Project site (with respect to temperature, humidity and protection).
2. Contractor is also responsible for timely transportation to the laboratory in Spokane (or closer) on a schedule that will permit adequate laboratory curing before testing.
3. Contractor shall notify the Owner at least 48 hours before any concrete pour to allow time for observation.
4. Frequency and location of tests are to be determined. As a minimum, four test cylinders will be made for each day's pour or for every hundred cubic yards, whichever is greater.
5. The results of Owner's tests will be made available to Contractor.
6. The quality of all concrete is to be the sole responsibility of Contractor. If Contractor feels that additional testing is required to assure continued quality control, the frequency, testing, and payment therefore is Contractor's responsibility.

E. All Other Work Inspection and Testing Requirements:

1. Contractor shall, at no additional cost to Owner, provide all inspections and tests required to assure full compliance with the Contract Documents. Unless specifically required, Contractor is not required to submit copies of such test results to Owner. Contractor, however, shall maintain copies of all testing and inspection reports at the Project site for inspection and copying by Owner.
2. The performance of testing or inspection by Owner or Owner's Testing Laboratory does not relieve Contractor from responsibility for meeting all requirements of the Contract Documents.

END OF SECTION 01 45 00

PART 1 GENERAL

1.01 SUMMARY

A. General: Owner will select and employ an independent testing agency, engineering service, or a special inspector to conduct the tests and inspections to be provided by Owner. Inspections that are normally associated with obtaining State approval (e.g., electrical work as specified in Division 26, etc.) shall be provided and paid for by Contractor. Contractor shall comply with all applicable building codes and provide all testing services required by the Contract Documents unless specifically identified as Owner's responsibility.

B. Owner's testing agency shall prepare test reports, logs and certificates applicable to the Work for which Owner will provide testing and shall deliver the specified number of copies to the designated parties. If any inspection or testing reveals failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for Owner's services and expenses, shall be at Contractor's expense.

1.02 DESCRIPTION

A. Definition: For the purpose of this Section, all references made herein to testing laboratory, testing agency, or special inspector shall refer to as the tests or inspections conducted by a special inspector provided by Owner.

1.03 QUALITY ASSURANCE

A. Qualifications: Contractor's inspection personnel must be approved by Owner and possess certain qualifications as stated in this Section. The testing agency shall comply with all requirements of ASTM E329.

1. The inspector for waterproofing and roofing shall have specialized technical knowledge and experience specific to waterproofing and roofing.
2. The testing agency for concrete testing and inspection services should be an agency other than the agency employed by Contractor for the purpose of establishing concrete mix designs, etc.
3. Geotechnical inspection will be performed by a licensed geotechnical consulting firm.

1.04 DUTIES OF OWNER'S TESTING AGENCY

A. General: Testing agencies shall conduct testing and inspection services, interpret them, evaluate the results for compliance with the Contract Documents, and report the findings to the Owner, Contractor, and local building authority, as applicable. Testing and inspection services shall be performed in accordance with applicable ASTM standard methods or other specified procedures.

B. Testing: Materials to be tested are those so specified and others as Owner or authorities having jurisdiction over the Project may direct.

C. Inspection: Inspections, continuous and special, shall be performed by the inspectors as required by the Contract Documents and authorities having jurisdiction.

D. Rejected Work: Inspectors shall have the right to recommend rejection of materials and workmanship that is defective. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the Project site without charge to Owner. If Contractor does not correct rejected work within a reasonable time, Owner may elect to correct the work and charge the expense to Contractor.

E. Inspectors are not authorized to do the following:

1. Release, revoke, waive, alter, or enlarge on requirements of the Contract Documents;
2. Approve or accept any portion of the Work, except as specified for soil conditions (i.e. bearing capacities, etc.);
3. Perform any duties of Contractor; or
4. Stop Work.

F. Should the Owner elect at any time before Final Acceptance to make an examination of Work already completed by removing or tearing out the same, Contractor shall on request promptly furnish all necessary facilities, labor, and material. If such Work is found to be defective in any respect, Contractor shall be responsible for the cost of such examinations and of satisfactory reconstruction. If such Work is found to meet the requirements of the Contract, however, Owner shall be responsible for the cost of such examinations and of satisfactory reconstruction.

1.05 PAYMENTS

A. Owner shall pay for the cost of initial testing and inspection, except as otherwise specified in the Contract Documents. Initial tests and inspections are defined as the first tests and inspections as hereinafter specified.

B. In the event any test or inspection reveals Work not in compliance with the Contract Documents, Contractor shall pay for or be backcharged for all costs of re-testing and/or re-inspection.

C. Additional tests and inspections not herein specified but requested by Owner shall be paid for by Owner, unless the results of such tests or inspections reveal Work not in compliance with the Contract Documents, in which case Contractor shall pay for or be backcharged for all costs of testing, re-testing, re-inspection, and any related Owner costs.

D. Costs for additional tests or inspections required because of any change in materials or change in the source of supply from that specified shall be paid by or backcharged to Contractor.

E. Contractor is responsible for all work required to correct any deficiencies.

F. Contractor is responsible for the cost of any testing required for the convenience of Contractor in the scheduling and performance of the Work.

G. Contractor is responsible for the cost to verify testing done without prior notice, with improper supervision, or contrary to construction practice, and for testing of materials for which mill reports are required but not furnished.

H. Contractor is responsible for the cost of any testing that is required to be performed by Contractor by the Contract Documents.

1.06 TESTS AND INSPECTION REPORTS

A. Copies of Test and Inspection Reports: Copies of test and inspection reports will be distributed at weekly intervals. Such reports shall include all tests performed, regardless of whether such tests indicate that material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations shall also be reported. Test and inspection reports shall be distributed electronically as requested by Owner.

B. Test and inspection reports shall be distributed as follows:

1. Architect/Engineer;
2. Owner; and
3. Contractor.

1.07 CONTRACTOR'S RESPONSIBILITIES

A. Coordination: Contractor shall initiate and coordinate all required tests and inspections, including conforming with requirements of applicable public agencies and authorities. Inspection of the Work does not relieve Contractor of any obligation under the Contract. The Owner's Designated Representative shall have authority to reject Work that is not in compliance with the Contract Documents.

B. Access: Inspectors shall at all times have free access to the Work, wherever the Work is in preparation. Contractor shall at all times provide and maintain proper facilities and safe access for such inspection. Contractor shall also cooperate with testing personnel and furnish access, tools, samples, certifications, test reports, design mixes, equipment, storage, and requested assistance.

C. Storage Facilities: Contractor shall furnish adequate storage facilities for the sole use of the testing laboratory for safe storage of specimens that must remain on the site.

D. Data: Furnish records, drawings, certificates and similar data, including Shop Drawings and Change Orders, as may be required by the testing and inspection personnel to confirm compliance with the Contract Documents.

E. Notice: Contractor shall furnish notice to Owner and inspector at least 48 hours in advance of all required tests and inspections, unless otherwise specified.

F. Defective Work: Contractor shall remove and replace any Work found defective by Owner or not complying with the Contract Documents at no additional cost or Contract Time. Where testing personnel take cores or cut-outs to verify compliance, repair prior to acceptance. Where defective Work requires redesign, any redesign costs shall be paid for by Contractor.

G. Cancellations: Contractor shall give sufficient advance notice to the inspector to allow in the event of any cancellation or rescheduling of a previously scheduled test or inspection. Any charges due to insufficient advance notice of cancellations or delay shall be paid by or backcharged to Contractor.

1.08 TEST FAILURES

A. Where a sample fails to pass a required test, Owner may permit re-testing of the sampled material. In such cases, two samples shall be tested and the material shall be rejected if either of the two subsequent samples fail.

1.09 REPORTING TEST FAILURES

A. Immediately upon inspector’s determination of a test failure, inspector shall notify Owner. On the same day, inspector shall send written test results to those named on the distribution list above.

1.10 REMOVAL OF MATERIALS

A. Unless otherwise directed, materials not conforming to the requirements of the Contract Documents shall be promptly removed from the Project site and properly disposed of without additional expense to Owner.

END OF SECTION 01 45 23

PART 1 GENERAL

1.01 SUMMARY

A. Contractor shall be evaluated on performance throughout the course of the contract to provide past performance documentation for future projects.

B. Section includes:

1. Program Objectives;
2. Performance Categories and Assessment;
3. Evaluation Reports;
4. Notice, Review and Appeal.

1.02 PROGRAM OBJECTIVES

A. The Contract Performance Evaluation Program is intended to improve contractor selection given the following primary objectives:

1. Assist the Owner in evaluating the contractor's qualifications and proven ability to successfully perform future contracts when past performance has been previously documented;
2. Provide the University objective data relating to Contractor responsibility;
3. Provide contractors with a means of enhancing their qualifications and reputation by receiving recognition for exceptional performance;
4. Encourage better working relationships between the University and the Contractor and to provide feedback to the contractor during and after the contract period;

1.03 PERFORMANCE CATEGORIES AND ASSESSMENT

A. Contractor shall be evaluated based upon the following categories:

1. Schedule and Time Management;
2. Quality Management;
3. Communication Effectiveness;
4. Management Approach;
5. Code and Compliance; and
6. Cost.

B. Each of the above categories will be assessed by multiple key project stakeholders and provided one of the following performance levels based upon objective and cumulative data:

1. Outstanding (5): Contractor has exceeded the majority of all of the significant contract criteria and has met or exceeded the Schedule, Quality, Communications, Management, Code Compliance and Cost requirements of the contract. The contractor was extremely or completely knowledgeable of the contract requirements and applicable laws and regulations. A very consistent high level of cooperation, project management, and job site control appreciably contributed to an unusually good result.
2. Very Good (4): Contractor has exceeded many of the significant contract criteria and has met or exceeded some of the Schedule, Quality, Communications, Management, Code Compliance, and Cost requirements of the contract. The contractor was knowledgeable of the contract requirements and applicable laws and regulations. Was generally cooperative and performed their work with minimal prompting. Their performance results were very good.
3. Satisfactory (3): Contractor has satisfactorily met the overall contract criteria and has met the overall Schedule, Quality, Communications, Code Compliance and Cost requirement of the contract. The contractor occasionally had to be prompted or reminded of the contract requirements, but overall the project was acceptable, producing an acceptable result.
4. Marginal (2): Contractor may have met many, but not all, of the contract criteria and failed to meet one or more of the Schedule, Quality, Communications, Code Compliance or Cost performance requirements of the contract. Even though the project may have been accepted, the contractor's performance, as evaluated, was marginal overall. The contractor frequently had to be prompted or reminded of the contract requirements; overall the project was less than satisfactory.
5. Unsatisfactory (1): Contractor failed to meet many or most of the contract criteria and failed to meet the overall Schedule, Quality, Communications, Code Compliance and Cost performance requirements of the contract. While the project may have been accepted by the owner, the effort expended in prompting the contractor to perform was excessive. The contractor's poor or uncooperative performance created serious unnecessary and avoidable difficulties in achieving contract completion.

1.04 EVALUATION REPORTS

A. At the midpoint of project completion, Owner shall provide contractor with a draft Contract Evaluation Report based upon the current performance during the contract. This shall provide the Contractor an opportunity improve performance levels during the contract, and provide an opportunity for Contractor-Owner communication and working relationship.

B. A final Contract Performance Evaluation Report will be completed upon contract completion and shall become the official report of record.

1. A Summary Contract Performance Evaluation will be provided to the Contractor within 30 calendar days after Final Completion.
2. Final Contract Performance Evaluation Reports will remain on record for a minimum of 5 years from date issued.

C. Upon receipt of the Summary Contract Performance Evaluation, Contractor shall review the report and may request a debrief conference within 21 calendar days of receipt.

D. If after the debrief, Contractor would like to dispute the evaluation findings the Contractor shall submit in writing, the specific reasons for disagreement and include the basis for their appeal within 14 calendar days following the debrief.

1. Upon receipt of appeal, Owner shall convene a review with the Assistant Vice President, Facilities Services, Capital to consider the objectivity, accuracy, completeness and fairness of the Contract Performance Evaluation.
2. The Contractor shall be notified and issued a final determination within 30 calendar days of receipt of the appeal.

END OF SECTION 01 45 34

PART 1 GENERAL

1.01 TEMPORARY UTILITIES

A. Owner may furnish to Contractor temporary Owner-owned utilities when available and upon Owner written approval. Owner reserves the right to restrict the use of its utilities if, in its opinion, Contractor fails to adequately conserve utilities or to use utilities appropriately. When using Owner-owned utilities, Contractor is to make metered connections to the nearest available service and disconnect same when no longer needed.

B. If Owner-owned utilities are not available at the Project site, or if Owner restricts use of Owner-owned utilities, Contractor shall obtain required services from commercial sources or public utilities, and Contractor is responsible to pay for all utility costs.

C. Contractor shall field verify the availability of utility services provided by Owner and coordinate the Work accordingly.

D. In remodeling projects where portions of the building are to remain in service, Contractor shall be responsible for coordinating the Work to maintain utility services to the occupied portions of the building.

1.02 TEMPORARY ELECTRICAL SERVICE

A. Contractor shall provide all services required for construction operations and may connect to existing services when available upon Owner approval. .

B. Contractor shall provide lighting for construction operations.

C. Contractor may use existing lighting when available and adequate.

D. Contractor shall maintain site lighting throughout the duration of the Work.

1.03 HEAT AND VENTILATION

A. Contractor shall provide heat and ventilation as required to maintain specified conditions for construction operations and to protect materials and finishes from damage due to temperature or humidity.

B. After a building is substantially enclosed, the permanent heating system or a temporary hook-up of equipment from the permanent system may be used for temporary heat provided that the equipment is properly installed by the responsible electrical and mechanical Subcontractors and available for supplying temporary heat. Owner shall be the sole judge of the adequacy of the building enclosure for temporary heating or cooling purposes.

C. Contractor shall arrange with the electrical and mechanical Subcontractors installing said systems and equipment for the use, operation, and maintenance of

the systems. Contractor shall pay for all connections and attendants for temporary heating, including necessary accessories such as temporary (construction) air filters to protect the air distribution systems from contamination.

D. Contractor shall provide a dust free air distribution system and correct all damage to this system caused by the Work.

E. In existing facilities, Contractor shall coordinate use of the existing systems with Owner. Contractor shall extend and supplement with temporary units as required to maintain specified conditions for construction operations.

F. Use of electric resistance type heating systems for temporary heat is prohibited.

G. The warranty period for any permanent equipment used during construction will not commence until Contractor achieves Substantial Completion.

1.04 TEMPORARY WATER SERVICE

A. Unless available from an Owner-owned utility, Contractor shall provide service required for construction operations. At all times, Contractor shall utilize backflow/cross-connection devices, certified by Owner, to safeguard water supply.

B. For Work in existing facilities, Contractor shall connect to existing services when approved by Owner and extend branch piping with outlets so that water is available for use by all persons associated with the Work.

C. Provide drinking water from a safe source for all those associated with the Work.

1.05 SANITARY FACILITIES

A. Use of permanent and/or existing Owner’s facilities will be allowed as long as proper cleanliness is maintained. If, in the opinion of the Owner, restrooms are not being properly maintained, Contractor will be required to provide its own sanitary facilities at its own expense.

B. Owner will designate any restrooms that can be used by Contractor personnel.

1.06 BARRIERS

A. Contractor shall provide barriers as required to prevent public entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. When temporary fencing is indicated by the Drawings, or if fencing is provided at Contractor's option, enclosures shall be constructed of 6 feet high commercial grade chain link with vehicular and personnel gates, as required.

1.07 ENCLOSURES

A. Contractor shall provide temporary weather-tight closures of openings to provide acceptable working conditions, protect materials, facilitate temporary heating, and prevent entry of unauthorized persons. Provide doors with self-closing hardware and locks.

B. Contractor shall provide temporary roofing when so indicated by the Drawings or when made necessary by the Project requirements.

C. Contractor shall provide temporary dust-proof partitions when required to confine dust and moisture to the immediate Work area.

D. Contractor shall provide temporary noise-proof partitions when required to confine noise to the immediate Work area.

1.08 PROTECTION OF EXISTING FACILITIES

A. Utility Tunnel Protection: Contractor shall provide adequate planking across any tunnels to distribute loads and prevent damage. If necessary, Contractor shall provide temporary shoring inside tunnel areas.

B. Low Overhead Clearance: Contractor shall be fully responsible for addressing all vehicular limitations caused by low overhead restrictions throughout campus. Route all traffic to avoid damage to overhead structures. Review proposed routing with Owner prior to commencement of construction.

C. Tree and Plant Protection: Contractor shall protect trees and other plants not scheduled for removal; maintain protection until Project completion.

1. In the event that a tree or plant is damaged as a result of the Work that, in the opinion of Owner, requires replacement, Contractor shall be responsible for such replacement.
2. If at any time Contractor judges that the protection of plant materials designated to be saved is incompatible with Work required, or if operations necessarily threaten the health of any plant material, Contractor shall immediately notify Owner and cease Work affecting the area until a written agreement is reached concerning acceptable procedure.

1.09 SECURITY

A. Contractor shall provide security to protect the Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, and theft. Coordinate with Owner's security program.

B. During construction, all openings to Owner's utility tunnel system must be protected against unauthorized entry. Contractor shall provide closures, approved by Owner, including locked doors or hatches at any openings created

by the Work.

1.10 PROTECTION OF INSTALLED WORK

A. Contractor shall provide temporary protection for installed products. Control traffic in immediate area to minimize damage.

B. Contractor shall provide protective coverings for walls, projections elevator cabs, jambs, sills, and soffits of openings. Protect finished floors and stairs from traffic, movement of heavy objects, and storage.

C. Contractor shall prohibit traffic and storage on waterproofed and roofed surfaces and on lawns and landscaped areas.

1.11 CLEANING DURING CONSTRUCTION

A. Contractor shall clean the site each day during construction and shall prevent the accumulation of waste materials and rubbish.

B. Contractor shall clean interior areas prior to the start of finish Work and maintain areas free of dust and other contaminants during finishing operations.

1.12 OFF-SITE CLEAN UP

A. Contractor shall continuously keep sidewalks, lawns, parking areas, and streets clear of construction materials, debris, gravel, rock, and dirt related to the Project.

1.13 LIFTING DEVICES AND HOISTING FACILITIES

A. Contractor shall provide cranes, hoists, towers, and other lifting devices necessary for the proper and efficient movement of materials.

1.14 MECHANICAL AND ELECTRICAL SYSTEM SHUT-DOWNS

A. Any shut-down of mechanical or electrical systems affecting Owner's operations shall be scheduled by Contractor during off-hours. Contractor shall submit a written shut-down request providing at least 14 Days advance notice. Any shut-down must be coordinated with and approved by Owner.

1.15 CONSTRUCTION PARKING

A. Contractor's employees may park only in accordance with campus traffic and parking regulations and pay all required fees.

B. When working in Pullman's central campus, Contractor’s vehicular use will be limited to the following:

1. Delivery of materials to and from Project site;

2. Single vehicle for use by Project supervisor of each major Contractor

(four total vehicles maximum); and

3. Workers' vehicles shall not be allowed to park in the central mall.

1.16 NOISE CONTROL

A. Any construction related noise that interferes or is likely to interfere with normal use of adjacent space(s) shall be scheduled and approved by Owner.

B. Contractor shall restrict any construction related noise to the hours approved by Owner and in accordance with the state and local noise ordinance.

C. Owner may approve Contractor working extended hours. Request any extended hours of operation with Owner.

1.17 TRAFFIC OBSTRUCTIONS

A. Contractor shall submit a written traffic control plan for all traffic obstructions, either pedestrian or vehicular, for approval by Owner, per the Pre-Construction Submittal Requirements of Section 01 33 00.

B. In some cases, it may be necessary to develop special routes for large or unwieldy deliveries that could interfere with pedestrian movement, especially at peak times.

C. Contractor shall avoid deliveries or equipment operations that block street traffic during peak times.

D. Pedestrian Obstructions: Any equipment on sidewalks or other pedestrian ways shall be barricaded. Barricades shall include a horizontal member at a maximum of two feet above the walking surface.

1.18 REMOVAL OF TEMPORARY FACILITIES

A. Contractor shall remove temporary materials, equipment, services, and construction facilities prior to Substantial Completion inspection.

B. Contractor shall clean and repair damage caused by installation or use of temporary facilities.

C. Contractor shall restore existing facilities used during construction to specified or original condition.

END OF SECTION 01 50 00

PART 1 GENERAL

1.01 PRODUCTS

A. Products include material, equipment, and systems.

B. Comply with Specifications and referenced standards as minimum requirements.

C. Components required to be supplied in quantity within a specification section shall be the same, and shall be interchangeable.

D. All materials shall be new unless specifically noted otherwise.

1.02 TRANSPORTATION AND HANDLING

A. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

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

1.03 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.

B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.

C. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.

D. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under required conditions.

1.04 VARIATION FROM SPECIFIED PRODUCTS

A. Subsequent to Bid Opening/Proposal - Approved Equivalents:

1. Requests for approved equivalents will only be considered when approved equivalent statements, used in reference to product

specifications, are specifically provided for within individual Specification sections.

2. The terms "or an approved equivalent", "approved equivalent", or similar statements, when used herein in connection with manufacturers' products, shall be understood to mean products that are equally effective and suitable for their intended use; based on the judgment of the Owner, whose decision shall be final.

3. Written requests for consideration by the Owner of approved equivalents may be submitted throughout the Project.

4. Time extensions and additional costs resulting from use of approved equivalent products will not be considered.

B. No Substitutions:

1. The terms "No Substitutions", "Alternative Products not Acceptable", or similar statements used in reference to product specifications, shall mean that only the specified product will meet the needs of the University and that no other products will be considered at any time before or during the Project.

C. Requirements and Procedures for Product Variations:

1. The Contract is based on the standards of quality established in the Contract Documents.

2. Substitution or approved equivalent revisions shall be made only with the prior written acceptance of the Owner.

3. All requests for substitutions or approved equivalents must be on the proposer's letterhead and shall be accompanied by complete specifications, samples, records of performance, certified copies of tests by impartial and recognized laboratories, and such other information as the Owner may request to prove the merit of the proposed revisions.

4. The Contractor assumes the responsibility for capacity, dimensions, clearance, etc., of the named manufacturer's particular item to assure that the revision meets the requirements.

5. The Contractor shall assume the cost of any redesign, in the form of changes to the Drawings, or for the Work of any other trades, or any other costs required to properly incorporate any revision associated with substitutions or use of approved equivalent products.

6. Final decisions as to the quality and suitability of proposed revisions will rest solely with the Owner and will be based on proof submitted.

7. When the Owner approves a substitution or approved equivalent proposed by the Contractor, it is with the understanding that the Contractor certifies that the article or material is equivalent to or better than that specified.

END OF SECTION 01 60 00

PART 1 GENERAL

1.01 PURPOSE

A. Provide for an orderly, timely, and efficient completion of the Work for Owner.

1.02 SUBSTANTIAL COMPLETION

A. Requirements for Substantial Completion: Contractor shall comply with all requirements for Substantial Completion identified in the General Conditions and other Contract Documents. Prior to Substantial Completion, Contractor must have constructed the Work in substantial accordance with the Contract Documents, and:

1. Certificate of Occupancy received from the AHJ.
2. All elements of the Work must be operational and in good working order and condition, except for incidental punchlist Work;
3. The fire and life safety systems, if any, must be tested and accepted;
4. Any elevators must be operational, functioning, and in good working order and condition, and be fully approved for use;
5. All mechanical, electrical, plumbing, telecommunications, security, and access control systems must operate and function in good working order and condition, including commissioning;
6. The finish portion of the Work must be complete including but not limited to paint, trim, doors, partitions, cabinetry, floor coverings, ceilings, wall finish, and other finish surfaces, except for incidental punchlist Work;
7. All roadway improvements, paving, sidewalks, parking areas, other street improvements, lighting, landscaping and irrigation must be complete;
8. Utilities must be complete, connected, and operating normally;
9. Contractor must have removed all construction facilities, temporary controls, and construction debris;
10. Contractor must have completed training Owner’s personnel on all operating instructions and submitted training DVDs; and
11. Final cleaning.

B. Prior to Substantial Completion Contractor shall request in writing that Owner grant Substantial Completion. Accompanying the request Contractor submit the following:

1. A list of all items remaining to be completed or corrected;
2. Signed originals from authorities having jurisdiction of all certificates of compliance and final approval, as applicable;
3. All system software files required by the Contract Documents, including

but not limited to lighting and environmental controls;

4. Revised Draft Operation & Maintenance manuals; and

5. Draft Project Record.

C. Upon satisfactory completion of the requirements for Substantial Completion, Owner shall prepare and forward to Contractor a letter of Substantial Completion. The letter will identify the date of Substantial Completion and include a punch list identifying all remaining incomplete Work. Contract warranties shall begin as of the date of Substantial Completion.

1.03 FINAL COMPLETION

A. Requirements for Final Completion: Upon receipt of Contractor's written Notice that Contractor has inspected and completed punch list items and that the Work is ready for final inspection and acceptance, Owner will promptly make such inspection accompanied by Contractor. If Owner determines that some or all of the punch list items are not complete, Contractor shall be responsible to Owner for all costs, including re-inspection fees, for any subsequent inspection to determine completion of the punch list. When Owner finds all punch list items complete and the Work and Contract fully performed, Owner shall establish the date of Final Completion. Owner is not required to establish Final Completion until the following are complete:

1. Complete all requirements listed in the Contract Documents for Substantial Completion of the Work;

2. Complete all remaining punch list items and remaining Work, and obtain approval by Owner that all Work is complete;

3. Obtain permanent occupancy permits (if only a temporary occupancy permit was issued at Substantial Completion);

4. Submit Project Record, any final property survey, and final Operation and Maintenance manuals (if not previously submitted) required by the Contract Documents;

5. Deliver any required tools, spare parts, extra stock of material and similar physical items to Owner as required by the Contract Documents;

6. Complete cleaning after completion of punch list;

7. Submit executed warranties;

8. Complete any required sustainability documentation for which Contractor is responsible;

9. Submit a final comprehensive list of all Subcontractors of all tiers and suppliers for the Project; and

10. Submit certification that materials used in the Work are "asbestos-free" and that all requirements of governing jurisdictions related to the Project have been addressed.

11. Final Project Record.

B. Upon satisfactory completion of the requirements for Final Completion, Contractor shall submit a final Application for Payment.

1.04 FINAL ACCEPTANCE

A. Requirements for Final Acceptance: Final Acceptance shall be established by Owner in writing. Owner shall not be obligated to accept the Project as complete before Final Completion has occurred and Contractor has submitted the following:

1. An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which Owner or Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, except for any claims that are specifically identified on the affidavit (Affidavit of Payment of Debts and Claims, AIA form G706 or equivalent).
2. A certificate or written statement evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 Days' prior written Notice has been given to Owner.
3. Receipt of consent of surety, if any, to final payment (AIA form G707 or equivalent).
4. If required by Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by. If a Subcontractor refuses to furnish a release or waiver required by Owner, Contractor may furnish a bond satisfactory to Owner to indemnify Owner against such lien. If such lien remains unsatisfied after payments are made, Contractor shall refund to Owner all money that Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.
5. Provide copy to Owner of all "Affidavits of Wages Paid". Pursuant to RCW 39.12.040, an "Affidavit of Wages Paid" from Contractor and from each Subcontractor certified by the Industrial Statistician of the Washington State Department of Labor and Industries, with the fees paid by Contractor or Subcontractor.

B. Contingent upon completion of all Affidavits of Wages Paid, the "Notice of Completion of Public Works Contract" form may be completed by Owner.

1.05 RETAINAGE

A. Retainage must be held at least 45 Days following Final Acceptance. If there are either unpaid taxes or fees, or unsatisfied claims of lien against the retained percentage, disbursement of retainage funds will be made in accordance with Washington law.

B. The retainage will be held and applied by Owner as a trust fund in the manner required by RCW 60.28. Release of the retainage will be processed in the ordinary course of business following Final Acceptance of the Work by Owner, provided no notice of lien has been given as provided in RCW 60.28, no claims have been brought to the attention of Owner, Owner has no claims under the Contract, and the requirements below have been met.

C. Owner shall not release retainage until the following requirements have been satisfied.

1. "Certificate of Payment of State Excise Taxes by Public Works Contractor": Following receipt of Owner's notice of completion and after determining that all taxes, increase and penalties due from Contractor have been paid, the Department of Revenue will issue this certificate to Owner.
2. "Certificate of Payment of Contributions, Penalties and Interest on Public work Contract": Upon receiving a copy of Owner's notice of completion and after determining that Contractor is in compliance with the provisions of the Employment Security Act, the Employment Security Department will issue this certificate to Owner.
3. "Certificate of Release": Upon receipt of Contractor's request for release and verification from its records that required premiums have been paid by Contractor and each Subcontractor, the Department of Labor and Industries will issue a statement to that effect.

END OF SECTION 01 70 00

PART 1 GENERAL

1.01 SUMMARY

A. This Section specifies administrative and procedural requirements for field engineering services, including but not limited to the following:

1. Land survey Work; and
2. Establishment of coordinated reference points for general building layout and location.

1.02 SUBMITTALS

A. Project Record: Contractor shall submit a record of Work performed and record survey data as required by the Contract Documents.

1.03 QUALITY ASSURANCE

A. Surveyor: Contractor shall engage a registered Professional Land Surveyor registered in the State of Washington to perform the required land-surveying services.

B. Owner may furnish surveys describing physical characteristics, legal limitations, utility locations, and a legal description for the Project site. Contractor may rely on the information furnished by Owner but must exercise proper precautions to ensure the safe performance of the Work. Contractor shall assume that the locations of any underground or hidden utilities, underground tanks, plumbing, or electrical runs indicated in the surveys or Contract Documents are shown in approximate locations, but Contractor is responsible for verifying the location of all utilities impacted by the Work. Additionally, Owner may make available to Contractor the results of investigations of hidden or subsurface conditions for the convenience of Contractor. While Contractor may rely upon such investigation results, there is no guarantee, express or implied, that the conditions indicated are representative of those existing throughout the Project site, or that unforeseen developments may not occur. Contractor is solely responsible for interpreting the information and extrapolating beyond the location, including each individual boring, test pit, or other locations.

1.04 EXAMINATION

A. Identification: Contractor shall verify the location of benchmarks and control points provided by Owner.

B. Contractor shall verify layout information on Drawings in relation to the property survey and existing benchmarks before proceeding to layout the Work.

Contractor shall also locate and protect existing benchmarks and control points and preserve permanent reference points during construction.

1. Do not change or relocate benchmarks or control points without prior written approval of Owner. Promptly report lost or destroyed reference points and requests to relocate reference points because of changes in grades or locations.
2. Promptly replace lost or destroyed Project control points. Base replacements on the original survey control points.

C. Contractor shall establish and maintain a minimum of two permanent benchmarks at the Project site.

1. Record benchmark locations, with horizontal and vertical data, on Project Record.

D. Existing utilities and equipment: The existence and location of underground and other utilities are not guaranteed. Before beginning the Work, Contractor shall investigate and verify the existence and location of underground and other utilities (including irrigation and snow melt systems).

1. Prior to construction, verify the locations and invert elevation at points of connection sanitary sewer, storm sewer, and water service piping.

1.05 PERFORMANCE

A. Contractor shall work from lines and levels established by the property survey; establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to locate each element of the Project; and calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.

1. Advise entities engaged in Work activities of marked lines and levels provided for their use.
2. As construction proceeds, check every major element for line, level, and plumb.

B. Surveyor’s Log: Contractor shall maintain a surveyor’s log of control points and other survey Work. Make this log available to Owner for reference.

1. Record deviations from required lines and levels and advise Owner when deviations that exceed indicated or recognized tolerances are detected. On Project Record, record deviations that are accepted and not corrected.
2. Following completion of foundation walls, major site improvements, and other Work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and site Work.

C. Site Improvements: Contractor shall locate and lay out site improvements, including pavement, stakes for grading, fill and topsoil placement, utility slopes, and invert elevations.

D. Existing Utilities: Contractor shall furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines, services, or other appurtenances affected by construction. Contractor shall coordinate with local authorities having jurisdiction.

E. Contractor shall record accurately on the Project Record the principal metes, bounds, lines, and levels of the Project.

END OF SECTION 01 71 23

PART 1 GENERAL

1.01 SUMMARY

A. This Section describes the waste management and recycle management criteria for debris and solid waste generated as part of the Work.

B. Contractor shall be responsible for sorting, segregating, and placing designated waste materials into containers provided by Owner. Contractor shall be responsible for segregating and disposing all unacceptable and dangerous wastes as defined below.

C. Owner shall be responsible for furnishing waste collection containers, servicing those containers, and disposing solid waste from the Project, with the exception of unacceptable and dangerous waste.

D. Waste that is disposed of by Contractor shall be in accordance with all applicable local, state, and federal regulations, including WAC 173-350, Solid Waste Handling Standards, and WAC 173-303, Dangerous Waste Regulations.

1.02 DEFINITIONS

A. Construction Waste: Waste resulting from the Work.

B. Dangerous Waste: Solid waste designated in WAC 173-303 and/or 40 CFR. As used in this Section, the words “dangerous waste” will refer to the full universe of wastes regulated by WAC 173-303 and 40 CFR.

C. Demolition Waste: Largely inert waste, resulting from the selective demolition of buildings, roads and other man-made structures such as cured concrete, asphaltic compounds, brick and masonry, ceramic, glass, steel, and aluminum, and non-inert materials such as clean wood, composition roofing and roofing paper, and minor amounts of metal. Plaster (i.e., sheetrock or plaster board) or any other material, other than clean wood, that is likely to produce gases or leachate during its decomposition process and asbestos waste are not considered to be demolition waste.

D. Land Clearing Waste: Natural vegetation and clean soils from clearing and grubbing land for development such as stumps, brush, weeds, tree branches, tree bark, mud, dirt, sod and rocks.

E. Recycle/Recycling: The process of separating waste materials for remanufacturing or reprocessing into usable or marketable materials. Examples of recycling include separating wood off-cuts for recycling by a wood processor into paper pulp, or separating cardboard, plastic, beverage containers, or miscellaneous metals for recycling.

F. Reuse: To use a construction waste material again in roughly its same form. Materials can be reused on-site or on other projects off-site. Examples of reuse

include removing a hardwood floor and reinstalling it in a new project, or using soil from one site as fill on another site.

G. Salvage: To remove a construction waste material or equipment from an existing building for reuse on-site or reuse on other projects off-site. Items to be salvaged shall be designated by Owner for removal and delivery to Owner.

H. Unacceptable Waste: All waste not authorized for disposal by Owner. This includes any waste that is now or hereafter defined by federal law or by the governing jurisdiction as radioactive, dangerous, hazardous or extremely hazardous waste, unsanitary waste, and vehicle tires in excess or those permitted to be disposed of by the laws of the governing jurisdiction. It does not include any waste destined for salvage, recycling, or general demolition.

I. Waste: All solid waste generated within the limits of the Project, or extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable and recyclable materials, masonry, and concrete.

J. Waste Management Plan: A Project-specific plan for the salvage, collection, transportation, recycling, and disposal of the waste generated at the Project site. A waste management plan includes procedures for separating, storing, and transporting waste and includes methods to assure proper implementation of the plan.

1.03 WASTE MANAGEMENT PLAN

A. Draft Waste Management Plan: Per the Pre-Construction Submittal Requirements of Section 01 33 00, Contractor shall submit to Owner a Draft Waste Management Plan. The Draft Plan shall contain the following:

1. List of materials to be salvaged, materials to be recycled, and materials to be disposed of as solid waste, and dangerous waste.
2. General material handling methods, including segregation and sorting, and placing solid waste into designated containers, on-site storage, and any special procedures for removing and protecting materials.
3. Plan for communicating salvage and recycling requirements on the Project.
4. Dangerous waste identification, accumulation, and disposal management procedures.
5. Materials to be sorted, salvaged, and recycled:
    a. At a minimum, the following types of materials in reusable condition shall be salvaged and sorted. Contractor shall remove and deliver to the Owner at designated location on the Pullman campus.
        1) Surplus building materials (new, leftover, unwanted). Review with Owner for clarification.

b. At a minimum, the following types of materials shall be sorted and included for recycling:

1) All metals (from banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze);

2) Beverage containers;

3) Cardboard (from supplies and packaging);

4) Clean wood (all unpainted, untreated wood scrap including pallets and engineered wood);

5) Mixed office paper (including blue prints);

6) Film plastic (from shrink wrap and other packaging, and sheeting used as protection or erosion control); and

7) Plate glass.

c. With the exception of unacceptable waste, all materials not designated for salvage or recycle per Paragraph 1.03(A)(5) above, may be co-mingled and disposed of as waste.

B. Dangerous Waste Management:

1. Contractor is responsible for all dangerous waste generated during the Project shall be identified, accumulated and disposed in accordance with WAC 173-303. Contractor generated dangerous waste must be shipped for disposal within 90 Days of generation.

2. Contractor may accumulate dangerous waste in accordance with WAC 173-303 and Washington Department of Ecology Technical Information Memorandum 94-120, Satellite Accumulation. If Contractor accumulates dangerous waste in volume greater than 55 gallons or acutely hazardous waste in a volume greater than one quart, Contractor shall establish and operate a “90-Day” accumulation area in accordance with WAC 173-303.

3. Contractor shall dispose dangerous waste only through vendor(s) approved by Owner. Contractor shall arrange all dangerous waste shipments. Utilization of the vendor and facilities included in the State of Washington Hazardous Waste Disposal contract is authorized. Any other proposed vendor(s) and/or facilities are subject to audit by Owner, prior to utilization. Contractor shall pay for said audits. Contractor shall coordinate with Owner’s Environmental Health & Safety (EH&S) Department for transportation and disposal of all Project generated dangerous waste. EH&S will sign all Uniform Hazardous Waste Manifests.

C. Final Waste Management Plan: Once Owner has reviewed the draft Waste Management Plan and responded with comments or corrections, Contractor shall submit a final plan within 14 Days.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 WASTE CONTAINMENT

A. Owner will provide and service containers for all wastes, with the exception of unacceptable waste. This service is at no cost to Contractor.

B. Contractor shall provide separate waste containers for and properly dispose of all unacceptable waste, including dangerous waste, in accordance with applicable law.

3.02 CONTAMINATION OF WASTE

A. Contractor shall take extraordinary care to ensure construction wastes are properly sorted, segregated, and placed within the correct containers.

B. Should any waste containers designated for salvage, recycle, or general disposal be cross-contaminated with dangerous or unacceptable waste, Contractor shall pay all costs of legally disposing the contaminated waste.

C. Co-mingling of waste:

1. Should designated recycle or salvage containers become cross contaminated with other than unacceptable wastes, the Contract Sum shall be reduced at a rate of $500.00 per cubic yard size of container. (i.e. a partially full, co-mingled 3 yard container would result in a charge to Contractor of $1,500.00).

D. Project progress meetings shall include review of construction waste management as an agenda item.

END OF SECTION 01 74 19

PART 1 GENERAL

1.01 PURPOSE

A. Contractor shall submit advance/draft electronic of Operation & Maintenance manuals (O&Ms) at or immediately following the 80% Application for Payment. Subsequent Applications for Payment will not be processed until an advance/draft copy of the O&Ms has been submitted for review.

B. Contractor shall submit a final draft of O&Ms on or before Substantial Completion and provide training of Owner's staff in the operation and maintenance of the facility.

1.02 PROCEDURES

A. Together with a request for Substantial Completion, Contractor shall provide one revised draft electronic version of O&Ms.

B. To achieve Final Completion, Contractor shall submit :

1. Two final copies of O&Ms;
2. A text-searchable PDF electronic file of the O&Ms;
3. Separate Test & Balance Reports and Telecommunications Test Reports in an independent three ring binder;
4. A text-searchable PDF electronic file of the Test & Balance Reports and Telecommunications Test Reports.

PART 2 PRODUCTS

2.01 O&M MANUAL MATERIALS

A. O&M Manuals shall be bound into 3-ring binders (three sets) with the cover and spine to be composed and laid out per the cover page template on the last page of this Section.

B. The maximum thickness for each manual shall be 3". Multiple manual sets shall be organized by:

1. General,
2. Vertical Transportation,
3. Mechanical,
4. Electrical, and
5. Other (Laboratory Equipment, Special Equipment, etc.).

C. Paper shall be 8 1/2" x 11", 20 lb. white paper. Divisions within volumes are to be accomplished and annotated with permanently imprinted tabs (insertable indexes are not permitted) which indicate Specification Section numbers only.

D. Copies must be legible. Facsimile transmission copies are not acceptable. Original equipment manufacturer (OEM) printed material is preferred.

PART 3 EXECUTION

3.01 PRODUCTION

A. O&Ms are to be as follows:

1. Table of Contents – a listing of the contents of all volumes. This table of contents shall be inserted at the beginning of each volume in the set.
    a. Identify Contractor, include name, address, phone and fax number, and provide a contact name.
2. Subcontractor List – a list or spreadsheet, organized by Specification Section, of all suppliers and Subcontractors of all tiers who performed Work on the Project. Include the name, address, phone and fax number of Subcontractor or supplier, the Specification Section, and the description of the Work. When Subcontractors perform Work of more than one Specification Section, provide a separate listing of each Specification Section. This listing shall be at the beginning of volume #1 only.
    a. Written certification from Contractor attesting that no asbestos containing products have been incorporated into the Work.
3. Warranty List – a list or spreadsheet containing Contractor's one-year correction period obligation and all extended (greater than one-year) warranties, organized by Specification Section that indicates:
    a. Item Description (include here special warranty numbers or codes),
    b. Length of warranty,
    c. Specification Section, and
    d. Contractor's contact information, followed by physical copies of the Contractor's one-year correction period obligation and all extended warranties. Note that 1-year warranties from Subcontractors are not to be bound into each volume of the O&Ms. This warranty list and attendant warranties shall be at the beginning of volume #1 only, immediately following the asbestos certification.
4. Provide data as outlined in each specification section.

B. Original equipment manufacturer (OEM) information is required to be a part of all equipment information within the O&Ms.

C. Shop Drawings and product data initially submitted for acceptance are generally not acceptable for O&M use (one notable exception is snow melting cable layout drawing – a manufacturer detailed item). Routine Project components such as asphalt, concrete, pipe, fittings, conduit, etc., are not to be included in O&Ms.

END OF SECTION 01 78 23
(O&M cover and spine data on next page)

Facility No. 0078A, Electrical-Mechanical Engineering Building (EEME)

EEME Install Additional DX Units in 106

2024

General
O&M Manual

Vol. X of Y

(Spine and Cover)

PART 1 GENERAL

1.01 PURPOSE AND PROCEDURE

A. Contractor shall submit draft Project Record drawings on or before Substantial Completion. Requests for Substantial Completion will not be considered if submission of Project Record drawings has not occurred.

B. Contractor shall submit final Project Record drawings before Final Completion may be achieved.

PART 2 PRODUCTS

2.01 MATERIALS

A. Project Record drawings are to be red-line markings on original Drawings which clearly indicate the as-built dimensions (both horizontally and vertically) for all installed Work.

B. Identify on Project Record drawings all underground utilities encountered during the Work. Locate these utilities both horizontally and vertically and tie the dimension string(s) back to permanent and visible structures.

C. Clearly label each sheet with the words “PROJECT RECORD DRAWINGS.”

D. Do not affix requests for information (RFIs), change proposals (CCPs) or architectural supplemental instructions (ASIs) to the Project Record drawings. If all or part of a Drawing has been modified, it is acceptable to affix the revised layout over top of the original. However, all dimensions that have been modified are to be red-lined or yellow highlighted.

E. Copies must be legible.

PART 3 EXECUTION

3.01 PRODUCTION

A. During construction, Project Record information will be reviewed not less than monthly concurrent with the monthly review of the draft Application for Payment.

END OF SECTION 01 78 39

PART 1 GENERAL

1.01 DESCRIPTION

A. Owner has set the following indoor air quality requirements for site operations on the Project, within the limits of the Progress Schedule, Contract Sum, and available materials, equipment, products, and services. These include:

1. Protect workers on the site from air quality problems during construction.
2. Prevent indoor air quality problems in the completed facility.
3. Prevent indoor air quality problems in adjacent facilities.

B. To achieve these requirements, Contractor shall develop an “Indoor Air Quality (IAQ) Management Plan” for this Project.

C. Comply with current LEED Reference Guide.

1.02 IAQ MANAGEMENT PLAN MANAGER

A. Contractor shall identify an IAQ Management Plan Manager who will be responsible to monitor construction activities to ensure that the requirements of the IAQ Management Plan are met. The IAQ Manager may also be the Contractor’s Quality Control Manager. The IAQ Manager will be responsible for the following:

1. Draft and submit the IAQ Management Plan to Owner for acceptance.
2. Document IAQ Management Plan progress on a weekly basis.
3. Conduct meetings as required with all participants in the construction process to communicate the IAQ procedures and understand the importance of the requirements of the IAQ Management Plan. If necessary, post signs to ensure workers' safety.
4. Identify IAQ problems and institute remedial action as necessary.
5. Be present at regular Progress Meetings, as appropriate, and be responsible for providing a monthly written status report as it relates to IAQ for the Project and be prepared to discuss construction related IAQ procedures currently in effect.

1.03 IAQ MANAGEMENT PLAN

A. Draft IAQ Management Plan: Submit a Draft IAQ Management Plan within 14 Days after Notice to Proceed, which contains preliminary descriptions of the following procedures for which Contractor is responsible (initial installation, verification that element(s) are in place, daily inspection and upkeep, and removal):

1. List of indoor air quality protective measures to be instituted at Project site, including HVAC system protection during construction and any other control measure applicable to the Project;
2. A plan and schedule for inspection and maintenance of indoor air quality measures;
3. Installation sequencing for porous materials, including paint;
4. Measures to be employed to protect ducts and stored on-site or installed absorptive materials from moisture damage;
5. Type of filtration media used during construction
6. Cleanup of contaminated components after construction.

B. The Draft IAQ Management Plan shall meet or exceed the minimum requirements of the current Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines.

C. Final IAQ Management Plan: After review and comment on the "Draft IAQ Management Plan," Contractor shall submit a "Final IAQ Management Plan" that includes the finalized written procedures for above noted elements. This final plan shall address all review comments noted on the draft submittal and be submitted prior to the commencement of construction.

1.04 BUILDING FLUSH-OUT SCHEDULE – NOT USED

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 IAQ MANAGEMENT PLAN IMPLEMENTATION

A. Contractor shall implement and maintain the approved IAQ Management Plan for the duration of the Project and update procedures at any time due to unanticipated building conditions. Contractor shall:

1. Use temporary filtration media during construction to protect HVAC at each return air grille; filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 8 as determined by ASHRAE 52.2 - 1999. Isolate the return side of the HVAC system from the surrounding environment as much as possible. Return side shall have the heaviest Work areas dampered off and all return system openings sealed with plastic. Return side shall be shut down and sealed whenever possible.
2. Avoid the use of products, materials and operations that would cause IAQ problems or concerns.
3. Protect the ventilation system components (equipment and ductwork) from contamination, and provide cleaning of the ventilation components, including ductwork exposed to contamination during construction. Protect during transit and installation.

4. Provide ventilation as may be necessary to protect workers' health and avoid the accumulation of volatile compounds, dust and other harmful airborne contamination.

5. Provide weekly reports and photographs of construction IAQ management measures such as protection of ducts and stored or installed absorptive materials. In each report, describe and illustrate IAQ measures (installation, effectiveness, upkeep, etc.) during construction along with a description of the SMACNA approach employed.

6. Provide data sheets of filtration media used during construction and installed prior to building occupancy.

7. During installation of carpet, resilient flooring, paints, furnishings, and other VOC emitting products, provide supplemental (spot) ventilation for at least 72 hours after Work is completed and describe these activities in the weekly reports.

B. Contractor shall conduct regular inspection and maintenance of indoor air quality measures, including ventilation system protection and ventilation rate.

C. Contractor shall use low-toxic cleaning supplies for surfaces and equipment.

D. When dry sanding for gypsum board assemblies, Contractor shall provide the following protection:

1. Isolate the space;

2. Provide plastic sheet separation during sanding;

3. Close and seal all air system devices and ductwork; and

4. Sequence the Work to avoid contamination of other spaces with gypsum dust.

3.02 VENTILATION OF CONSTRUCTION FUMES

A. When hazardous chemicals, mineral-spirit based paints, adhesives, or other similar materials are used, the Contractor shall exhaust toxic, noxious, or odor producing fumes from the building in a manner approved by Owner. Contractor's method of exhaust shall ensure the safety of building occupants and pedestrians in and around the Project site. All supply and return air ductwork within the construction area shall be capped air-tight to prevent distribution of fumes.

3.03 BUILDING FLUSH-OUT – NOT USED

3.04 COMPLETION PROCEDURES

A. Remove all IAQ measures as well as signs, framing, and supports at completion of Project.

END OF SECTION 01 81 19

PART 1 - GENERAL

1.1 CONDITIONS AND REQUIREMENTS

A. Refer to BIDDING REQUIREMENTS, CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS and DIVISION 1 of these specifications which govern work under DIVISION 23. Refer to other sections of these specifications for additional related requirements.

B. Codes, Permits and Fees:
   1. Mechanical work shall be in accordance with the most recent adopted publication of the following:
      a. International Building Code
      b. International Mechanical Code
      c. Uniform Plumbing Code
      d. International Fire Code
      e. National Electric Code
      f. American Disability Act
      g. Washington State Energy Code
      h. All applicable State and Local Codes and Ordinances.
   2. The Contractor shall obtain permits and inspections required for the mechanical work on this project at his expense. Deliver all inspection certificates to the Owner's Representative prior to final acceptance of the work.
   3. Contractor(s) shall pay all costs levied by utility companies and/or governing agencies associated with water, gas, sanitary and storm sewer connections and include these costs within his bid. This shall include but not be limited to tap fees, service mains, meters and vault charges.

1.2 DESCRIPTION OF WORK

A. The work covered by the contract documents (specifications and construction drawings), shall include but not be limited to:
   1. Furnishing all materials and supplying all labor, equipment and services to install the complete mechanical system as shown on the contract documents and specified herein.
   2. All products and materials installed on the project shall be new and in first class condition. Used or resold materials will not be allowed. If requested to verify authenticity of materials the Contractor shall be prepared to produce bill-of-sale invoices.

B. This project has been designed to meet or exceed the minimum requirements of the governing Codes. The Contractor must notify the Owner's Representative in writing of any items in conflict with the Codes prior to signing the contract, or he shall thereafter make any minor adjustments necessary to meet the Codes at no cost to the Owner.

C. The Contractor shall comply with the project close-out requirements as detailed in Division 01, "Closeout Procedures."

D. Safety Measures:

1. The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement applies continuously and is not limited to normal working hours.
2. Provide all required safety measures and consult with the State or Federal safety inspector for interpretation whenever in doubt as to whether safe conditions do or do not exist.
3. Head protection: Where pipe hangers, equipment support angles, etc., are exposed in access ways for any maintenance, cover all such potentially injurious protrusions less than 7'-0" above the floor with padding; secure and permanently fasten, and finish to match adjacent finishes.

1.3 REFERENCES

A. Definitions
1. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
2. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
3. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
4. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
5. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.4 QUALITY ASSURANCE

A. Materials used under this Contract, unless specifically noted otherwise, shall be new and of the latest and most current model line produced by the manufacturer. Each item of equipment shall conform to the latest Standard Specifications of the American Society for Testing Materials and shall conform to any applicable standards of the United States Department of Commerce.

B. Electrically Driven or Connected Mechanical Equipment:
1. All electrically driven or connected equipment and associated control panels shall be provided with UL or equivalent label and/or listing in accordance with the requirements of the NEC. Equipment shall be listed as an assembly where listing/labeling program is available for that type of equipment.
2. Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.
3. All HVAC equipment provided in Division 23 requiring compliance with NEC Article 440 "Air-Conditioning and Refrigerating Equipment" shall be listed for a minimum short-circuit current (AIC) rating of 10,000 Amperes RMS. This equipment shall

be listed under UL 1995 for both circuit breakers and fuses as the upstream overcurrent protective device. The nameplate shall read “Maximum overcurrent protective device” not “Maximum Fuse” or “Maximum Circuit Breaker.

4. All Division 23 equipment other than that provided in 2 above shall be listed or rated for a minimum of 10,000 AIC at 240, 208 or 120 volts and 14,000 AIC at 480 or 277 volts unless a higher value is specifically indicated on the drawings or in the specific equipment specifications.

C. AWS states that welding qualifications remain in effect indefinitely unless welding personnel have not welded for more than six months or there is a specific reason to question their ability.

D. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

1.5 COORDINATION

A. Consider architectural and structural drawings part of this work insofar as these drawings furnish information relating to design and construction of the building and shall take precedence over mechanical drawings if any dimensional discrepancies exist.

B. The Contractor shall refer to the architectural and structural details, plans, elevations, and other Contract Drawings and shall coordinate his work with that of the other trades to avoid interference.

C. Dimensions are approximate and are for estimating purposes only, unless noted otherwise.

D. The mechanical drawings are diagrammatic and show general locations of fixtures, equipment, and pipe. Drawings are not to be scaled. Field verify exact size, location, invert, and clearances of existing material and equipment, and advise the Owners Representative of any discrepancies between the field conditions and the Drawings prior to any installation. Contractor shall be responsible for all costs associated with the removal or relocation of systems that have been installed without prior notification of the Owners Representative.

E. Assume all responsibility for fitting materials and equipment to other parts of equipment and structure.

F. Prior to installation of the new Division 23 systems, the Contractor shall coordinate the proposed installation with the Architectural and Structural requirements and all other trades (including HVAC, Plumbing, Fire Protection, Electrical, Ceiling Suspension and Tile systems), and provide reasonable maintenance access requirements. Changes required in work specified in Division 23 caused by neglect to do so shall be made at no cost to Owner.

G. The Contractor shall be responsible for the installation of systems according to the Contract Documents. Anything not clear or in conflict will be explained by making application to Owner’s Representative. Should conditions arise where certain changes would be advisable, secure approval from Owner’s Representative for those changes before proceeding.

H. Furnish sleeves, inserts, supports, and equipment that are to be integrated into other Divisions of the Work to those involved in sufficient time to be built into construction as the Work proceeds. Locate these items and see that they are properly installed. Expense resulting from improper location or installation of items above shall be borne under Division 23.

I. Electrical Coordination
   1. The electrical characteristics of all mechanical equipment to be furnished on the project shall be cross-checked with the Electrical Drawings, prior to ordering equipment, to confirm correct power supply; horsepower, kW, amps, voltage and phase. Where proposed equipment characteristics do not agree with the Electrical Drawings, the engineer shall be contacted for directions before proceeding.
   2. Electrical connection sizes: coordinate with the Electrical Drawings for proper electrical lug size and quantity on large capacity devices such as chillers, electric heaters, etc. and determine if the connections will accept either copper or aluminum conductors. Make necessary adjustments to equipment connections to accommodate electrical power feeder sizes and types.
   3. Disconnect Switches: Where disconnect switches are furnished integral with the equipment, mounting height shall not exceed 7 ft. (to top) above floor or roof level, including allowance for bases on roof curbs.

1.6 SUBMITTALS

A. Mechanical Cost Breakdown:
   1. The Contractor shall furnish the Owner's Representative an itemized breakdown of the mechanical construction cost within 30 days of notice to proceed. This breakdown shall be utilized for pay applications.

B. Payment Requests:
   1. Refer to Division 01 for Payment Procedures.

C. Submittal Log: Contractor shall prepare a master submittal log tracking spreadsheet for all Division 23 items, to be filled in, updated and furnished with each submittal package. Submittal log shall indicate specification section and sub-paragraph of each item included in the submittal, along with a general description of the item/equipment, manufacturer name, date submitted and a column for returned date, A/E review action (i.e. approved, approved as noted, revise and resubmit or rejected) and re-submittal action required (if any).

D. Submit Shop Drawings and Product Data per the requirements of Division 01 Section, "Submittal Procedures." See individual Division 23 specification sections for additional submittal requirements.
   1. Electronic Submittal: Organize electronic files in a similar manner to hard copy binders, with electronic indexing (bookmarks) and/or portfolio format for ease of organizing and navigating for A/E review and comment purposes. Additionally, submittals shall contain original PDF files capable of the find command (crtl+F) for digital searching. Photocopies of submittals that do not allow for digital searching are not acceptable. SUBMITTALS NOT PROVIDED IN THIS FORMAT WILL BE REJECTED.

E. Shop Drawings: Refer to Section 013300 for specific information regarding the preparation, submittal and approval of Shop Drawings.
   1. Shop drawings, catalog information and material schedules shall be submitted for approval on all materials and equipment prior to ordering. This applies to all specified material and equipment in Division 23.
   2. Shop drawings shall be reviewed, approved and stamped by Contractor prior to submitting to Owner's Representative for approval. Submittals without such approval will be returned without review.
   3. Allow for sufficient time for developing shop drawings, processing and review time so that the installation will not be delayed.
   4. Indicate manufacturer, trade name and model number. HIGHLIGHT, ENCIRCLE OR OTHERWISE INDICATE ALL DEVIATIONS FROM THE SPECIFIED PRODUCTS OR BASIS-OR-DESIGN EQUIPMENT. Include copies of applicable brochure or catalogue materials. Indicate sizes, types, model numbers, ratings and capacities being proposed. Only those items being used on the project shall be included in the submittal.
   5. Where choices of options and accessories are available or specified, provide written description of what is to be furnished. If necessary, list page numbers where submitted items are described.
   6. Include dimensional data for roughing in and installation and technical data sufficient to confirm that equipment meets requirements of drawings and specifications.
   7. Include wiring, piping and service connection data, motor sizes complete with voltage ratings and schedules. Upon approval, copies of these diagrams shall be forwarded to pertinent contractors.
   8. Upon approval, copies of these diagrams shall be forwarded to pertinent contractors

F. Product Data: Refer to Section 013300 for specific information regarding preparation, collation, labeling and submittal of Product Data.
   1. Clearly identify product data submittal with the project name. Submittals containing resubmitted data shall also include a "Re-submittal" label in bold letters on the cover.
   2. Indicate manufacturer, trade name and model number. Include copies of applicable brochure or catalogue material. Indicate sizes, types, model numbers, ratings, capacities and options actually being proposed.
   3. Include dimensional data for roughing in and installation, and technical data sufficient to confirm that equipment meets requirements of drawings and specifications.
   4. Include wiring, piping and service connection data, motor sizes complete with voltage ratins and schedules.
   5. Submit all materials specified in this Division in one pdf binder.
   6. Re-submittals shall include all materials being re-submitted in one binder. Only completed re-submittal including all applicable specification sections will be reviewed.
   7. Allow for sufficient time for A/E review time (10 business days) so that the installation will not be delayed.

G. If material or equipment is not as specified or submittal is not complete, it will be rejected. Only completed submittal including all applicable specification sections will be reviewed.

H. Review comments shall not relieve Contractor from responsibility for deviations from Contract Documents unless attention has been called to such deviations in writing at time of submission, nor shall they relieve this Contractor from responsibility for errors in items submitted.

1.7 CLOSEOUT SUBMITTALS

A. General: Submit documents to the Owner/Owners Representative for approval [prior to the building being turned over to the Owner] [within 90 days of the date of receipt of the Certificate of Occupancy].

B. Record Documents: Construction documents shall be updated to convey a record of the alterations to the original design. Such updates shall include updated mechanical, electrical and control drawings red-lined, or redrawn if specified, that show all changes to size, type and locations of components, equipment and assemblies.

C. Mechanical Operating and Maintenance (O&M) Manuals
1. Refer to Division 01 for additional Closeout Submittal and Operation and Maintenance Data requirements.
2. Contents for the Mechanical O&M Manual are to include the following:
   a. Title Page: Project Name, Project Number, building name, Architect, Mechanical Engineer, Electrical Engineer and General Contractor.
   b. Table of Contents: Complete listing of contents of this O&M Manual. Where multiple volumes are required, provide Master Table of Contents covering all Volumes and place in the front of each volume.
   c. Part 1: Listing of all Contractors, subcontractors and suppliers/vendors for all tiers. Information to include: names, addresses, phone numbers, fax numbers and area of work. Also include a copy of the emergency service information required in Division 1.
   d. Part 2: Copies of all signed general, mechanical and plumbing permits, and inspection reports.
   e. Part 3: Copies of all manufacturer's warranty and guarantee forms, and any specified special guarantees, fully executed.
   f. Part 4: Provide a separate sub divider for each applicable Section in Divisions 22 & 23. Tabs are to be identified by specification section title (i.e. Valves for HVAC Piping) and not just specification section number (i.e. Section 23 05 23). For every Section provide the following:
      1) Index listing materials and equipment used.
      2) List of suppliers with address, phone number and fax number.
      3) Catalog cuts, data sheets, engineering calculations, schedules, wiring diagrams and complete parts lists for all products and equipment incorporated into the Project. Literature shall be clearly marked to indicate each specific item. Include copies of approved submittal data as part of this information.
      4) Approved submittal drawings (Option to submit Product Data Submittals as separate Volume(s) if contents are large).
      5) Manufacturer's printed operating instructions for all equipment including:
         a) Initial startup procedures and break-in routine.
         b) Normal operating instructions.
         c) Regulation, control, stopping and shutdown.

d) Troubleshooting and emergency instructions.
e) Seasonal operating instructions.

6) Cleaning, lubrication and preventative maintenance instructions.
7) Disassembly, repair and reassembly instructions, including alignment and adjustment instructions.
8) Sequence of operation for each system.

g. Part 5: Valve schedule, including location, system and function for each scheduled valve.
h. Part 6: Filter schedule, including equipment item, filter type and size for each filter used on the Project.
i. Part 7: Controls system manufacturer and calibration information, including wiring diagrams, shop drawings, schematics, record documents, and control sequence descriptions. Desired or field determined set-points shall be permanently recorded on control drawings at control devices or, for digital control systems, in system programming instructions.
j. Part 8: Equipment startup records, test records and certifications. Include certification and test results for the disinfection of domestic water piping, and testing of backflow prevention assemblies, pipe pressure testing, duct leak testing and hydronic water treatment flushing and cleaning witness sheets.
k. Part 9: Testing, Adjusting and Balancing Report.
l. Part 10: Final Commissioning Report (Option to submit as separate Volume(s) if contents are large).
m. Part 11: Spare parts and maintenance materials list. Provide summarized list of spare parts that are to be furnished to the Owner.
n. Part 12: Owner training sign-off sheets. Notebook sleeves with DVD;s of training.

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Refer to Division 01 for Product Storage and Handling Requirements".

B. Follow manufacturer's directions in delivery, storage, protection, and installation of equipment and materials.

C. Promptly notify Owner's Representative in writing of conflicts between requirements of Contract Documents and Manufacturer's directions and obtain written instructions from Owner's Representative before proceeding with work. Contractor shall bear expenses of correcting deficiencies of work that does not comply with manufacturer's directions or such written instructions from Owner's Representative.

D. Deliver equipment and material to site and tightly cover and protect against dirt, water, and chemical or mechanical injury but have readily accessible for inspection. Store items subject to moisture damage in a dry, heated space.

E. Special Storage Requirements:
1. Equipment and products to be stored on the project site either outside or inside but unheated spaces shall be provided with shrink-wrapped coverings and shall be additionally provided with chemical desiccant packs to control any stray moisture that may enter the protective wrapping.

2. Ductwork shall be stored on pallets on grade. Ductwork and air handling equipment shall be kept dry. Air handling equipment that has been allowed to become wet may be rejected.

F. New Equipment and Ductwork Protection:
1. Protect equipment and materials in storage on site, during and after installation until final acceptance. Leave factory covers in place and take special precautions to prevent entry of foreign material into working parts of piping and duct systems.
2. Protect equipment with polyethylene covers and crates.
3. Operate, drain and flush bearings and refill with change of lubricant before final acceptance.
4. Protect bearings and shafts during installation. Grease shafts and sheaves to prevent corrosion. Provide extended nipples for lubrication.
5. During construction, provide temporary closures of metal or taped polyethylene at all openings in new ductwork to prevent construction dust from entering existing ductwork system.
6. RA Grille Filters: Prior to the completion of all dirt and dust producing activities, cover all return intake grilles and openings with temporary MERV 8 filter media. Replace filters at Substantial Completion.

G. Notify Owner of equipment delivery dates 24 hours in advance of delivery.

H. The Contractor shall be responsible for protection of equipment furnished in this Division from vandalism and weather during all phases of construction. Damaged equipment shall be restored to like new condition or replaced at the Contractor's expense.

I. Any factory painted equipment scratched or marred during shipment or construction shall be restored to original "new" condition. This includes complete repainting if necessary to provide exact paint match.

1.9 FIELD CONDITIONS

A. Existing Utilities and Piping:
1. The locations of existing concealed lines and connection points have been indicated as closely as possible from available information. The Contractor shall assume that such connection points are within a Ten foot (10') radius of the indicated location. Where connection points are not within this radius, the Contractor shall contact the Owner's Representative for a decision before proceeding or may proceed at his own expense.
2. Connection points to existing work shall be located and verified prior to starting new work.
3. Prior to commencing any excavation or ditching activity, the Contractor shall verify the exact location and inverts of all existing utilities and connection points in the area of his proposed excavation. Notify Owner's representative for further direction if actual inverts will not allow the proper installation of new work.
4. The Contractor shall be responsible for damages, which might be caused by his failure to exactly locate and preserve underground utilities.

B. Existing Hazardous Materials: Refer to Division 00 for information, instructions, and requirements regarding existing potentially hazardous materials including, but no limited to, asbestos and lead.

1. Specific attention is directed to the potential existence of asbestos bearing compounds and materials on remodel and demolition projects. Careful coordination with other Contractors and reasonable care shall be exercised.
   a. Extent of Asbestos:
      1) It can be assumed that the Owner will have removed all asbestos from the construction area of this project prior to this contract.
      2) An asbestos survey of the building has been performed and reports the extent of asbestos located throughout the building.
      3) A copy of the Asbestos Survey is located in the project manual.
   b. If asbestos bearing or other hazardous compounds are encountered during the course of construction that are not identified in the Asbestos Survey, the Contractor shall immediately notify the Owners Representative.

1.10 WARRANTY

A. The Mechanical equipment and installation shall be warranted for a period of one (1) year from the date of acceptance unless an individual item or specification is otherwise noted as longer. The Contractor shall make good, at his own expense, all defects in work and/or furnished equipment which develop at any time during the warranty period and shall bare all expenses including that of cutting and patching.

B. Refer to individual Division 23 specification sections for warranties required to extend beyond the 1-year project warranty period.

1.11 TEMPORARY HEATING, COOLING OR VENTILATION

A. Temporary heating, cooling or ventilation for the facility during the construction phase shall not be supplied by the permanent system installed under Division 23.

B. Exceptions:
   1. Contractor shall obtain letter of approval from the Owner stating that they understand equipment expected life may be shortened due to severe usage.
   2. Product warranties shall be extended to account for construction use. Contractor shall furnish certified document stating such extended warranties.
   3. Contractor shall be responsible for pressure cleaning all coils and vacuum cleaning all ductwork prior to occupancy.
   4. If Contractor is given permission to use permanent systems for space heating, cooling or ventilation filters shall be installed equal to Farr 30/30. Check and change filters at intervals sufficient to protect the mechanical system. Units shall not be operated without filters in place. New filters shall be installed prior to system balancing.
   5. Prior to the completion of all dirt and dust producing activities, cover all return intake grilles and openings with temporary filter media. Replace filters at Substantial Completion.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Refer to Division 01 Substitution Procedures regarding product prior approval and substitution requirements.

B. Throughout these specifications and drawings, various materials, equipment, apparatus, etc., are specified or scheduled by manufacturer, brand name, type or catalog number. Such designation is to establish standards of desired quality and construction and shall be the basis of design and the bid.

C. Substitutions will not be permitted without written approval.

D. Where two or more manufacturer designations are listed in these specifications, choice will be Contractors option.
   1. Exception: Where more than one manufacturer is listed, and only one manufacturer's catalog number is specified or only one manufacturer is scheduled on the drawings (basis of design), that standard of quality, dimensional characteristics, capacities, and construction shall be maintained by materials or equipment supplied by the other manufacturer(s).

E. If the Contractor uses manufacturers other than the basis of design, the Contractor shall be responsible for:
   1. Ensuring the substituted item will perform identical to the basis-of-design equipment, fit in the available space while allowing proper maintenance access. In the event other than specified equipment is used and will not fit job site conditions, the Contractor assumes responsibility for replacement with items indicated as the basis of design.
   2. Any changes required by other Contractors caused by the substituted equipment, such as different electrical characteristics, control point requirements, etc.
   3. Changes in structural design and/or construction due to weight differences.

F. Products furnished other than the basis of design shall have similar electrical characteristics as the scheduled or specified equipment. Contractor shall be responsible for any electrical changes caused by products not in accordance with this requirement.

2.2 ELECTRICAL MOTORS

A. All electrical motors furnished on the project, whether provided with factory packaged equipment such as pumps, fans, air handlers, fan coil units, etc., or provided separately for field mounting, shall meet or exceed the minimum energy efficiency requirements of Washington State Energy Code, whichever is more stringent.

B. Motors used with Variable Frequency Drives (VFDs): Motors shall be Premium efficiency type NEMA MG 1 Part 31 compliant, Class F insulation, rated as "Inverter Duty".

C. ECM (Electrically Commutated Motor) type single-phase motors utilized on direct drive applications, shall be ultra-high efficiency type with programmable brushless DC motor, utilizing a permanent magnet rotor and built-in inverter. Permanently lubricated ball

bearing design. Provide with integral microprocessor controller for variable speed control (constant torque or external input variable speed control) as indicated.

2.3 SLEEVES

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

B. Steel Pipe: ASTM A53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated “wall pipe” equivalent to ductile-iron pressure pipe, with plain ends and integral water-stop, unless otherwise noted.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
1. Underdeck Clamp: Clamping ring with set screws.

E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.

F. PVC Pipe: ASTM D1785, Schedule 40.

G. Molded PE: Reusable, PE, tapered-cup shaped and smooth-outer surface with nailing flange for attaching to wooden forms.

2.4 MECHANICAL SLEEVE SEALS

A. Acceptable Products: Subject to compliance with requirements, provide the following products or approved equal:
1. Link seal by GPT Industries.

B. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

C. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe and fiberglass duct. Include type and number required for pipe material and size of pipe.

D. Pressure Plates: Stainless steel. Include two for each sealing element.

E. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.5 ESCUTCHEONS

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

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw.
1. Finish: Polished chrome-plated.

D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
   1. Finish: Polished chrome-plated.

2.6 ACCESS DOORS

A. Access doors to match surrounding surface, provided with recess to accept matching finish in accordance with the requirements of Division 08. Provide UL rated doors in fire rated construction.

B. Provide flush type steel framed panel with concealed hinges, size minimum 24 x 24 inch for man access and minimum 18 x 18 inch for inspection and hand access.

C. Provide cam type locking device with hand or key lock when located in public corridors and washrooms complete with master keys.

D. Provide access doors for maintenance or adjustments purposes for all mechanical system components including valves, volume dampers, fire dampers, fire/smoke dampers, clean outs, traps and controls.

2.7 ROOF CURBS

A. Roof curb construction for mechanical equipment shall be carefully coordinated with the architectural and structural roof systems for compatibility, including proper pitch to create a level mounting surface, adequate curb height to allow for roof insulation thickness (including taper and roof crickets at curbs), and flashing details.

B. Roof curb sidewall heights shall be a minimum of 12” above the surrounding roof insulation thickness or as noted on the plans. Allow for tapered insulation and cricket thickness when determining curb height.

C. Roof curb base construction shall be compatible with roof construction (metal decks, concrete decks, etc.) and mounting and anchoring shall be coordinated with the structural systems present.

D. Roof curbs mounted on metal decks shall be in-filled (below the unit/platform) with a minimum of two (2) layers of 5/8” gyp board (for sound dampening) and at least 4” thickness of roofing insulation boards.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine premises and understand the conditions which may affect the execution of work of this Division before submitting proposals for this work.

B. No allowance for time or money will be considered for any consequence related to failure to examine existing site conditions.

3.2 INTERFACE WITH OTHER WORK – COORDINATION

A. It is understood that anything not clear or in conflict will be explained by making application to Owner's Representative. Should conditions arise where certain changes would be advisable, secure approval from Owner's Representative for those changes before proceeding with work.

B. Coordinate with the work of various trades when installing interrelated work. Before installation of mechanical items, make proper provision to avoid interference's. Changes required in work specified in Division 23 caused by neglect to do so shall be made at no cost to Owner.

C. Furnish and install inserts and supports required by Division 23 unless otherwise noted. Furnish sleeves, inserts, supports, and equipment that are an integral part of other Divisions of the Work to those involved in sufficient time to be built into construction as the Work proceeds. Locate these items and see that they are properly installed. Expense resulting from improper location or installation of items above shall be borne under Division 23.

3.3 INSTALLATION

A. Coordinate Division 23 equipment and systems to the available space, with other trades. The access routes through the construction shall be the Contractor's responsibility.

B. Drawings are diagrammatic. Make offsets, transitions, and changes in direction of pipes and ducts, as required to maintain proper headroom and pitch of sloping lines and avoid structural, electrical, pipe and duct interference's whether or not indicated on Drawings. Furnish fittings, etc., as required to make these offsets, transitions and changes in direction at no additional cost to the Owner.

C. Determine exact route and location of each pipe and duct and coordinate and obtain approval for changes from the layout indicated on the drawings with the Owner's Representative prior to fabrication.

D. Locations of equipment and devices, as shown on the drawings, are approximate unless dimensioned. Verify the physical dimensions of each item of mechanical equipment to fit the available space and promptly notify the Owner's Representative prior to roughing-in if conflicts appear.

E. All piping, wiring, equipment, ductwork, tubing, etc., shall be concealed within building construction unless otherwise noted, or in mechanical rooms.

F. Arrange pipes, ducts, and equipment to permit ready access to valves, unions, traps, trap primers, starters, motors, control components, and to clear openings of doors and access panels.

G. Prior to installation of the new Division 23 systems, the Contractor shall coordinate the proposed installation with the Architectural and Structural requirements, and all other trades (including HVAC, Plumbing, Fire Protection, Electrical, Ceiling Suspension and Tile systems), and provide reasonable maintenance access requirements.

H. Provide means of access to all valves, dampers, controllers, operable devices and other apparatus which may require adjustment or servicing.

I. Verify in field exact size, location, invert, and clearances regarding all existing material, equipment and apparatus, and advise the Owners Representative of any discrepancies between that indicated on the Drawings and that existing in the field prior to any installation. Contractor shall be responsible for all costs associated with the removal or relocation of installed systems that have been installed without prior notification of the Owners Representative.

J. Equipment Installation – Common Requirements:
   1. Install equipment in accordance with the manufacturer's instructions. Where the construction documents appear to conflict with the manufacturer's instructions, contact the A/E for direction before proceeding with installation. Rework caused as a result of failing to resolve conflicting information beforehand shall be done at no additional cost to the Owner.
   2. Install equipment to allow maximum possible headroom unless specific mounting heights are indicated.
   3. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
   4. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting with minimum interference to other installations. Extend grease fittings to accessible locations.
   5. Install equipment to allow for piping to be installed at required slope.
   6. Motor and equipment name plates as well as applicable UL and AGA labels shall be in place when the Project is turned over to the Owner.

K. Erection of Metal Supports and Anchorages:
   1. Refer to Division 05 Section "Metal Fabrications" for structural steel fabrication requirements.
   2. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
   3. Field Welding: Comply with AWS D1.1.

L. Access Openings for Valves, Dampers, Etc.
   1. Provide access doors wherever required to service valves, dampers, fire dampers, motors or any other concealed items requiring access, unless specifically indicated on the drawings to be furnished under other Divisions (i.e., architectural). Access doors for fire dampers shall be installed in duct adjacent to fire damper. Equipment which is accessible by means of removable ceiling panels or tile does not require access doors or panels. Access doors and panels for service and maintenance of items shall be sized and located to allow adequate access for required service.

M. Fire Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 for penetration fire-stopping for materials.

N. Switchgear/Electrical Equipment Drip Protection:

1. Every effort shall be made to eliminate the installation of pipe above electrical and telephone switchgear. If this is not possible, encase pipe in a second pipe with a minimum amount of joints.
2. Installation of piping, ductwork, leak protection apparatus or other installations foreign to the electrical installation shall be located in the space equal to the width and depth of the equipment and extending to a height of 1.8 m (6 ft.) above the equipment to ceiling structure, whichever is lower (NFPA 70).

O. Inaccessible Equipment:
1. Where the A/E determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed and reinstalled or remedial action performed as directed at no additional cost to the Owner.
2. The term “conveniently accessible” is defined as capable of being reached without the use of ladders, or without climbing or crawling under or over obstacles such as motors, fans, pumps, belt guards, transformers, high voltage lines, piping, and ductwork.

P. Cutting and Patching:
1. Perform all cutting and patching of new and existing construction required for the installation of systems and equipment specified in Division 23. All cutting shall be accomplished with masonry saws, drills or similar equipment to provide neat uniform openings. Field verify locations for new openings to avoid conflict with new or existing structure, architectural elements or other utilities. Coordinate penetration locations.
2. Patch and repair walls, floors, ceilings and roof with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials. All patching shall meet the approval of the Owner’s Representative. Where existing mechanical systems are removed and roof or wall openings are not to be reused for new systems, the Division 23 Contractor shall be responsible for in-filling the abandoned opening per above.
3. All cutting and patching made necessary by defective equipment, defective workmanship or failure of this Contractor to properly anticipate his requirements shall be included.
4. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses or other structural members without the Owner Representative’s written approval.
5. Cutting, patching, repairing, and replacing pavement, sidewalks, roads, and curbs to permit installation of work specified or indicated under this Division is included.

Q. Demolition and Salvage:
1. Refer to Division 01 for cutting, patching, waste management and disposal, recycling, reuse and documentation requirements.
2. Comply with all Local, State and EPA requirements for glycol antifreeze and/or refrigerant disposal and/or reclaim.
    a. Where existing refrigeration systems are disturbed by the demolition or new work, the existing refrigerant gas charge shall not be vented to the atmosphere but shall be captured and reclaimed/reused (if in good condition) or disposed of in a safe and legal manner.

b. Where existing glycol anti-freeze hydronic systems are impacted by the work, the existing anti-freeze glycol-water solutions shall be either captured and stored for reuse, or disposed of in a safe and legal manner. Refill systems with same level of glycol protection as original (or as specified new).

3. Demolition of mechanical systems and equipment in remodeled areas shall be provided under Division 23.
4. Disconnect, demolish, and remove HVAC systems, equipment, and components indicated to be removed.
   a. Ducts to be removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
   b. Equipment to be removed: Disconnect and cap services and remove equipment.
   c. Equipment to be removed and reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
   d. Equipment to be removed and salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
5. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.
6. Where the plans are not clear on what existing systems are to remain and be reused or retained for later upgrades, the Contractor shall contact the Owner's Representative for direction before proceeding with demolition work.
7. Systems, materials and equipment designated for demolition, shall be salvaged to the Contractor and removed from the site unless otherwise noted.
8. Equipment and materials salvaged to the Owner shall be delivered to an owner approved on-site location.
9. Contractor shall repair any existing equipment damaged as a result of his work.
10. Verify and document condition of existing systems to be connected to prior to construction.
    a. Submit to A/E a list of required equipment repairs due to existing conditions.
    b. Required repairs not documented will be made by the Contractor at his own expense.
11. Contractor's bid shall include re-claim and disposal of refrigerant from existing systems indicated to be removed.

3.4 EQUIPMENT TESTING

A. Equipment Tests: Equipment shall be subject to tests as specified in individual Division 23 specification sections.

B. Demonstrate that the mechanical equipment and systems are performing to provide conditions through all possible modes of operation as outlined below. The verification testing procedures shall address all operating characteristics of all mechanical equipment and systems. Equipment and systems shall be tested in accordance with the manufacturer's requirements and the Commissioning testing requirements.

C. Provide all test equipment, including test pumps, gauges, instruments, and other equipment required. Test all rotational equipment for proper direction of rotation. Upon completion of testing, certify to the Owner's Representative in writing, or as witnessed

by the Commissioning Authority, that the specified tests have been performed and that the installation complies with the specified requirements.

1. Provide equipment start-up test reports on forms provided by the manufacturers, filled-in, dated and signed by the authorized start-up agent or technician. Include copies of start-up reports in the O&M manuals.

D. A record similar to the following shall be kept to record each test and copies shall be sent to the Owner's Representative after each test is complete:

3.5 PIPING AND DUCTWORK TESTING

A. Piping and duct systems shall be subject to tests as specified in the applicable Division 23 sections.

B. No piping shall be covered, insulated or concealed until it has been tested, inspected and approved by any local authority having jurisdiction. Isolate systems during testing and flushing.

C. Ductwork systems and specialties shall be subject to testing as specified in the applicable Division 23 sections.

D. Tests and repairs shall be completed prior to concealment or insulation of ducts.

E. Provide all test equipment including test pumps, gauges, instruments and other equipment required. Test all rotating equipment for proper direction of rotation. Upon completion of tests contractor shall certify in writing to the Owner's Representative, or as witnessed by the Commissioning Authority, that the specified tests have been performed and that the installation complies with specifications.

1. Provide pipe and duct pressure and leakage reports on forms developed by the contractor or based on SMACNA, filled-in, dated and signed by the authorized start-up agent or technician. Include copies of start-up reports in the O&M manuals

F. A record shall be kept to record each test and copies shall be sent to the Owner's Representative after each test is complete:

3.6 CLOSEOUT ACTIVITIES

A. Demonstration and Owner Training: Instruct the designated Owners representative(s) in operation and maintenance of mechanical systems utilizing the information and material available in the Operation and Maintenance Manual.

1. Upon completion of the equipment and systems installation and connections, start-up, testing and balancing, and at the end of each Construction Phase, the Contractor shall assemble all major equipment factory representatives and subcontractors together for the Owner instructional period.
    a. Coordinate training schedule in advance with Owner's representative so that the required Owner personnel may be present and also to minimize the number of sessions required and/or return trips by factory agents.
    b. Coordinate training periods with Commissioning requirements.

2. Instruction period shall occur after start-up and testing activities have occurred, the controls are operational and when systems are properly working. Training may occur before Commissioning is finalized.
3. All training sessions shall be recorded on Video.
   a. Furnish DVD or flash drive copy of training videos with O&M Manual.
   b. Organize each individual training session as a separate file or folder for quick and easy searching by subject.
4. Instructional sessions for each system or equipment shall be led by the authorized factory agent, technician or system installer. Provide an overview of the system or equipment's function and operation as well as a detailed instructional description on all required maintenance and service requirements. Training periods shall allow the Owner's personnel to operate and/or inspect equipment until they fully understand the process and acknowledge such to the trainer.
5. Prepare statement and check list, to be included in the Operation and Maintenance Manual.
6. Copies of this acceptance sign-off sheet shall be sent to the Owner's Representative and included in the O & M manual.

B. Owner Acceptance, Hand-off, Operational & Maintenance Responsibilities & Warranty:
   1. Refer to the General Conditions and Division 01 for the definitions or and additional requirements associated with "Prior Occupancy", "Substantial Completion", "Correction on Nonconforming Work", "Final Completion" and "Warranty of Construction", and other project close-out, substantial completion and warranty requirements.
   2. Near the end of the project, or at the end of each phase, schedule a meeting with the Owner, A/E, Commissioning Authority and select major subcontractors, including the Temperature Control Contractor, to discuss mechanical system turn-over responsibilities and expectations. Agenda shall include the following topics:
      a. Status of system completion, testing and Owner training.
      b. Commissioning status and outstanding issues.
      c. Status of control system operation and outstanding issues.
      d. Date(s) of Owner occupancy and beneficial usage.
      e. Date(s) of Substantial Completion and warranty start & end. Include end dates for extended equipment warranties and special conditions.
      f. Owner and Contractor responsibilities during close-out and warranty period, including an understanding of which party is responsible for the following items:
         1) Filter maintenance & replacement.
         2) Equipment lubrication & regular maintenance.
         3) Control system & alarm monitoring, adjusting and trouble-shooting.
         4) Water treatment chemical and glycol maintenance.
         5) Equipment problems, diagnosis and trouble-shooting.
         6) Warranty call-backs vs. normal system behavior and fine-tuning.
         7) Outstanding work, Commissioning issues and follow-up.
      g. Provide & distribute copies of the Hand-off meeting minutes to all parties involved.
   3. Notwithstanding other requirements in the General Conditions and Division 01, once the Owner has taken beneficial occupancy and the mechanical systems have been made operational, tested, commissioned and the Owner has received training, it is expected that the Owner will be responsible for ongoing system

operations, maintenance and control activities, except as otherwise determined above during the Hand-off meeting.

4. Once the Owner has taken over primary responsibility for the operation and maintenance of the mechanical systems, the Contractor shall still be obligated to complete all outstanding work in accordance with the Contract Documents, including, but not limited to those items as identified in the Commissioning issues logs, punch lists, or other reports, as well as correct all nonconforming work and repair all defective work as identified during the warranty period.

C. Punch List Procedures:
   1. Refer to Division 01 Closeout Procedures for general punch list procedures.
   2. The project shall be fully cleaned and in all respects ready to turn over to the Owner for occupancy before the Punch List Inspection is requested. This shall include but not be limited to:
      a. Cleaning up all equipment, materials, cartons, and other debris that is a direct result of the installation of equipment under this contract.
      b. Cleaning exposed piping, ductwork, equipment, and fixtures.
      c. Repairing damaged finishes.
   3. The Contractor shall notify the Owner's Representative in writing when the project or phase is ready for punch lists. After punch lists are complete, written notice must be forwarded to the Owner's Representative requesting final checkout.
   4. At the time of final observation, the contractor shall accompany the observation party and shall remove access panels as required, to allow complete observation of the entire mechanical system.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes the following:
1. Steel pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems and cross-supports.
4. Thermal-hanger shield inserts.
5. Fastener systems.
6. Equipment supports.

B. See Division 5 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.

C. See Section 23 05 48 - Mechanical Vibration Controls, and Section 23 05 50 – Mechanical Seismic Controls, for vibration isolation devices.

D. See Section 23 05 16 - Expansion Fittings and Loops for HVAC Piping, for pipe guides and anchors.

E. See Section 23 07 00 – Mechanical Insulation for pipe insulation requirements.

F. See Section 23 31 00 - HVAC Ducts for duct hangers and supports.

1.2 REFERENCES

A. Definitions:
1. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

B. Reference Standards:
1. American Society of Mechanical Engineers (ASME):
a. ASME B31.1 – Standards of Pressure Piping.
b. ASME B31.9 – Building Services Piping.
c. ASME Boiler and Pressure Vessel Code: Section IX
2. ASTM International:
a. ASTM A36 – Standard Specification for Carbon Structural Steel.
b. ASTM A780 – Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
c. ASTM C533 – Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.
d. ASTM C552 – Standard Specification for Cellular Glass Thermal Insulation.
e. ASTM C1107 – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).
3. American Welding Society (AWS) D1.1 – Structural Welding Code – Steel.

1.3 SUBMITTALS:

A. Product Data: For the following:
1. Steel pipe hangers and supports.
2. Thermal-hanger shield inserts.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
1. Trapeze pipe hangers.
2. Metal framing systems. Equipment supports.

C. Welding certificates.

1.4 QUALITY ASSURANCE:

A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS:

A. Contractor shall be responsible for determining the weights of the supported piping, equipment and/or ductwork, based on sizes, hanger support spacing and operating loads. All hangers, rods, clevises, cross-support members, etc. shall be sized and located by the Contractor based on these loads and the recommendations of the support product manufacturers or equivalent structural design practices. Adequacy of building structural elements to bare all upper equipment support anchors points shall be the Contractor’s responsibility through the information provided on the Architectural and Structural Drawings.

B. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

2.2 MANUFACTURERS:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.3 STEEL PIPE HANGERS AND SUPPORTS:

A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.

B. Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.
2. ERICO/Michigan Hanger Co.
3. Globe Pipe Hanger Products, Inc.
4. Anvil International
5. National Pipe Hanger Corporation.
6. PHD Manufacturing, Inc.
7. PHS Industries, Inc.
8. Piping Technology & Products, Inc.
9. Tolco Inc.

C. Galvanized, Metallic Coatings: Pre-galvanized or hot dipped.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.4 TRAPEZE PIPE HANGERS:

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

2.5 METAL FRAMING SYSTEMS:

A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.

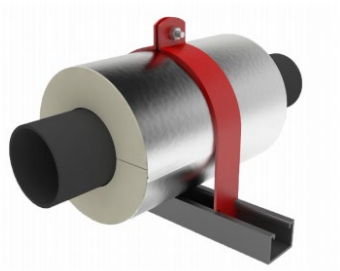
B. Manufacturers:
1. B-Line Systems, Inc.; a division of Cooper Industries.
2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
3. GS Metals Corp.
4. Power-Strut Div.; Tyco International, Ltd.
5. Thomas & Betts Corporation.
6. Tolco Inc.
7. Unistrut Corp.; Tyco International, Ltd.

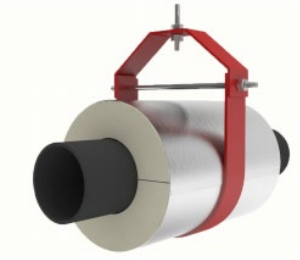
C. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.6 THERMAL-HANGER SHIELD INSERTS:

A. Description: High density compressive-strength insulation insert encased in sheet metal shield. Compressive strength varies (25 to 100 psi) based on insulation material selected and shall be as required to accommodate various hanger types, pipe sizes and materials, and associated loading. Flame/smoke rated at 25/50 for plenum applications. Minimum R-Value per 1” thickness shall be 2.5 for calcium silicate and 5.0 for cellular glass or phenolic insulations.





B. Manufacturers:
   1. Thermal Pipe Shields.
   2. Carpenter & Paterson, Inc.
   3. ERICO/Michigan Hanger Co.
   4. PHS Industries, Inc.
   5. Pipe Shields, Inc.
   6. Rilco Manufacturing Company, Inc.
   7. Value Engineered Products, Inc.

C. Insulation-Insert Material for Cold Piping: Water-repellent treated, ASTM C533, Type I calcium silicate, ASTM C-1126 Type III Phenolic Foam or ASTM C552, Type II cellular glass with vapor barrier.

D. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C533, Type I calcium silicate, ASTM C-1126 Type III Phenolic Foam or ASTM C552, Type II cellular glass.

E. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference, 360 degrees, of pipe.

F. For Clevis, Band or Roller Supports/Hangers: Insert and shield shall cover lower 180 degrees of pipe. Contractor's option to utilize full 360 degree inserts.

G. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

H. Insert Thickness: Match adjacent pipe insulation thickness as required for system duty. Refer to Section Mechanical Insulation.

2.7 FASTENER SYSTEMS:

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
   1. Manufacturers:
      a. Hilti, Inc.
      b. ITW Ramset/Red Head.
      c. Masterset Fastening Systems, Inc.
      d. MKT Fastening, LLC.
      e. Powers Fasteners.

B. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
   1. Manufacturers:
      a. B-Line Systems, Inc.; a division of Cooper Industries.
      b. Empire Industries, Inc.
      c. Hilti, Inc.
      d. ITW Ramset/Red Head.
      e. MKT Fastening, LLC.
      f. Powers Fasteners.

2.8 EQUIPMENT SUPPORTS:

A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.9 MISCELLANEOUS MATERIALS:

A. Structural Steel for Cross-Supports and Support Stands: ASTM A36, steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C1107, factory-mixed and -packaged, dry, hydraulic-cement, non-shrink and nonmetallic grout; suitable for interior and exterior applications.
   1. Properties: Non-staining, noncorrosive, and nongaseous.
   2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS:

A. Contractor shall be responsible for determining the weights of the supported piping, equipment and/or ductwork, based on sizes, hanger support spacing and operating loads. All hangers, rods, clevises, cross-support members, etc. shall be sized and located by the Contractor based on these loads and the recommendations of the support product manufacturers or equivalent structural design practices. Adequacy of building structural elements to bare all upper equipment support anchors points shall be the Contractor’s responsibility through the information provided on the Architectural and Structural Drawings.

B. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.

C. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.

D. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.

E. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
   1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated or insulated stationary pipes, NPS 1/2 to NPS 30.
   2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F pipes, NPS 4 to NPS 16, requiring up to 4 inches of insulation.
   3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
   4. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 8.
   5. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
   6. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
   7. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.
   8. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.

G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
   1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
   2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.

H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
   1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
   2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.

I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
   1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
   2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
   3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
   4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
   5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
   6. C-Clamps (MSS Type 23): For structural shapes.
   7. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
      a. Light (MSS Type 31): 750 lb.
      b. Medium (MSS Type 32): 1500 lb.

c. Heavy (MSS Type 33): 3000 lb.

8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

J. Saddles and Thermal-Hanger Shield Inserts: On all thermally insulated piping, unless otherwise indicated, install the following types:
1. Thermal-Hanger Shield Inserts: Utilize thermal hanger shield inserts on ALL insulated pipe hanger assemblies (clevis, trapeze or rollers). Do not allow bare piping to contact hanger. Do not run straight sections of basic pipe insulation through hanger assemblies since it will crush under the weight of the piping.
2. Steel Pipe-Covering Protection Saddles (MSS Type 39): Where indicated or required for large diameter piping installed on pipe rollers, utilize steel pipe saddles in lieu of thermal hanger shield inserts. Fill interior voids with insulation that matches adjoining insulation.
3. Protection Shields (MSS Type 40): Semi-circular sheet metal saddles may only be utilized when approved in advance by the engineer. Of length recommended in writing by manufacturer to prevent crushing insulation.

K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
2. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
3. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.

L. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.

M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.

N. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

3.2 HANGER AND SUPPORT INSTALLATION:

A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, cross-supports and structural steel members, clamps, and attachments as required to properly support piping from building structure.

B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.

2. Field fabricate from ASTM A36, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.

D. Thermal-Hanger Shield Installation: Install in pipe hanger clevis, trapeze or roller for ALL insulated piping.

E. Fastener System Installation:
1. Install powder-actuated fasteners in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

F. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

I. Install lateral bracing with pipe hangers and supports to prevent swaying.

J. Install building attachments within concrete slabs or attach hangers or cross-members to structural steel. Do not anchor to non-structural elements such as bare metal roof decks, non-load bearing metal stud framing or certain points on metal bar joists as per the joist manufacturer’s limitations. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

K. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.1 (for power piping) and ASME B31.9 (for building services piping) are not exceeded.

M. Insulated Piping: Comply with the following:
1. Install thermal-hanger shield inserts on ALL insulated piping, unless indicated otherwise. Install insert with insulation same thickness as piping insulation.
2. Install MSS SP-58, Type 39, protection saddles, on large diameter piping set on roller supports where indicated. Fill interior voids with insulation that matches adjoining insulation.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier, only when approved by the engineer. Otherwise use thermal-hanger shield inserts. Shields shall span an arc of 180 degrees.

3.3 EQUIPMENT SUPPORTS:

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make smooth bearing surface.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS:

A. Cut, drill, and fit miscellaneous metal fabrications for hanger cross-support members, trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.5 ADJUSTING:

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.6 PAINTING:

A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following vibration isolation for mechanical equipment:
1. Elastomeric isolation pads and mounts.
2. Restrained elastomeric isolation mounts.
3. Freestanding and restrained spring isolators.
4. Housed spring mounts.
5. Elastomeric hangers.
6. Spring hangers.
7. Thrust limits.
8. Pipe riser resilient supports.
9. Resilient pipe guides.

B. For seismic controls for mechanical systems refer to Section 23 05 50.

1.2 PERFORMANCE REQUIREMENTS:

A. Provide vibration isolation on all motor driven equipment, plus connected piping and ductwork.

B. The following equipment shall be provided with vibration isolators:
1. Indoor Heat Recovery Units.
2. Indoor Air Handling Units.
3. Inline Exhaust Fans.
4. Water-Cooled Chillers.
5. Pumps.
6. Unit Heaters.
7. Chiller Suspended Piping.

C. Provide minimum static deflection of isolators for equipment as follows, unless noted otherwise:
1. 400 – 600 rpm: 3.5 inch
2. 601 – 800 rpm: 2 inch
3. 801 – 900 rpm: 1 inch
4. 901 – 1500 rpm: 0.5 inch
5. Over 1500 rpm: 0.2 inch

1.3 SUBMITTALS:

A. Product Data: Include load deflection curves for each vibration isolation device indicated.

B. Shop Drawings: Include the following:
1. Design Calculations: Calculate requirements for selecting vibration isolators for individual pieces of equipment (unit weight and distribution, isolator type and deflection, isolator weight rating).

1.4 SEISMIC RETRAINT REQUIREMENTS:

A. Refer to Section 23 05 50 – Mechanical Seismic Control, for requirements for piping, ductwork and all system appurtenances (including weight of normal operating contents) that shall be adequately restrained to resist seismic forces. For seismic restrained vibration isolators provided under this Section, coordinate the isolator type and strength specifications with the engineering requirements as determined under the seismic design for the project location.

1.5 QUALITY ASSURANCE:

A. Welding: Qualify procedures and personnel according to AWS D1.1, “Structural Welding Code—Steel.”

PART 2 - PRODUCTS

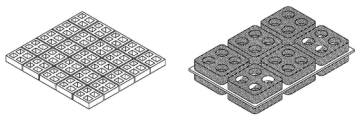
2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 VIBRATION ISOLATORS

A. Manufacturers:
1. Amber/Booth Company, Inc.
2. B-Line Systems, Inc.
3. California Dynamics Corp.
4. Isolation Technology, Inc.
5. Kinetics Noise Control, Inc.
6. Mason Industries, Inc.
7. Vibration Eliminator Co., Inc.
8. Vibration Isolation Co., Inc.
9. Vibration Mountings & Controls/Korfund.
10. Vibro-Acoustics

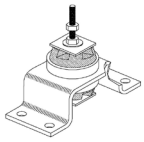
B. Type EP: Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.
1. Material: Bridge-bearing neoprene, complying with AASHTO M 251.
2. Minimum ¾” thick.
3. Max Loading 60 PSI.



ELASOTOMERIC PAD
EP

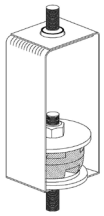
C. Type EM: Elastomeric Mounts: Double-deflection type, with molded, oil-resistant rubber or neoprene isolator elements with factory-drilled, encapsulated top plate for bolting to equipment and with baseplate for bolting to structure. Color-code or otherwise identify to indicate capacity range.

D. Type ER: Restrained Elastomeric Mounts: All-directional elastomeric mountings with seismic restraint.
   1. Materials: Cast-ductile-iron housing containing two separate and opposing, molded, bridge-bearing neoprene elements that prevent central threaded sleeve and attachment bolt from contacting the casting during normal operation.
   2. Neoprene: Shock-absorbing materials compounded according to, the standard for bridge-bearing neoprene as defined by AASHTO.



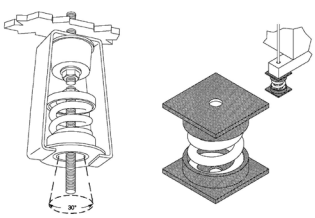
RESTRAINED (SEISMIC) S
ELASOTOMERIC MOUNTS
ER

E. Type EH: Elastomeric Hangers: Double-deflection type, with molded, oil-resistant rubber or neoprene isolator elements bonded to steel housings with threaded connections for hanger rods. Color-code or otherwise identify to indicate capacity range.



ELASTOMERIC HANGER
EH

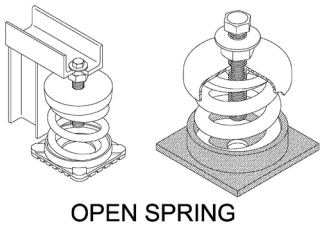
F. Type SH: Spring Hangers: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression.
   1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
   2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
   3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
   4. Lateral Stiffness: More than 80 percent of the rated vertical stiffness.
   5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
   6. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-



SPRING HANGER
SH

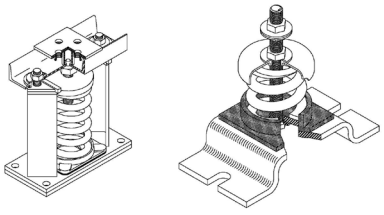
reinforced cup to support spring and bushing projecting through bottom of frame.

G. Type OS: Open Spring Isolators: Freestanding, laterally stable, open-spring isolators.
   1. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
   2. Minimum Additional Travel: 50 percent of the required deflection at rated load.
   3. Lateral Stiffness: More than 80 percent of the rated vertical stiffness.
   4. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
   5. Baseplates: Factory drilled for bolting to structure and bonded to ¼-inch- thick, rubber isolator pad attached to baseplate underside. Baseplates shall limit floor load to 100 psig.
   6. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.



OPEN SPRING
OS

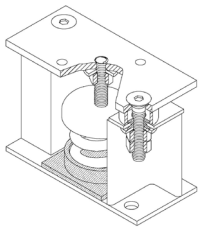
H. Type RS: Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.
   1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to ¼-inch-thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
   2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
   3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
   4. Lateral Stiffness: More than 80 percent of the rated vertical stiffness.
   5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.



RESTRAINED SPRING
RS

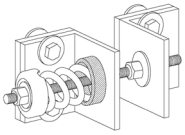
I. Type SS: Seismic Spring Mounts: Housed spring isolator with integral seismic snubbers.
   1. Housing: Ductile-iron or steel housing to provide all-directional seismic restraint.
   2. Base: Factory drilled for bolting to structure.

3. Snubbers: Vertically adjustable to allow a maximum of ¼-inch (6-mm) travel before contacting a resilient collar.



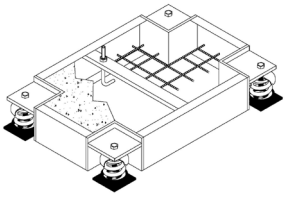
SEISMIC SPRING
SS

J. Type TR: Thrust Restraint: Combination coil spring and elastomeric insert with spring and insert in compression and with a load stop. Include rod and angle-iron brackets for attaching to equipment.
1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of the rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
7. Coil Spring: Factory set and field adjustable for a maximum of ¼-inch movement at start and stop.



THRUST RESTRAINT
TR

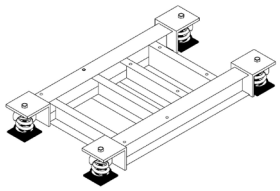
K. Type IB: Inertia Base.
1. Concrete filled base sized to support equipment without overhanging structural steel members that form perimeter framing. Cutout in center may be provided with structural member interior section to adjust base weight if necessary. Total mass of base shall not be less than two times the total weight of all equipment mounted on base unless otherwise indicated. Submit calculations for base deflection. Deflection shall be in accordance with 1995 ASHRAE Handbook, Vibration Isolation. Furnish with preset embedded anchor bolts and pipe sleeves for fan and motor slide rail or other equipment attachment. Size base to support suction elbow of end suction pumps and suction and discharge elbow of



INERTIA BASE
IB

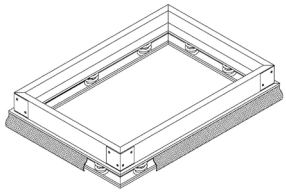
horizontal split case pumps, unless flexible neoprene elbows are used. Use T-shape where necessary to conserve weight and size.

L. Type SB: Structural Steel Base.
1. Structural steel rectangular base with cross members to prevent twisting where longest beam dimension exceeds 6 feet. Use height-saving brachets for side mounting of isolators.



STRUCTURAL BASE
SB

M. Type IRC: Spring Isolation Roof Curb
1. Custom spring isolation roof curb to be provided for roof mounted air handling units. Coordinate curb type, dimensions, etc. with RTU equipment manufacturer.



SPRING ISOLATION
ROOF CURB
IRC

N. Type NG: Neoprene Gasket
1. Neoprene gasket to be provided on roof curb mounted centrifugal exhaust fans between curb framing and fan base assembly.

O. Pipe Riser Resilient Support: All-directional, acoustical pipe anchor consisting of 2 steel tubes separated by a minimum of ½-inch- thick, 60-durometer neoprene. Include steel and neoprene vertical-limit stops arranged to prevent vertical travel in both directions. Design support for a maximum load on the isolation material of 500 psig and for equal resistance in all directions.

P. Resilient Pipe Guides: Telescopic arrangement of 2 steel tubes separated by a minimum of ½-inch- thick, 60-durometer neoprene. Factory set guide height with a shear pin to allow vertical motion due to pipe expansion and contraction. Shear pin shall be removable and reinsertable to allow for selection of pipe movement. Guides shall be capable of motion to meet location requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide in accordance with manufacturers instructions.

B. Anchor isolators to equipment and structure.

C. Connect all associated piping, ductwork and wiring with flexible connectors (unless specifically noted or detailed otherwise).

D. Install seismic snubbers on isolated equipment when installed in seismic rated systems. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.

E. Install resilient bolt isolation washers on equipment anchor bolts.

F. Connect wiring to isolated equipment with flexible hanging loop.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:
1. Test isolator deflection.
2. Inspect minimum snubber clearances.

3.3 ADJUSTING

A. Adjust isolators after piping systems have been filled and 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. Attach thrust limits at centerline of thrust and adjust to a maximum of ¼-inch movement during start and stop.

D. Adjust active height of spring isolators.

E. Adjust snubbers according to manufacturer’s written recommendations.

F. Adjust seismic restraints to permit free movement of equipment within normal mode of operation.

3.4 VIBRATION ISOLATOR RESTRAINT SCHEDULE:

A. Refer to Section Mechanical Seismic Controls for seismic restraint requirements for equipment, piping and ductwork.

B. See plans for additional details and or Vibration Isolator Schedules which shall take precedence over the following default table.

DEFAULT VIBRATION ISOLATOR SCHEDULE												
EQUIPMENT/ SYSTEM	MOUNTING LOCATION	WEIGHT (LBS)	MOUNTING TYPE/ LOCATION			FACTORY INSTALLED INTERNAL VIB. ISOL.	VIBRATION ISOLATOR		SERVICE CONNECTIONS			NOTES
			FLOOR		SUSPENDED		TYPE See Note 1	STATIC DEFL. (“)	FLEXIBLE			
			SLAB ON-GRADE	ELEVATED STRUCTURE					DUCT	PIPE	ELECTRICAL	
AHU	SUSPENDED				X		SH	2.5”	X	X	X	
AHU	FLOOR		X			RS	EP	50 Duro	X			
AHU	FLOOR			X		RS	EP	50 Duro	X			
FAN COIL	FLOOR			X			EP	50 Duro	X	X	X	
FAN COIL	SUSPENDED				X		EH	50 Duro	X	X	X	
CENTRIFUGAL EXHAUST FAN	ROOF			ROOF			NG	NA				
UTILITY SET EXHAUST FAN	ROOF			ROOF			EM	50 Duro	X		X	
EXHAUST FAN	SUSPENDED				X		SH	1”	X		X	
EXHAUST FAN < 1/4 HP	SUSPENDED				X		EH	50 Duro	X		X	
PUMPS	BASE MTD		X				EP	50 Duro		X	X	
PUMPS	IN-LINE				X		N/R	NA				
PUMPS	BASE MTD			X			IB	2”		X	X	
CHILLER	FLOOR		X				RS	?		X	X	
CHILLER	OUTDOOR		X				EP	50 Duro				
CHILLER	FLOOR/ROOF			X			SB/RS	2.5”		X	X	
Notes: Vibration isolators shall be sized and selected by isolator manufacture based on application, equipment weight and distribution, unit operating speed, mounting configuration, structural span (where applicable).												

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following mechanical identification materials and their installation:
   1. Equipment markers.
   2. Access panel and door markers.
   3. Pipe markers.
   4. Valve tags.
   5. Above ceiling access T-bar markers.
   6. Duct Labels.

1.2 REFERENCES

A. American Society of Mechanical Engineers (ASME):
   1. ASME A13.1 – Scheme for the Identification of Piping Systems.

1.3 SUBMITTALS

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

B. Lists:
   1. Provide lists of equipment labels and ID tags; pipe labels with system abbreviation, name & pipe size; and valve label ID tags with duty, for engineer review and approval.

1.4 QUALITY ASSURANCE

A. ASME Compliance: Comply with ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approved pipe, valve and equipment label manufacturers.
   1. Seton.
   2. W. H. Brady.
   3. Marking Services Inc.
   4. Trophy House Pros, Signs and Engraving
   5. Brimar Industries.

2.2 EQUIPMENT IDENTIFICATION DEVICES

A. Equipment Markers: 1/16” thick, engraved, color-coded plastic, phenolic or aluminum.
   1. Data: Equipment tag # listed on schedule.

2. Size: 4 by 6 inches for large equipment, 2 by 3 inches for terminal units. Lettering size proportional.
3. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.



4. Tag Colors:
   a. Heating devices: Red with White Letters
   b. Cooling devices: Blue with White Letters
   c. Fans & AHUs: Black with White Letters.
   d. Pumps & Hydronic Devices: Green with White Letters.

B. Access Panel and Door Markers: Same as equipment markers. Label items or equipment that is access through the door or panel.

2.3 PIPING IDENTIFICATION DEVICES

A. Manufactured Pipe Markers, General: Preprinted, color-coded, with lettering indicating service, and showing direction of flow.
1. Colors: Comply with ASME A13.1, unless otherwise indicated.
2. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length.



3. Pipes with OD, Including Insulation, Less Than 6 Inches: Full-band pipe markers extending 360 degrees around pipe at each location.
4. Pipes with OD, Including Insulation, 6 Inches and Larger: Either full-band or strip-type pipe markers at least three times letter height and of length required for label.
5. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow.



B. Pre-tensioned Pipe Markers: Pre-coiled semi-rigid plastic formed to cover full circumference of pipe and to attach to pipe without adhesive.

C. Shaped Pipe Markers: Preformed semi-rigid plastic formed to partially cover circumference of pipe and to attach to pipe with mechanical fasteners that do not penetrate insulation vapor barrier.

D. Self-Adhesive Pipe Markers: Plastic with pressure-sensitive, permanent-type, self-adhesive back.

E. Plastic Tape: Continuously printed, vinyl tape at least 3 mils thick with pressure-sensitive, permanent-type, self-adhesive back.
   1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches: 3/4 inch minimum.
   2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches or Larger: 1-1/2 inches minimum.

2.4 PIPING IDENTIFICATION PIPELINE PAINTING

A. Unless indicated otherwise, all piping, both insulated and not insulated, shall be color coded with pipeline paint. Painting shall cover all visible sections of piping, fittings, elbows, etc. within chiller plant. Outdoor piping with metal jacketing does not need to be painted, but outdoor uninsulated piping shall be painted.
   1. Do not paint removable insulation jackets or pipeline fittings that are not insulated.

B. Pipeline paint shall be latex type paint, suitable for fiberglass ASJ insulation and PVC pipe jackets.

C. Pipeline paint colors shall be the same as for the pipe identification labels as indicated above.
   a. CWS: Chilled Water Supply. Color: Blue.
   b. CWR: Chilled Water Return. Color: Blue.
   c. CSFT: Condenser Supply From Tower. Color: Light Green.
   d. CRTT: Condenser Return to Tower. Color: Light Green.
   e. CEM: Chemical Treatment Lines. Color: Purple.
   f. SOW: Soft Water (Make-up). Color: Light Blue.
   g. FPW: Fire Protection Water. Color: Light Blue.
   h. Drains & Auxiliaries: Color: White.

2.5 VALVE TAGS (WITHOUT SERVICE DATA)

A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers, with numbering scheme. Provide 5/32-inch hole for fastener.
   1. Material: 0.032-inch- thick brass or aluminum.
   2. Valve-Tag Fasteners: Brass wire-link or beaded chain; or S-hook.
   3. Labeling: System tag (HW, CW, Steam, etc.) and valve number.

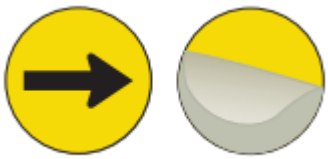
2.6 VALVE TAGS (WITH SERVICE DATA)

A. Valve Tags: Stamped or engraved with white letters for piping system abbreviation and valve duty description. Provide hole for fastener.
   1. Material: 1/8-inch thick 3-ply plastic, brass or aluminum.
   2. Valve-Tag Fasteners: Brass wire-link or beaded chain; or S-hook.

2.7 T-BAR CEILING LABELS

A. T-Bar ceiling labels tape shall be 3/4-inch diameter plastic tags with self-adhesive backing and mounted to t-bar grid at a point closest to the item to be accessed. Provide with directional arrows indicating which ceiling tile is the most appropriate for removal. Brimar Industries (Pipemarker.com) or equal.

B. Ceiling Label Tag Color Scheme:
   1. HVAC Isolation Valves: BLUE.
   2. Plumbing Isolation Valves: GREEN.
   3. HVAC Units/Filter Access: ORANGE.
   4. Control Dampers, OSA Valves, etc: YELLOW.
   5. Fire or Smoke Dampers: RED.
   6. Waste or Roof Drain Clean-outs: WHITE.



2.8 DUCTWORK LABELS

A. Self-Adhesive vinyl markers with air flow directional arrows. Label to identify air handling unit/system and type of air flow, e.g.” HRU-1 Supply Air”, “EF-1 Exhaust Air”, etc.

B. Label Color Scheme:
   1. Supply Air (Tempered Air): Red label with white lettering.
   2. Return Air: Yellow label with black lettering.
   3. Exhaust Air: Green label with white lettering.
   4. Outside Air: Blue label with white lettering.



PART 3 - EXECUTION

3.1 PIPING IDENTIFICATION

A. Install manufactured pipe markers indicating service on each piping system. Install with flow indication arrows showing direction of flow.
   1. Pipes with OD, Including Insulation, Less Than 6 Inches: Pre-tensioned pipe markers. Use size to ensure a tight fit.
   2. Pipes with OD, Including Insulation, Less Than 6 Inches: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, at least 1-1/2 inches wide, lapped at least 1-1/2 inches at both ends of pipe marker, and covering full circumference of pipe.
   3. Pipes with OD, Including Insulation, 6 Inches and Larger: Shaped pipe markers. Use size to match pipe and secure with fasteners.
   4. Pipes with OD, Including Insulation, 6 Inches and Larger: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, at least 1-1/2 inches wide, lapped at least 3 inches at both ends of pipe marker, and covering full circumference of pipe.

B. Locate pipe markers and color bands where piping is exposed in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior non-concealed locations as follows:
   1. Near each valve and control device.
   2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
   3. Near penetrations through walls, floors, ceilings, and non-accessible enclosures.
   4. At access doors, manholes, and similar access points that permit view of concealed piping.
   5. Near major equipment items and other points of origination and termination.
   6. Spaced at maximum intervals of 20 feet along each run. Reduce intervals to 10 feet in areas of congested piping and equipment.
   7. On piping above removable acoustical ceilings. Omit intermediately spaced markers.

3.2 EQUIPMENT IDENTIFICATION

A. Install equipment markers with permanent adhesive or screws on or near each major item of mechanical equipment (all equipment scheduled and tagged on the drawings).
   1. Data: Name and equipment tag # listed on schedule.

2. Locate markers where accessible and visible. Include markers for the following general categories of equipment:
   a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
   b. Fuel-burning units, including boilers, furnaces, etc.
   c. Pumps, compressors, chillers, condensers, and similar motor-driven units.
   d. Heat exchangers, coils, evaporators, cooling towers, heat recovery units, and similar equipment.
   e. Fans, blowers, air handlers, fan coils, heat pumps and terminal units.
   f. Packaged HVAC central-station and zone-type units.
   g. Tanks and pressure vessels.
   h. Humidifiers, water-treatment systems, and similar equipment.

3.3 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; plumbing fixture supply stops; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag List: Provide printed valve tag list with the following information for each valve:
   1. System abbreviation as indicated on plans, e.g. HWS, CWS, HPS, PC, etc.
   2. Unique valve number for each system valve.
   3. Size of valve.
   4. Type of valve, e.g. ball valve, gate valve, butterfly valve, etc.
   5. Duty of valve: e.g. shut-off, bypass, drain, etc.
   6. Location of valve: Room number and/or name, and location, e.g. near boiler, at ceiling, etc.

3.4 ABOVE CEILING ACCESS TBAR TAGS

A. Provide a colored label appropriate to the service being accessed above the ceiling at t-bar ceilings and access doors in hard ceilings. Point directional arrow towards the most accessible ceiling tile that leads to the device to be serviced.

3.5 DUCT LABEL INSTALLATION

A. Install self-adhesive duct labels on all duct systems, including ductwork above lay-in ceilings and inside accessible duct chases. Affix duct label with air flow direction arrows on most visible section of duct. Affix to bare or insulated ductwork as necessary. Clean surfaced before installing labels. Install in the following locations:
   1. Near connections to each piece of equipment, inlets and outlets.
   2. Near branch take-offs.
   3. At wall and floor penetrations. Locate on both sides of penetration.
   4. Spaced at a maximum of 25 feet along each duct run. Reduce to intervals of 10 feet in areas of congested ductwork, piping or equipment.

3.6 ADJUSTING AND CLEANING

A. Relocate mechanical identification materials and devices that have become visually blocked by other work.

B. Clean faces of mechanical identification devices and frames of valve schedules.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes Testing, Adjusting and Balancing for air and water systems.

1.2 COORDINATION

A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.

B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

C. Six weeks prior to starting TAB, submit the qualifications of the site technician for the project, including the name of the contractors and facility managers of recent projects the technician on which was lead.

D. Provide formal progress reports and deficiency reports weekly.

E. Communicate in writing all set-point and parameter changes made or problems and discrepancies identified during TAB that affect the control system setup and operation.

F. Provide a draft TAB report within two weeks of completion. The report will contain a full explanation of the methodology, assumptions and the results in a clear format with designations of all uncommon abbreviations and column headings.

1. Provide a list of all components and systems that perform out of specified parameters.
2. Provide any requested data, gathered, but not shown on the draft reports.

G. Provide a final TAB report for the Owner’s Representative and Commissioning Authority with details. Provide final information as requested in draft TAB report.

1. Identify the following:

a) Systems or subsystems for which final balancing is complete.
b) Status of deficiencies and balancing issues encountered, including corrective actions taken.
c) Plan & Schedule for completion of unfinished work.

1.3 SUBMITTALS

A. Strategies and Procedures Plan:

1. Submit the outline for the TAB Strategies and Procedures Plan six weeks prior to starting TAB procedures.
2. The submitted plan will include:

    a) Certification that the TAB contractor has reviewed the construction documents and the systems with the design engineers and contractors to sufficiently understand the design intent for each system.
    b) An explanation of the intended use of the DDC. The controls contractor will comment on feasibility of the plan.
    c) All field checkout sheets and logs to be used that list each component to be tested, adjusted and balanced with the data cells to be gathered for each.
    d) Discussion of what notations and markings will be made on the duct and piping drawings during the process.
    e) Final test report forms to be used.
    f) Detailed step-by-step procedures for TAB work for each system and issue: terminal flow calibration (for each terminal type), diffuser proportioning, branch / sub-main proportioning, total flow calculations, rechecking, diversity issues, expected problems and solutions, etc. Criteria for using air flow straighteners or relocating flow stations and sensors will be discussed. Provide the analogous explanations for the waterside.
    g) List of all airflow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
    h) Details of how total flow will be determined (Air: sum of terminal flows via DDC calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations. Water: pump curves, circuit setter, flow station, ultrasonic, etc.).
    i) The identification and types of measurement instruments to be used and their most recent calibration date.
    j) Specific procedures that will ensure that both air and water side are operating at the lowest possible pressures and provide methods to verify this.
    k) Confirmation that TAB understands the outside air ventilation criteria under all conditions.
    l) Details of whether and how minimum outside air cfm will be verified and set, and for what level (total building, zone, etc.).
    m) Details of how building static and exhaust fan / relief damper capacity will be checked.
    n) Proposed selection points for sound measurements and sound measurement methods.
    o) Details of methods for making any specified coil or other system plant capacity measurements.
    p) Details of any TAB work to be done in phases (by floor, etc.), or of areas to be built out later.
    q) Details regarding specified deferred or seasonal TAB work.
    r) Details of any specified false loading of systems to complete TAB work.
    s) Details of all exhaust fan balancing and capacity verifications, including any required room pressure differentials.
    t) Details of any required interstitial cavity differential pressure measurements and calculations.

B. Certified TAB Reports: Submit two copies of reports prepared, as specified in this Section, on approved forms certified by TAB firm.

1.4 QUALITY ASSURANCE

A. TAB Firm Qualifications: An independent testing, adjusting, and balancing agency certified by National Environmental Balancing Bureau (NEBB) in those testing and balancing disciplines specified for this project.

B. Prequalified balancing contractors are:

1. Air Commander
2. TestComm
3. Riley Engineering

C. Report Certification: Certify TAB field data reports in accordance with NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems, 5.2.2 Report Certification." This certification includes the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that TAB team complied with approved TAB plan and the procedures specified and referenced in this Specification.

D. TAB Report Forms: Use standard forms from NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."

E. NEEB's Quality Assurance Program (QAP): TAB work shall be performed in accordance with NEBB standards. The certified TAB firm will make application to the NEBB Office for a Certificate of Conformance Certification.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine approved submittal data of HVAC systems and equipment.

C. Examine Project Record Documents described in Division 1 Section "Project Record Documents."

D. Examine equipment performance data including fan and pump curves. Relate performance data to Project conditions and requirements, including system effects that

can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Calculate system effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from those presented when the equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," Sections 7 through 10; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.

E. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Sections have been performed.

F. Examine system and equipment test reports.

G. Examine HVAC system and equipment installations to verify that indicated balancing devices are properly installed and that their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.

H. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.

I. Examine HVAC equipment to ensure that clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls are ready for operation.

J. Examine Fan Coil Units to verify that they are accessible and their controls are connected and functioning.

K. Examine strainers for clean screens and proper perforations.

L. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.

M. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

N. Examine system pumps to ensure absence of entrained air in the suction piping.

O. Examine equipment for installation and for properly operating safety interlocks and controls.

P. Examine automatic temperature system components to verify the following:

1. Dampers, valves, and other controlled devices are operated by the intended controller.
2. Dampers and valves are in the position indicated by the controller.
3. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in multizone units, mixing boxes, and variable-air-volume terminals.
4. Automatic modulating and shutoff valves, including two-way valves and three-way mixing and diverting valves, are properly connected.

5. Thermostats are located to avoid adverse effects of sunlight, drafts, and cold walls.
6. Sensors are located to sense only the intended conditions.
7. Sequence of operation for control modes is according to the Contract Documents.
8. Controller set points are set at indicated values.
9. Interlocked systems are operating.
10. Changeover from heating to cooling mode occurs according to indicated values.

Q. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

R. If conditions are discovered that prevent the Testing Agent from performing the test, the Testing Agent shall notify MSI Engineers (509-624-1050) prior to leaving the site.

3.2 PREPARATION

A. Complete system readiness checks and prepare system readiness reports. Verify the following:

1. Permanent electrical power wiring is complete.
2. Hydronic systems are filled, clean, and free of air.
3. Automatic temperature-control systems are operational.
4. Equipment and duct access doors are securely closed.
5. Balance, combination fire & smoke, and fire dampers are open.
6. Isolating and balancing valves are open and control valves are operational.
7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
8. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and this Section.

1. Where conditions or situations arise that are not covered by the standards, or where system dynamics and performances are not as intended or expected, the Engineer reserves the right to modify the NEBB TAB procedures and standards for the benefit of the final system operation. The balancing agency shall seek guidance from the Engineer when such conditions develop.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to Specifications.

C. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. Determine the best locations in main and branch ducts for accurate duct airflow measurements.

D. Check airflow patterns from the outside-air louvers and dampers and the return- and exhaust-air dampers, through the supply-fan discharge and mixing dampers.

E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

F. Verify that motor starters are equipped with properly sized thermal protection.

G. Check dampers for proper position to achieve desired airflow path.

H. Check for airflow blockages.

I. Check condensate drains for proper connections and functioning.

J. Check for proper sealing of air-handling unit components.

K. Check for proper sealing of air duct system.

L. Check all fans for proper fan rotation.

3.5 PROCEDURES FOR AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure fan static pressures to determine actual static pressure as follows:

a) Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.
b) Measure static pressure directly at the fan outlet or through the flexible connection.
c) Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.

d) Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

2. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.

   a) Simulate dirty filter operation and record the point at which maintenance personnel must change filters.

3. Measure static pressures entering and leaving other devices such as sound traps, heat recovery equipment, and air washers, under final balanced conditions.
4. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. Compare actual system effect factors with calculated system effect factors to identify where variations occur. Recommend corrective action to align design and actual conditions.
5. Obtain approval from Engineer for adjustment of fan speed higher or lower than indicated speed. Make required pulley size changes or adjustments to pulley sizes, and electrical connections to accommodate fan-speed changes.
6. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full cooling, full heating, economizer, and any other operating modes to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure static pressure at a point downstream from the balancing damper and adjust volume dampers until the proper static pressure is achieved.

   a) Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure terminal outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust terminal outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using volume dampers rather than the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.

2. Adjust patterns of adjustable outlets for proper distribution without drafts.

E. Where applicable, adjust counterbalanced relief dampers to maintain a maximum room pressure of .05”w.g. in the economizer mode.

3.6 PROCEDURES FOR HYDRONIC SYSTEMS

A. Set calibrated balancing valves, if installed, at calculated presettings.

B. Measure flow at all stations and adjust, where necessary, to obtain first balance.

C. Measure flow at main balancing station and set main balancing device to achieve flow that is 5 percent greater than indicated flow.

D. Measure the differential-pressure control valve settings existing at the conclusions of balancing.

3.7 PROCEDURES FOR TEMPERATURE MEASUREMENTS

A. During TAB, report the need for adjustment in temperature regulation within the automatic temperature-control system.

B. Measure indoor wet- and dry-bulb temperatures every other hour for a period of two successive eight-hour days, in each separately controlled zone, to prove correctness of final temperature settings. Measure when the building or zone is occupied.

C. Measure outside-air, wet- and dry-bulb temperatures.

3.8 TEMPERATURE-CONTROL VERIFICATION

A. Verify that controllers are calibrated and commissioned.

B. Check transmitter and controller locations and note conditions that would adversely affect control functions.

C. Record controller settings and note variances between set points and actual measurements.

D. Check the operation of limiting controllers (i.e., high- and low-temperature controllers).

E. Check free travel and proper operation of control devices such as damper and valve operators.

F. Check the sequence of operation of control devices. Note air pressures and device positions and correlate with airflow and water flow measurements. Note the speed of response to input changes.

G. Check the interaction of electrically operated switch transducers.

H. Check the interaction of interlock and lockout systems.

I. Check main control supply-air pressure and observe compressor and dryer operations.

J. Record voltages of power supply and controller output. Determine whether the system operates on a grounded or nongrounded power supply.

K. Note operation of electric actuators using spring return for proper fail-safe operations.

3.9 TOLERANCES

A. Set HVAC system airflow and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.
3. Heating-Water Flow Rate: Plus or minus 10 percent.
4. Cooling-Water Flow Rate: Plus or minus 5 percent.

3.10 FINAL REPORT

A. General: Provide electronic pdf reporttabulated and divided into sections by tested and balanced systems.

B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.

1. Include a list of instruments used for procedures, along with proof of calibration.

C. Final Report Contents: In addition to certified field report data, include the following:

1. Pump curves.
2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance, but do not include Shop Drawings and Product Data.

D. General Report Data: In addition to form titles and entries, include the following data in the final report, as applicable:

1. Title page.
2. Name and address of TAB firm.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB firm who certifies the report.

10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a) Indicated versus final performance.
    b) Notable characteristics of systems.
    c) Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer, type size, and fittings.
14. Notes to explain why certain final data in the body of reports varies from indicated values.
15. Test conditions for performance forms

E. System Diagrams: Include schematic layouts of systems. Present each system with single-line diagram.

3.11 ADDITIONAL TESTS

A. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional testing, inspecting, and adjusting during near-peak summer and winter conditions.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes insulation requirements for HVAC ductwork, hydronic piping as associated tanks, vessels and equipment.

1.2 REFERENCES

A. Insulation values shall conform with the latest edition of the Washington State Energy Code and ASHRAE recommendations.

B. ASTM International:
1. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
2. ASTM C411 – Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
3. ASTM C534 – Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
4. ASTM C547 – Standard Specification for Mineral Fiber Pipe Insulation.
5. ASTM C585 – Standard Practice for Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing.
6. ASTM C612 – Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
7. ASTM C665 – Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
8. ASTM C1104 – Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
9. ASTM C1136 – Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
10. ASTM C1338 – Standard Test Method for Determining Fungi Resistance of Insulation materials and Facings.
11. ASTM E84 (NFPA 255) – Standard Test Method for Surface Burning Characteristics of Building Materials.

C. Underwriters Laboratories (UL):
1. UL 723 – Test for Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

A. Product Data: Provide product data for each type of insulation product indicated.

B. Shop Drawings: Show details for the following:
1. Application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
3. Removable insulation at piping specialties, valves, equipment connections, and access panels.

4. Application of field-applied jackets.

C. Insulation Schedule: Provide a schedule indicating insulation type and thickness and equivalent R-value for each mechanical system to be insulated. Indicate jacketing type to be utilized.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of mechanical insulation products, of types and sizes required, whose products have been in satisfactory use in similar services for not less than 10 years.

B. Installer's Qualifications: Firms with at least 5 years successful installation experience on projects with mechanical insulation systems similar to that required for this project.

C. Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics and adhesives) with flame-spread index of 25 or less, and smoke developed index of 50 or less, as tested by ASTM E84 (NFPA 255) method.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of the following:
1. Armacell LLC
2. CertainTeed Corp.
3. Foster Products Corp.
4. IMCOA
5. Johns Manville Products Corp.
6. Knauf Fiber Glass GmbH.
7. Owens-Corning Fiberglas Corp.
8. Pittsburgh Corning Corp.

2.2 PIPING INSULATION MATERIALS

A. Fiberglass Piping Insulation: ASTM C411, ASTM C547, ASTM C585, ASTM C1136, K = 0.24 @ 100° F mean temperature. HP All Service (White ASJ) vapor retarder jacket with self-sealing longitudinal closure LAP. Equal to Johns Manville Micro-Lok.

B. Elastomeric Piping Insulation: ASTM C534, Type 1, ASTM E84, NFPA 255, UL 723, K = 0.27 @ 75° F Mean temperature. Equal to AP Armaflex pipe insulation.

C. Pipe Fittings:
1. Fitting Insulation: Fittings, elbows, tees, unions, etc. shall be molded fiberglass fabricated specifically for pipe size, type, and adjacent insulation thickness. Only molded products are acceptable. Equal to Johns Manville Hi-Lo temperature fiber glass insulation inserts.

D. Insulation Fitting Covers:

1. Subject to compliance with requirements, provide one of the following products or approved equal:
   a. Johns Manville Zeston 2000
   b. Speedline Smoke-Safe
2. One-piece premolded 0.020” thick white PVC fitting covers fastened as per manufacturer’s recommendations with fiberglass inserts.

2.3 PIPE INSULATION JACKETS

A. PVC Pipe Insulation Jackets:
   1. Subject to compliance with requirements, provide one of the following products or approved equal:
      a. Johns Manville Zeston 2000
      b. Speedline Smoke-Safe
   2. For interior applications, premolded 0.020” thick white PVC wrap covers fastened as per manufacturer’s recommendations.

B. Aluminum jacket pipe insulation shall be 0.016” (0.4MM) thick, stucco embossed finish, with a one mil polyethylene film/forty pound kraft paper integral vapor barrier affixed to the interior of the cover in conformance with ASTM B209. Elbows and fittings shall be jacketed with pre-formed 0.024” thick aluminum covers, with moisture retarder film.

2.4 THERMAL-HANGER SHIELD INSERTS

A. Description: High density compressive-strength insulation insert encased in sheet metal shield. Compressive strength varies (25 to 100 psi) based on insulation material selected and shall be as required to accommodate various hanger types, pipe sizes and materials, and associated loading. Flame/smoke rated at 25/50 for plenum applications. Minimum R-Value per 1” thickness shall be 2.5 for calcium silicate and 5.0 for cellular glass or phenolic insulations.

B. Refer to Section Hangers and Supports for HVAC Piping and Equipment for shield insert requirements.

2.5 PIPE INSULATION REMOVABLE VALVE AND FITTING COVERS

A. Valves and devices subject to service or operational needs shall be insulated with removable type covers. These include: Shut-off valves, balance valves (manual and automatic), control valves, venturis and strainers.

B. Valves sets at terminal unit and air handling unit coil connections shall be covered with pre-insulated valve wraps equal to “No-Sweat” reusable and removable covers. Valve wraps shall consist or 1” thick insulation with a durable vapor barrier jacket material and Velcro closures. Field or shop fabricated valve wraps for terminal unit and smaller AHU valve sets are NOT acceptable.

C. Larger body valves, strainers, etc. shall be covered with custom made or pre-manufactured removable covers utilizing PTFE Fiberglass Composite Jacketing, 16.5 oz/sq. yd minimum density, inside and outside face, or Silcone-coated F.G. cloth with S.S. mesh inner lining, both with fiberglass insulation fill. Assembly shall be double sewn lock stitch with minimum 4 to 6 stitches per inch. Jackets shall be fasteners

using hook and loop (Velcro) straps and 1" slide buckles or S.S. lacing hooks with Teflon-coated F.G. drawstrings.

D. Flex hose connections on the chilled water coil connections to terminal units shall be covered with ½" thick elastomeric foam, pre-molded pipe sections, for condensation control.

2.6 DUCTWORK INSULATION WRAP MATERIALS

A. Flexible fiberglass ductwork insulation shall conform to ASTM C411, ASTM C1104, ASTM C665, ASTM C1338, formaldehyde-free, K = 0.25 @ 75º mean temperature. Provide FSK (Alum. Foil-Scrim-Kraft) vapor barrier facing with 2" stapling tab. Equal to Johns Manville Microlite XG.

B. Duct Liner: Products meeting ASTM C1071; K(ksi) value of 0.25 (R=4.0 per inch)at 75 degrees F, coated air side for maximum 5,000 ft/min air velocity, 1.5 psf density.
1. See Section 23 31 00 - HVAC Ducts.

2.7 DUCT PLENUM INSULATION MATERIALS

A. Rigid fiberglass ductwork insulation shall conform to ASTM C612, type 1A, ASTM C612, type 1B. K = 0.23 @ 75º F mean temperature equal to Johns Manville 800 series spin-glass with FSK (Alum. Foil-Scrim-Kraft) vapor barrier facing. Type 814 at 3.00 pcf density.

2.8 EXTERIOR DUCTWORK INSULATION MATERIALS

A. Rigid Polyisocyanurate Foam Sheating shall conform to ASTM C1289-07 Type II. K = 0.17 @ 75°F mean temperature, equal to Johns Manville R-Panel Roof Insulation. For exterior (outside the building envelope) use only.

2.9 FIRE-RATED DUCT INSULATION SYSTEMS

A. High temperature, flexible, blanket insulation with FSK (Alum. Foil-Scrim-Kraft) jacket that is UL tested and certified to provide a 2-hour fire rating, equal to 3M fire barrier duct wrap 615+.

2.10 DUCTWORK JACKETING & WEATHERPROOFING

A. Self-adhering cover: Membrane shall be a pre-manufactured self-adhering product with an UV resistant, stucco embossed facing. Water valve transmission of the installed product shall be 0.020 perms or less. Product shall be suitable for continuous use in low temperatures of -10º F. Manufacturers shall be Flex-Clad 400, MFM Building Products Corp. or Alumaguard 60, Polyguard Products, Inc.

B. Non-self-adhering cover: Aluminum jacketing, 0.030" thick, stucco embossed finish with moisture barrier inner lining.

2.11 EQUIPMENT INSULATION MATERIALS

A. Rigid fiberglass equipment insulation shall conform to ASTM C612, Class 2, 6.0 PCF density, K = 0.23 @ 75º F mean temperature. Cover insulation with pre-sized glass cloth jacketing material, not less than 7.8 ounces per square yard. Provide a trowl or glove grade water based purpose mastic (white or light gray) suitable for interior or exterior applications. Install per manufacturer's written installation instructions.

B. Elastomeric Insulation: ASTM C534, Type 1, ASTM E84, NFPA 255, UL 723, K = 0.27 @ 75º F mean temperature, equal to Armaflex.

2.12 FASTENERS, MASTICS, SEALANTS, TAPES, ADHESIVES AND ACCESSORIES

A. The insulation installer shall utilize accessory materials and devices for the complete and proper application of all insulation systems, in accordance with manufacturer's directions and established good industry standards for materials and workmanship. All accessory products shall be compatible with the insulation materials being utilized.

PART 3 - EXECUTION

3.1 HVAC PIPING INSULATION

A. Provide insulation for the following piping:

Pipe Insulation Systems			
Pipe Service	**Location**	**Insulation Type**	**Insulation Cover[1]**
Heating & Chilled Water HR Loops & Drycoolers	Building Interior	Fiberglass	ASJ
	Exterior	Elastomeric	Metal Jacket
Make-up Water	Building Interior	Fiberglass	ASJ
	Exterior	Elastomeric	Metal Jacket
Condensate Drains	Building Interior	None	N/A
VRF Condensate Drains	Building Interior	Elastomeric	N/A
Condenser Water	Building Interior	None	N/A
	Exterior	Elastomeric	Metal Jacket
Refrigeration Piping	Building Interior	Elastomeric	None
	Exterior	Elastomeric	Paint
Heat Pump Loop	Building Interior	None	N/A
	Exterior	Elastomeric	Metal Jacket
Geothermal Heat Pump Loop	Building Interior	Fiberglass	ASJ
	Exterior	Elastomeric	Metal Jacket

NOTE: All insulated piping located in mechanical equipment rooms, platforms or other accessible spaces, located below the 10 ft level, shall be covered with PVC jacketing.

B. Provide minimum pipe insulation as listed in following table (based on Washington State Energy Code):

Pipe Service	Fluid Operating	Insulation Conductivity		Nominal Pipe Diameter (in.)				
		K Range	Mean	1/2"-	1"-1.25"	1.5"-3"	4"-8"	≥ 8"

	Temp, °F	BTU-in/ (hr-ft^2-°F)	Rating Temp. °F	3/4"				
				Nominal Insulation Thickness				
Steam ≥100 psig, Steam Condensate	> 350	0.32–0.34	250	4.5	5.0	5.0	5.0	5.0
Steam ≥15 psig, Steam Condensate	251-350	0.29–0.31	200	3.0	4.0	4.5	4.5	4.5
Steam <15 psig, Steam Condensate	201–250	0.27–0.30	150	2.5	2.5	2.5	3.0	3.0
Heating Water Supply / Return	141–200	0.25–0.29	125	1.5	1.5	2.0	2.0	2.0
Domestic Hot Water	≥ 105	0.24–0.28	100	1.0	1.0	1.5	1.5	1.5
Domestic Cold Water	40–60	0.23–0.27	75	0.5	0.5	1.0	1.0	1.5
Chilled Water	40–60	0.23–0.27	75	0.5	0.5	1.0	1.0	1.5
Make-Up Water	40–60	0.23–0.27	75	0.5	0.5	1.0	1.0	1.5
Condensate (VRF Indoor Units Only)	40–60	0.23–0.27	75	0.5	0.5	0.5	n/a	n/a
Heat Pump Loop	60-80	No insulation required						
Geothermal Heat Pump Loop	40–60	0.23–0.27	75	0.5	0.5	1.0	1.0	1.5
Refrigerant	40–60	0.23–0.27	75	0.5	0.5	1.0	1.0	1.5
Condenser Water	40–60	0.23–0.27	75	0.5	0.5	1.0	1.0	1.5
Direct Buried Pipe	See Section 23 21 13 - Hydronic Piping							
Dry Cooler Loop	40–60	0.23–0.27	75	0.5	0.5	1.0	1.0	1.5
Run-Around HR Loop	40–60	0.23–0.27	75	0.5	0.5	1.0	1.0	1.5

1. The Minimum Pipe Thickness chart shall be used for insulations with the scheduled ‘k’ values. Insulation thickness of insulation with k values outside of the schedule (i.e. calcium silicate) shall be computed via the formula noted in Washington State Energy Code.
2. For piping systems smaller than 1-1/2” and located in partitions in conditioned spaces, reductions of the listed thickness by 1 inch shall be permitted, but not less than 1 inch minimum.

C. HVAC piping system insulation omitted on steam traps on condensate piping between steam trap and union, hot piping within radiation enclosures or unit cabinets; on cold piping within unit cabinets provided piping is located over drain pan; and on unions, flanges, flexible connections, and expansion joints.

D. Insulate low temperature refrigerant piping (liquid line) with 1½” thick elastomeric insulation and cold condensate drains from refrigeration and air conditioning drain pans with 1” thick elastomeric insulation.

3.2 DUCTWORK SYSTEM INSULATION

A. Provide insulation for the following ductwork systems:

Duct Insulation Systems			
Service	**Location**	**Insulation Type**	**Insulation Cover**
Concealed Suspended Ductwork or Vertical Duct-work Runs	Building	Fiberglass Wrap	FSK

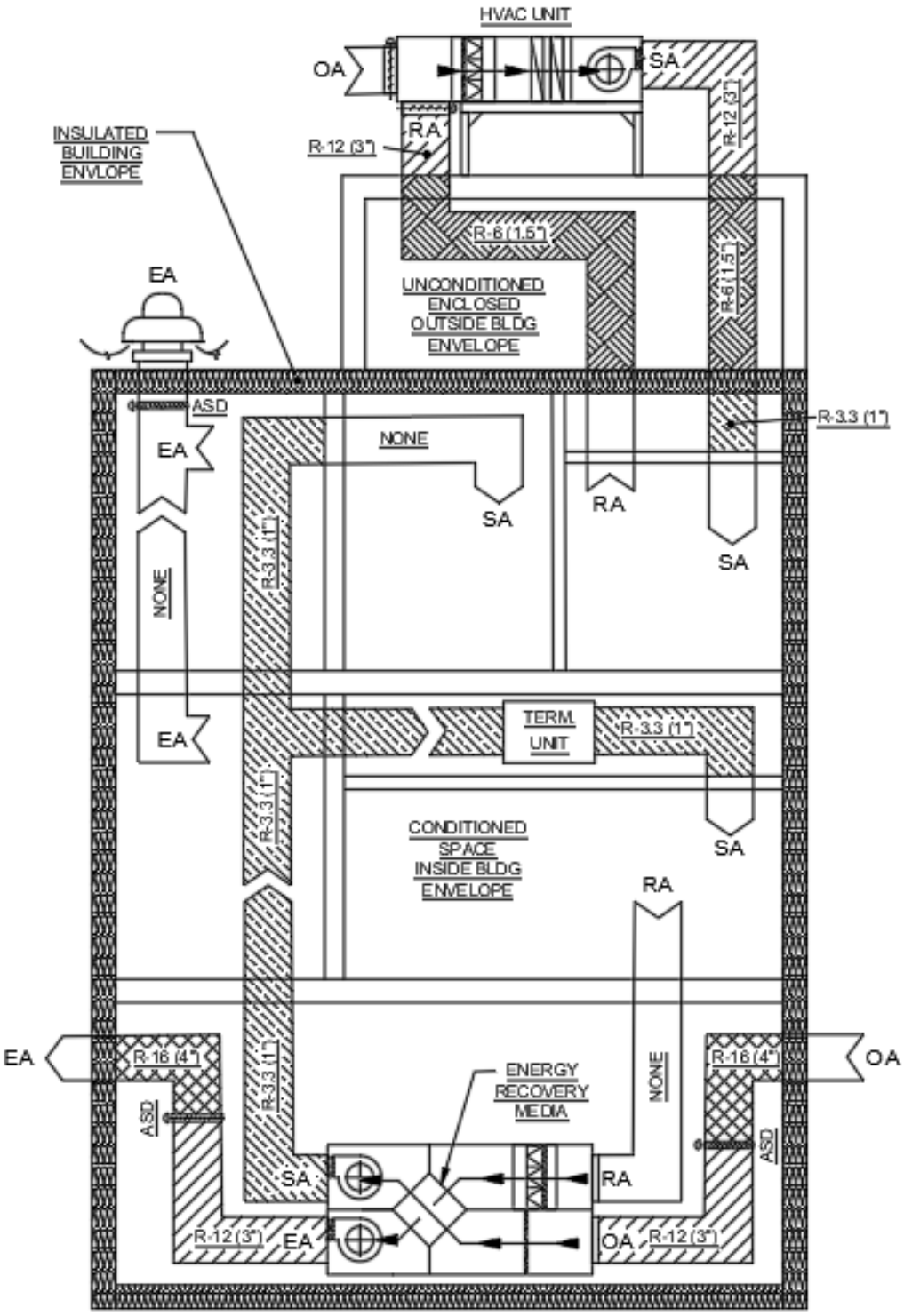
Exposed Ductwork Within 7'-0" of Floor Level or Areas Subject to Abuse or Maintenance Traffic	Building Mechanical Areas	Rigid Plenum Board	FSK
Ductwork run on Roof or at Exterior of Building	Exterior	Polyiso Board	Alum. Jacket
Type I Kitchen Hood (Grease) Exhaust Duct	Building	Fire Rated	FSK
	Exterior	Fire Rated	Alum. Jacket
Underground Ductwork	Below Grade	Pre-insulated FRP System (Spunstrand)	Integral
Ductwork Exposed to View in Finished Occupied Spaces	Building	Rigid Plenum Board	White PVC

B. Definitions:
   1. Conditioned Space: An area, room or space that is enclosed within the building thermal envelope and that is directly heated or cooled or that is indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate through openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floors or ceilings, or where they contain uninsulated ducts, piping or other sources of heating or cooling.

Minimum Duct Insulation Values (Per WA Energy Code – Climate Zone 5B)		
Duct Type	**Duct Location**	**Insulation R- Value, (Nominal Thickness)**
1. Outdoor Air	Outside the conditioned building envelope (roof, unheated attic, etc.)	None
2. Outdoor Air	Inside conditioned space, between automatic shut-off damper on/near HVAC unit and building envelope exit (louver, hood, etc.)	R-16 (4.0” wrap or board)
3. Outdoor Air	Inside conditioned space, between automatic shut-off damper and HVAC unit or room (>= 2800 CFM)	R-12 (3.0” wrap or board)
4. Outdoor Air	Inside conditioned space, between automatic shut-off damper and HVAC unit or room (<2800 CFM)	R-7 (2.0” wrap or board)
5. Supply Air	Outside the Building: On exterior of building, exposed to weather, on the roof.	R-12 (3.0” wrap or board) (2.0” polyiso)
6. Supply Air	Unconditioned space (enclosed, but not in the building conditioned space): In unconditioned attics, in enclosed unconditioned ceiling space, in ventilated garage, in ventilated crawl spaces.	R-6 (1.5” wrap or board)
7. Supply Air	Within conditioned space, but not serving same space (i.e. traversing through conditioned space), in ceiling plenums, chases, shafts, mechanical rooms and access platforms.	R-3.3 (1.0” wrap or board)
8. Supply Air	Within conditioned space, where the duct directly serves the space (is visible), and is not above a ceiling, in a shaft, etc.	None
9. Return Air	Outside the Building: On exterior of building, exposed to weather, on the roof.	R-12 (3.0” wrap or board) (2.0” polyiso)
10. Return Air	Unconditioned space (enclosed, but not in the building conditioned space): In unconditioned attics, in enclosed unconditioned ceiling space, in ventilated garage, in ventilated crawl spaces	R-6 (1.5” wrap or board)
11. Return Air	Within the conditioned space. Between the spaces served and the HVAC unit.	None
12. Exhaust Air or Relief Air	Within the conditioned space, between an energy recovery media and a downstream automatic shut-off damper.	R-12 (3.0” wrap or board)
13. Exhaust Air or Relief Air	Within the conditioned space, between the space served and the automatic shut-off damper.	None
14. Exhaust Air or Relief Air	Within the conditioned space, downstream (after) the automatic shut-off damper.	R-16 (4.0” wrap or board)
All Other Conditions	Refer to WSEC – 2018 – Table C403.10.1.2	

Duct Insulation Table Notes:

1. Duct insulation thickness values are based on typical duct insulation of K=0.25 (R=4.0/inch) (Polyiso R=5.8/inch).
2. Exposed supply and return ductwork located and visible (not in a plenum) within the space that it serves does not have to be thermally insulated unless otherwise noted on the plans.
3. Where ductwork is indicated to have internal duct liner (either field applied or factory ducts), at the Contractor’s option, the insulation value of the duct liner may be included in the above minimum values, allowing the external insulation levels to be reduced accordingly.



TYPICAL DUCTWORK INSULATION APPLICATIONS

3.3 EQUIPMENT INSULATION

A. Application Requirements: Insulate the following cold (below ambient) equipment:
   1. Refrigeration equipment, including chillers, tanks and pumps.
   2. Drip pans under chilled equipment.
   3. Cold water storage tanks.
   4. Cold and chilled water pump impeller housings.
   5. Pneumatic water tanks.
   6. Roof drain bodies.
   7. Air separators.

B. Insulate each item of equipment specified above with one of the following types and thicknesses of insulation:
   1. Elastomeric: 2” thick for refrigeration piping and devices in chilled water piping systems.

C. Application Requirements: Insulate with 2” thick rigid fiberglass the following hot (above ambient temperature) equipment:
   1. Hot water storage tanks.
   2. Heat exchangers.
   3. Condensate receivers.
   4. Hot water pumps impeller housings.
   5. Air separators.

3.4 COMMON INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.

B. Install insulation with tightly butted joints free of voids and gaps. Vapor barriers shall be continuous. Before installing jacket material, install vapor-barrier system.

C. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.

D. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

E. Install insulation with longitudinal seams at top and bottom of horizontal runs.

F. Install multiple layers of insulation with longitudinal and end seams staggered.

G. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

H. Keep insulation materials dry during application and finishing.

I. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

J. Install insulation with least number of joints practical.

K. Hangers and Anchors: Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
   1. Install insulation continuously through hangers and around anchor attachments.
   2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
   3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
   4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

L. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

M. Install insulation with factory-applied jackets as follows:
   1. Draw jacket tight and smooth.
   2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
   3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
      a. For below ambient services, apply vapor-barrier mastic over staples.
   4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
   5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct and pipe flanges and fittings.

N. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

O. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

P. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

Q. For above ambient services, do not install insulation to the following:
   1. Vibration-control devices.
   2. Testing agency labels and stamps.

3. Nameplates and data plates.
4. Manholes.
5. Handholes.
6. Cleanouts.

3.5 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
   1. Seal penetrations with flashing sealant.
   2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
   3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
   4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Below-Grade Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
   1. Seal penetrations with flashing sealant.
   2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
   3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
   4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions. Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
   1. Firestopping and fire-resistive joint sealers are specified in Division 07, Section "Firestopping."

F. Insulation Installation at Floor Penetrations:
   1. Duct: Install insulation continuously through floor penetrations that are not fire rated. For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
   2. Pipe: Install insulation continuously through floor penetrations.

3. Seal penetrations through fire-rated assemblies according to Division 07, Section "Firestopping."

3.6 INSTALLATION OF HOT PIPING INSULATION

A. After installation and pressure/leak testing of piping systems, install insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.

B. Maintain integrity of vapor barrier jacket on pipe insulation, and protect to prevent puncture or other damage.

C. Cover valves, fittings, and similar items in each piping system ≤ 2" with equivalent thickness and composition of insulation as applied to adjoining pipe run. PVC Pipe fittings shall be utilized at all fittings.

D. Install removable covers on all valves, flow balance devices, strainers, etc.

E. Extend Piping insulation without interruption through walls, floors and similar piping penetrations, except where penetrations go through fire rated construction.

F. Cover exposed ends of fiberglass with a vapor retardant mastic.

G. Butt pipe insulation against pipe hanger insulation inserts. Apply 3" wide vapor barrier tape or band over the butt joints.

H. Fasten aluminum jacket to insulation using strapping and wing seals of the same material as the cover. In exterior applications, insure that all seams are watertight. Follow manufacturer's written installation guidelines.

I. For all hot water (above ambient) hydronic heating piping, install thermal-hanger shield inserts per Section Hangers and Supports for HVAC Piping.

J. For steam piping, install thermal-hanger shield inserts or metal pipe saddles (when indicated) per Section Hangers and Supports for HVAC Piping.

3.7 INSTALLATION OF COLD PIPING INSULATION

A. After installation and leak/pressure testing is completed, install insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices in ensure that insulation serves its intended purpose. Insulation must be applied so there are no voids between the inner insulation face and cold piping system. The insulation system and vapor barrier must be installed in such a manner that the piping system will not condense.

B. Maintain integrity of vapor barrier jackets on pipe insulation, and protect to prevent puncture or other damage. Special care must be made to maintain the vapor barrier at PVC fittings and with pipe covered with aluminum jackets.

C. Cover valves, fitting and similar items in each piping system with insulation as applied to adjoining pipe run. Extra care must be taken on piping appurtenances to insure a

tight fit to the adjoining fiberglass system insulation. Pump impeller housings, air separators, etc. must be totally encapsulated with insulation.

1. Install fabricated molded insulation inserts at the pipe fittings under the PVC fitting.

D. Install removable covers on all valves, flow balance devices, strainers, etc.

E. Extend piping insulation without interruption through walls, floors and similar piping penetrations, except where penetrations go through fire rated construction. At fire rated construction, stop insulation at each side of the penetration, fill the interstitial space between the fire caulk with mineral wall (or other approved material), and seal penetration to maintain fire rating.

F. Cover exposed ends of fiberglass with a vapor retardant mastic.

G. Elastomeric Insulation:

1. Glue the butt ends of insulation to each other to form a homogenous membrane maintaining the vapor barrier.
2. Exterior elastomeric insulation shall be installed with the longitudinal seam on the bottom of the pipe and shall be protected with an ultra violet resistive paint.

H. Butt pipe insulation against pipe hanger insulation inserts. Apply wet coat of vapor barrier lap cement on butt joints and over staples and seal joints with 3” wide vapor barrier tape or band.

I. Fasten aluminum jacket to insulation using strapping and wing seals of the same material as the cover. In exterior applications, insure that all seams are watertight. Follow manufacturer’s written installation guidelines.

J. For all cold or chilled water (below ambient) hydronic piping, install thermal-hanger shield inserts per Section Hangers and Supports for HVAC Piping.

3.8 INSTALLATION OF DUCTWORK AND PLENUM INSULATION

A. Install insulation products in accordance with manufacturer’s written instructions, and in accordance with recognized industry practices to ensure that insulation serves the intended purpose.

B. Maintain integrity of vapor barrier on ductwork insulation, and protect it to prevent puncture and other damage. Where punctures occur, patch tears with a tape of the same facing. Excessive damage will require the insulation to be replaced.

C. Extend ductwork insulation without interruption through walls, floors and similar ductwork penetrations, except where penetrations go through fire rate construction.

D. Protect insulation on exterior ductwork from weather by installing outdoor protective finish or jacketing as recommended by manufacturer.

3.9 INSTALLATION OF EQUIPMENT INSULATION

A. Install equipment thermal insulation products in accordance with manufacturer's written instructions, and in compliance with recognized industry practices to ensure that insulation serves the intended purpose.

B. Install insulation materials with smooth and even surfaces and on clean and dry surfaces. Redo poorly fitted joints. Do not us mastic or joint sealer as filler for gapping joints and excessive voids resulting from poor workmanship

C. Maintain integrity of vapor barrier on equipment insulation and protect it to prevent puncture or other damage.

D. Do not apply insulation to equipment while hot.

E. Apply insulation using the staggered joint method for both single and double layer construction, where feasible. Apply each layer of insulation separately.

F. Coat insulated surfaces with layer of insulating cement, troweled in workmanlike manner, leaving a smooth continuous surface. Fill in scored block, seams, chipped edges and depressions, and cover over wire netting and joints with cement of sufficient thickness to remove surface irregularities.

G. Cover fiberglass insulated surfaces with all-service jacketing neatly fitted and firmly secured. Lap seams at least 2". Apply over vapor barrier where applicable.

H. Do not insulate handholes, cleanouts, ASME stamp, and manufacturer's nameplate. Provide neatly beveled edge at interruptions of insulation.

I. Provide removable insulation sections to cover parts of equipment that must be opened periodically for maintenance; include metal vessel covers, fasteners, flanges, frames, and accessories.

J. Protect outdoor insulation from weather by installation of weather-barrier mastic protective finish or jacketing, as recommended by the manufacturer.

3.10 FIRE RATED INSULATION SYSTEM INSTALLATION

A. When fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous UL-listed fire rating.

B. Insulate duct access panels and doors to achieve same fire rating as duct.

C. Install firestopping at penetrations through fire-rated assemblies. Fire-stop systems are specified in Division 07.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes refrigerant and condensate drain piping used for split air conditioning systems.

1.2 REFERENCES

A. Materials and products shall comply with the following standards:
   1. ANSI B16.22 – Wrought Copper and Wrough Copper Alloy Solder Joint Pressure Fittings
   2. ASTM B88 – Seamless Copper Water Tube
   3. ASTM B280 – Seamless Copper Tube for Air Conditioning and Refrigeration Field Service
   4. ASHRAE 15 – Safety Code for Mechanical Refrigeration
   5. ASME B31.5 – Refrigeration Piping and Heat Transfer Components
   6. UL 207 – Refrigerant – Containing Components and Accessories, Nonelectrical

1.3 SUBMITTALS

A. Product Data: For pipe material, fittings, joining methods, materials and tools. For valves and other piping specialties.

B. Shop Drawings:
   1. Submit complete layout of entire refrigerant piping system, showing indoor units, outdoor units, pipe routing, pipe sizes, valves and other specialty items.

C. Installer Qualifications
   1. Brazed Copper Piping: Submit installer names and certifications for fitters that are qualified to install “ACR” and medical gas grade brazed piping.

D. Field Piping Leak Test Report: Witnessed and signed by an Owner’s Representative.

1.4 QUALITY ASSURANCE

A. Comply with ASHRAE 15, “Safety Code for Refrigerant Systems.”

B. Order all copper refrigeration tube with each shipping unit marked with the metal or alloy designation, temper, size, and name of supplier; with soft straight lengths or coils identified with a tag indicating that the product was manufactured in accordance with ASTM B280; and with each hard temper straight length identified throughout its length by a blue colored marking not less than 3/16 inch in height and a legend at intervals of not greater than three feet that includes the designation “ACR” and pipe outside diameter.

C. Any installed material not meeting the specification requriements must be replaced with material that meets these specifications without additional cost to the Owner.

1.5 DELIVERY, STORAGE AND HANDLING

A. Promptly inspect shipments to insure that the material is undamaged and complies with specifications.

B. Cover pipe to eliminate rust and corrosion while allowing sufficient ventilation to avoid condensation. Do not store materials directly on grade. Protect pipe, tube, and fitting ends so they are not damaged. Where end caps are provided or specified, take precautions so the caps remain in place. If end caps arenot present on tube bearing the “ACR” designation, clean and re-cap in accordance with ASTM B280. Protect fittings, flanges, and unions by storage inside or by durable, waterproof, above ground packaging.

C. Offsite storage agreements will not relieve the contractor from using proper storage techniques.

D. Storage and protection methods must allow inspection to verify products.

1.6 DESIGN CRITERIA

A. Use only new material, free of defects and scale, and meeting the lates revision of ASTM specifications as listed in this specification.

B. Where ASTM B88, type L hard temper copper tubing is specified, ASTM B88, type K hard temper copper tubing may be substituted at Contractor’s option.

PART 2 - PRODUCTS

2.1 REFRIGERANT PIPING

A. ASTM B88 type L hard drawn copper tube, cleaned and capped in accordance with ASTM B280, and marked “ACR,” with ANSI B16.22 wrought copper or forged brass solder-type fittings.

B. Pre-insulated copper line-sets as approved by the AC unit manufacturer. Fittings and joints shall be brazed.

2.2 REFRIGERANT PIPING ACCESSORIES

A. Provide all refrigerant piping specialties with a maximum working pressure of full vacuum to 450 psig and a maximum working temperature of 225 F. For systems using R-410A, provide all refrigerant piping specialties with a maximum working pressure of full vacuum to 700 psig and a maximum working temperature of 225 F.

B. Manufacturers:
   1. Meuller Streamline
   2. Parker Sporlan
   3. Superior HVACR
   4. Prior approved equal.

C. Service Valves: Forged brass body with rupture proof stem, brass cap and auxiliary port. Full port chromium plated ball valve. Copper sweat connections.

D. Flexible pipe connectors: Double braided bronze hose flexible pipe connectors with brazed end connections.

E. Filter Dryers: For circuits 10 tons and over provide angle pattern filter dryers with replaceable core. For circuits below 10 tons provide straight pattern filter dryers without replaceable core.

F. Sight Glasses: Two piece brass construction with brazed end connections. Include color indicator for sensing moisture.

G. Solenoid Valves: Two way normally closed with two piece brass body, full port, stainless steel plug, stainless steel spring, Teflon diaphragm and solder end connections. Provide replaceable coil assembly.

H. Hot Gas Bypass Valves: Provide with integral solenoid valve, external equalizer connection and adjustable pilot assembly.

I. Thermostatic Expansion Valves: Brass body, bronze disc, neoprene seat, bronze bonnet, stainless steel spring and solder end connections.

J. Charging Valves: Provide ¼" SAE brass male flare access ports with finger tight, quick seal caps. Provide 2-inch long copper extension sections.

K. Check Valves: Spring loaded type with bronze body, bronze disc, neoprene seat, bronze bonnet, stainless steel spring and solder end connections.

2.3 REFRIGERANT PIPING SUPPORT

A. Metal pipe hangers must not come in direct contact with the refrigerant piping. Utilize hangers that support the piping on the outside of the insulation, or hangers that incorporate a non-metallic inserts or non-metallic pipe hangers. Do not allow copper refrigeration piping to come in direct contract with dis-similar metals.

2.4 REFRIGERANTS

A. Manufacturers:
   1. DuPont Company
   2. Honeywell, Inc.
   3. INEOS Flour America LLC
   4. As recommended by AC Equipment manufacturer.

B. Refrigerant type, R-134a, R-410c, etc. as required by system.

2.5 REFRIGERANT PIPING COVERS

A. Manufacturers:
1. Slimduct
2. Diversitech
3. Prior Approved Equal

2.6 CONDENSATE DRAIN PIPING

A. Cold Condensate-Drain Piping (indoor fan coils, air handlers, etc.)
1. Type M, drawn-temper copper tubing, wrought-copper fittings, and soldered joints.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Liquid & Gas Lines between indoor and outdoor units, or, on VRV systems, between indoor units and Branch Selector (Controller) boxes.
1. Type L copper ACR, drawn-temper tubing and wrought-copper fittings with brazed joints.
2. Pre-insulated Type L copper ACR tubing line-sets when specifically allowed by AC unit manufacturer, with wrought-copper fittings with brazed joints.
a) Flared connections may be used at equipment connections when specifically allowed by AC unit manufacturer.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install all piping parallel to building walls and ceilings and at heights that do not obstruct any portion of a window, doorway, stairway, or passageway. Where interferences develop in the field, offset or reroute piping as required to clear such interferences. In all cases, consult drawings for exact location of pipe spaces, ceiling heights, door and window openings, or other architectural details before installing piping.

B. Do not route piping through transformer vaults or above transformers, panel boards, or swtichboards, including the required service space for this equipment, unless the piping is serving this equipment.

C. Install all valves and piping specialties, including items furnished by others, as specified and/or detailed. Make connections to all equipment installed by others where that equipment requires the piping services indicated in this section.

D. Arrange piping to allow service and access to equipment.

E. Connect condensate drain piping to condensate pump discharge and run drain line to floor sink, mop basin or P-trap on nearby sink tailpiece.

3.3 REFRIGERANT PIPING

A. Firms and individuals who are experienced in the installation of refrigeration piping must install such piping.
   1. Brazing must be done by qualified technicians.

B. Pipe Joint Construction:
   1. All copper joints must be brazed an have a melting point greater than 1,125 degrees F. Filler impurities shall not exceed 0.15%. Tubing to be new and delivered to the job site with the original mill end caps in place. Purge all lines with nitrogen during brazing.
   2. Flared fittings may only be used at equipment connections when specifically allowed by the AC unit manufacturer.

C. Hangers and Supports:
   1. Support piping and equipment as specified in Division 23 Section “Hangers and Supports for HVAC Piping and Equipment.”
   2. Install hangers in accordance with manufacturers recommendations, with spacing in accordance with 2012 ASHRAE Handbook “HVAC Systems & Equipment.”
   3. Utilize “cushion clamps” and other non-metallic type hangers to isolate metallic piping from hanger.

D. Pipe Covers and Enclosures:
   1. Where refrigerant piping and line-sets are exposed to view within the building, or on the exterior of the building, the piping shall be enclosed in pre-manufactured, decorative type piping covers.
      a) Provide straight sections, elbow, boots, wall penetrations, etc. for a full and clean assembly.
      b) Color: white, unless indicated otherwise.

E. Refrigerant Piping Valves and Accessories:
   1. Install piping valves and specialties in accordance with the manufacturer’s instructions and recommendations.

3.4 FIELD QUALITY CONTROL

A. Perform test and inspections and prepare test reports.

B. No refrigerant is to be vented directly to the atmosphere except that which may escape through leaks in the system during leak testing. During evacuation procedures, use equipment designed to recover and allow recycling of the refrigerant.

C. Leak test the system by charging the system to a pressure of 10 psig with an HFC refrigerant, with the compressor suction and discharge valves closed and with all other system valves open. Increase pressure to 550 psig with dry nitrogen. Seal any leaks

that may be found and retest. Replace any mechanically attached fittings that leak with new fittings and retest.

1. Test shall be witnessed by an Owner's Representative. Submit a signed and dated test report for each system tested.

D. After completion of the leak test, evacuate the system with a vacuum pump to an absolute pressure not exceeding 1500 microns while the system ambient temperature is above 60°F. Break the vacuum to 2 psig with the refrigerant to be used in the system. Repeat the evacuation process, again breaking the vacuum with refrigerant. Install a drier of the required size in the liquid line, open the compressor suction and discharge valves, and evacuate to an absolute pressure not exceeding 500 microns. Leave the vacuum pump running for not less than two h ours without interruption. Raise the system pressure to 2 psig with refrigerant and remove the vacuum pump.

3.5 SYSTEM CHARGING

A. Charge refrigerant directly from original drums through a combination filter-drier. Each drier may be used for a maximum of three cylinders of refrigerant and then must be replaced with a fresh drier. Charge the system by means of a charging fitting in the liquid line. Weigh the refrigerant drum before charging so that an accurate record can be kept of the weight of refrigerant put in the system. If refrigerant is added to the system through the suction sie of the compressor, charge in vapor form only.

3.6 SYSTEM CERTIFICATION

A. The entire refrigerant piping network shall be reviewed in the field by the manufacturer's authorized agent for compliance with the system design requirements. When the manufacturer's agent is satisfied that the installation is in accordance with their design, he shall provide a letter of certification to the A/E.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes:
1. Metal round, oval, and rectangular ducts and fittings for supply, return, outside, and exhaust air-distribution systems for 1” to 4” W.G. pressure classes.
2. Stainless steel duct for Kitchen Range Hood Exhaust application.
3. Acoustic duct liner for sound control.

1.2 REFERENCES

A. ASTM International:
1. ASTM A36 – Standard Specification for Carbon Structural Steel.
2. ASTM A653 – Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
3. ASTM C916 – Standard Specification for Adhesives for Duct Thermal Insulation.
4. ASTM C1071 – Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).
5. ASTM D737 – Standard Test Method for Air Permeability of Textile Fabrics.
6. ASTM D3776 – Standard Test Methods for Mass Per Unit Area (Weight) of Fabric.

B. North American Insulation Manufacturers Association (NAIMA):
1. NAIMA Fibrous Glass Duct Liner Standard

C. NFPA Compliance:
1. NFPA 90A - "Installation of Air Conditioning and Ventilating Systems."
2. NFPA 90B - "Installation of Warm Air Heating and Air Conditioning Systems."
3. NFPA 96 - “Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations”

D. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
1. SMACNA “HVAC Duct Construction Standards – Metal and Flexible”
2. SMACNA “Industrial Duct Construction”
3. SMACNA “Duct Cleanliness for New Construction”

E. UL Standards:
1. UL 181A-M – Closure Systems for Use with Rigid Air Ducts.

1.3 SUBMITTALS:

A. Product Data: Provide product data on duct materials, sealants and pre-manufactured items, such as duct liner, turning vanes, duct flanges, etc., intended to be used for duct construction.

B. Shop Drawings: Show fabrication and installation details for HVAC Ducts.
1. Penetrations through fire-rated and other partitions.
2. Duct accessories, including access doors and panels.
3. Sheet Metal shop standards for duct construction, pressure classes, reinforcing, hanger sizes, flange construction, etc.
4. Duct liner application and installation details.

1.4 DUCT PRESSURE AND SEALANT CLASS DEFINITIONS:

A. General Sealing Requirements per WA NREC and IMC:
1. Pressure Class up to 3” w.g. – SMACNA Sealant Class B.
2. Pressure Class greater than 3” w.g. – SMACNA Sealant Class A.

B. Supply ducts between Terminal Unit and space being served, room return air boots and transfer air ducts:
1. Pressure Class: 1” W.G.

C. General Exhaust duct system serving Exhaust Fans:
1. Pressure Class: 1” W.G.

D. Return Air ducts serving all AHUs:
1. Pressure Class: 2” W.G.

E. Primary Supply Ducts between VAV AHUs and Terminal Units (VAV systems):
1. Pressure Class: 4” W.G.

F. Primary Supply Ducts between single zone AHUs and air outlets (constant volume systems):
1. Pressure Class: 2” W.G.

G. Special Conditions:
1. Return air ducts open to ceiling plenums shall be constructed 2-gauges heavier than SMACNA requirements, from unit connection point to 15 feet downstream.
2. Metal Supply air ducts exposed to line of sight upstream of duct silencers or fabric ductwork shall be constructed 2-gauges heavier than SMACNA requirements.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A653 and having G60 coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.

C. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts.

2.2 SEALANT MATERIALS:

A. Water-Based Joint and Seam Sealant: Flexible, adhesive sealant, resistant to UV light when cured, UL 181A-M listed. Maximum Volatile Organic Content shall be 45 gpl (water excluded) or less. Product shall be equal to Hardcast Versa-Grip 181.

2.3 HANGERS AND SUPPORTS

A. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
2. Exception: Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.

B. Hanger Materials: Galvanized sheet steel or threaded steel rod.
1. Hangers Installed in Corrosive Atmospheres: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
2. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for steel sheet width and thickness and for steel rod diameters.

C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

D. Trapeze and Riser Supports: Galvanized-steel shapes and plates complying with ASTM A36.

2.4 DUCT FABRICATION:

A. 1” to 2” W.G. Pressure Class:
1. Material shall be galvanized steel with the following exception:
   a. Exhaust systems serving kitchen range hood grease exhaust or dishwashers shall be as specified below.
2. Duct sizes shown on drawings are outside nominal dimensions for sheet metal ductwork. Where ductwork is indicated on the drawings to be lined, an allowance for 1” or 2” thick insulation is included and duct sizes do not need to be increased to compensate for the insulation.
3. Round ducts and fittings: All round ductwork shall be spiral lock seams with spot welded sealed manufactured fittings, galvanized steel.
   a. Manufacturers:
      1) United McGill
      2) Ventline.
      3) Accu Duct.
4. Round or oval ductwork indicated to be lined shall have a perforated liner and shall be equal to United Sheet Metal Acousti-K27. Unless noted otherwise on the drawings, insulation shall be 1" thick.
5. Rectangular to round branch duct connections shall use spin-in fittings: Spin-in fittings shall be DuroDyne or Air Control Products equal to Air Control Products Model S-SM-C with damper for unlined ductwork or Air Control Products Model S-DB-C with damper for lined ductwork.
6. Rectangular to rectangular branch duct connections shall use 45-degree entry. Straight taps are not allowed.
7. Rectangular Elbows: All 90-degree rectangular elbows shall contain turning vanes. See section 23 33 00 “Duct Accessories” for turning vane fabrication requirements.
8. Round Elbows: All round elbows shall be pleated or segmented with a centerline radius of 1.5 times the cross-section diameter.
9. Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" and complying with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.
   a. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure class.
   b. Deflection: Duct systems shall not exceed deflection limits according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."
10. Transverse Joints: Prefabricated slide-on joints and components constructed using manufacturer's guidelines for material thickness, reinforcement size and spacing, and joint reinforcement.

a. Manufacturers:
1) Ductmate Industries, Inc.

11. Formed-On Flanges: Construct according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," Figure 1-4, using corner, bolt, cleat, and gasket details.
a. Manufacturers:
1) Ductmate Industries, Inc.
2) Lockformer.
12. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches and larger and 0.0359-inch-thick or less, with more than 10 sq. ft. of nonbraced panel area unless ducts are lined.

B. 4" W.G. Pressure Class:
1. Ductwork shall be galvanized steel of the US Standard gauges as specified in HVAC Duct Construction Standards, Metal and Flexible, latest Edition as published by SMACNA.
2. Duct sizes shown on drawings are outside nominal dimensions for sheet metal ductwork. Where ductwork is indicated on the drawings to be lined, an allowance for 1" thick insulation is included and duct sizes do not need to be increased to compensate for the insulation.
3. Round or oval ductwork indicated to be lined shall have a perforated liner and shall be equal to United Sheet Metal Acousti-K27. Unless noted otherwise on the drawings, insulation shall be 1" thick.
4. All fittings shall be spot welded with machine formed entrances to branch fittings. No fabricated fittings using screw fasteners will be allowed. All welded seams shall be covered with one coat of rust inhibiting paint applied to both interior and exterior of duct or fitting.
5. Elbows: centerline radius shall be 1.5 times the cross-section diameter. Sizes shall be constructed with five pieces for 60 degree through 90 degree turns and three pieces for turns less than 45 degrees, and two pieces for turns less than 30 degrees.
6. Round ducts and fittings: all round ductwork shall be spiral lock seams with spot welded sealed manufactured fittings, galvanized steel. All sealant used shall be water based with a minimum Volatile Organic Content of 45 gpl (water excluded) or less.
7. Joints in duct and fittings up to and including 36" in diameter shall be made with couplings. Larger duct and fittings shall be jointed with companion flanges of United McGill Corp. design. Flat oval ducts and fittings - flat oval ductwork shall be fabricated with spiral lock construction through 24" minor axis.
8. Reinforcing of flat oval ducts shall be in accordance with the recommendations of the United McGill Corp. and as specified in HVAC Duct Construction Standards, Metal and Flexible, latest Edition as published by SMACNA.
9. Joints in oval duct and fittings up to and including 41" wide or 26" high shall be made with coupling.
10. Manufacturers:
a. United McGill Corp
b. Accu Duct
c. Metal Fab

2.5 DUCT LINER

A. Manufacturers:
1. JM Permacote Linacoustic Mat Faced
2. CertainTeed

B.

C. Products meeting ASTM C1071; K(ksi) value of 0.25 (R=4.0 per inch)at 75 degrees F, coated air side for maximum 5,000 ft/min air velocity, 1.5 psf density. Provide EPA registered, anti-microbial agent so that the liner will not support the growth of fungus or bacteria.

D. Adhesive: UL listed waterproof type.

E. Fasteners: Duct liner galvanized steel pins, welded or mechanically fastened.

F. Where ductwork is indicated on the drawings to be lined, an allowance for 1” or 2” thick insulation is included and duct sizes do not need to be increased to compensate for the insulation.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Construct and install ducts according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated. Ductwork for kitchen grease exhaust duty shall be constructed and installed in accordance with the IMC and NFPA 96.

B. Install ducts with fewest possible joints.

C. Take due care to prevent piping, conduit or other building materials from touching ductwork.

D. Install fabricated fittings for changes in directions, size, and shape and for connections. Use spin-in fittings to connect rigid or flexible round ductwork to rectangular duct for pressure class construction of 2” W.G. or less.

E. Install ducts, unless otherwise indicated, vertically and horizontally and parallel and perpendicular to building lines; avoid diagonal runs.

F. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

G. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

H. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions unless specifically indicated. Ducts exposed to view in finished spaces shall be installed with special attention to workmanship and quality control. Symmetry, alignment and quality of fittings shall be judged by their final appearance and corrected if found to have poor workmanship. Sealant on exposed to view joints shall be applied internally to fittings and wiped clean on exterior of ductwork. Contractor’s option on exposed ductwork to utilized gasketed fittings equal to McGill Uni-Gasket Fitting.

I. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.

J. Seal all joints and seams. Apply sealant to male end connectors before insertion, and afterward to cover entire joint and sheet metal screws.

K. Electrical Equipment Spaces: Route ducts to avoid passing through transformer vaults and electrical equipment spaces and enclosures.

L. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls and are exposed to view, conceal spaces between construction openings and ducts or duct insulation with sheet metal flanges of same metal thickness as ducts. Overlap openings on 4 sides by at least 1-1/2 inches.

M. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated fire dampers, sleeves, and firestopping sealant. Fire and smoke dampers are specified in Division 23 Section "Duct Accessories." Firestopping materials and installation methods are specified in Division 7 Section “Penetration Firestopping.”

N. Protect duct interiors from the elements and foreign materials until building is enclosed. Follow SMACNA's "Duct Cleanliness for New Construction."

3.2 SEAM AND JOINT SEALING:

A. Seal duct seams and joints according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for duct pressure class indicated.

B. Seal ducts before external insulation is applied.

C. Sealant on ducts exposed to view in occupied spaces shall be applied internally to fittings and wiped clean on exterior of ductwork.

3.3 DUCT LINER INSTALLATION

A. All duct liner shall be installed in accordance with the requirements of the NAIMA Fibrous Glass Duct Liner Standard, or SMACNA HVAC Duct Construction Standard and the project specifications.

B. The liner shall be cut and fitted to assure all joints are neatly and tightly butted with no interruptions or gaps. Where ductwork is indicated on the drawings to be lined, an allowance for 1” or 2” thick insulation is included, and duct sizes do not need to be increased to compensate for the insulation.

C. Where ducts are also specified to be thermally insulated, the duct liner shall be counted towards the total required insulation thickness (i.e. the internal liner thickness may be subtracted from the total duct system insulation thickness otherwise specified).

D. All duct liner products shall be adhered to the sheet metal ductwork using an adhesive meeting the requirements of ASTM C916. The adhesive film coverage shall be a minimum 90% of the metal surface.

E. Additionally, secure duct liner with mechanical fasteners at spacing in accordance with NAIMA or SMACNA standards.

F. All transverse joints shall be edge-coated. Metal nosing on leading or trailing edges is required where lined duct transitions to unlined metal duct.

3.4 DUCT SUPPORTS

A. Duct Supports shall be in accordance with SMACNA’s standards.

B. Support horizontal ducts within 24 inches of each elbow and within 48 inches of each branch intersection.

C. Support vertical ducts at maximum intervals of 16 feet and at each floor.

D. Install upper attachments to structural elements and joists. See structural plans and drawing details for additional limitations and criteria. Do not use eccentric beam clamps on joists. Do not attach duct hangers to bare metal decking (roof decks).

E. Install concrete inserts before placing concrete.

F. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
   1. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.

3.5 DUCTWORK PROTECTION:

A. During construction provide temporary closures of metal or taped polyethylene at all openings in ductwork to prevent construction dust from entering ductwork system.

3.6 CONNECTIONS:

A. Make connections to equipment with flexible connectors according to Section 23 33 00 - Air Duct Accessories.

B. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
1. Backdraft dampers.
2. Volume dampers.
3. Turning vanes.
4. Duct-mounting access doors.
5. Flexible connectors.
6. Flexible ducts.
7. Duct accessory hardware.

B. See Division 28 Section "Fire Alarm" for duct-mounting fire and smoke detectors.

C. See Division 23 Section "Controls and Instrumentation" for electric damper actuators.

1.2 SUBMITTALS

A. Product Data: For the following:
1. Backdraft dampers.
2. Volume dampers.
3. Turning vanes.
4. Duct-mounting access doors.
5. Flexible connectors.
6. Flexible ducts.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
1. Special fittings.
2. Manual-volume damper installations.
3. Wiring Diagrams: Power, signal, and control wiring.

1.3 QUALITY ASSURANCE

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated.

B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G60 coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.

C. Stainless Steel: ASTM A 480/A 480M.

D. Aluminum Sheets: ASTM B 209, alloy 3003, temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.

E. Extruded Aluminum: ASTM B 221, alloy 6063, temper T6.

F. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

G. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.2 NON-MOTORIZED, GRAVITY TYPE, BACKDRAFT DAMPERS

A. Approved Manufacturers:
1. Air Balance, Inc.
2. American Warming and Ventilating.
3. Ruskin.
4. Prior approved equal.

B. Application: Non-motorized gravity type backdraft dampers installed in ductwork distribution systems, may only be used for relief air on systems 5,000 cfm or less, in buildings less than three stories in height (WA NREC). Backdraft dampers provided for exhaust air outlets and larger relief air conditions shall be motorized type dampers (provided with the exhaust fans or field mounted). See Section HVAC Controls and Instrumentation for field mounted motorized control and/or shut-off dampers.

C. Performance: Leakage shall not exceed 20 cfm/sq. ft. at 1.0” w.g. pressure. Dampers shall be suitable for applications up to 2500 fpm velocity.

D. Description: Factory fabricated, multiple-blade, parallel action gravity type, counter-balanced, with center-pivoted blades of maximum 6-inch width, with sealed edges, assembled in rattle-free manner with 90-degree stop, synthetic bearings, and axles; adjustment device to permit setting for varying differential static pressure.

E. Frame: 0.125-inch-thick, galvanized sheet steel or extruded aluminum, with welded or jointed corners and mounting flange.

F. Blades: 0.070-inch-thick aluminum sheet.

G. Blade Seals: Neoprene or vinyl.

H. Blade Axles: Galvanized steel or extruded aluminum.

I. Tie Bars and Brackets: Galvanized steel or aluminum.

J. Adjustment Device: Adjustable counterweights or adjustable tension spring device.

2.3 MANUAL VOLUME DAMPERS

A. Approved Manufacturers:
1. Air Balance, Inc.
2. American Warming and Ventilating.
3. Nailor Industries Inc.
4. Penn Ventilation Company, Inc.
5. Ruskin.

B. Application: Manual, non-motorized, volume dampers shall be installed in distribution ductwork to be used for balancing supply, return and exhaust volumes. For automatic modulating type control dampers for tempterature control purposes, refer to Section HVAC Controls and Instrumentation.

C. Performance: Medium and low pressure duct applications up to 2,000 fpm. Manual volume dampers are not required to have resilent seals unless being applied for shut-off service.

D. General Description: Factory fabricated, with required hardware and accessories. 3V style stiffened damper blades for stability. Include locking quadrant device to hold damper blades in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class.

E. Rectangular Volume Dampers: Multiple- or single-blade (9 inch height or less), opposed-blade design, standard leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.
1. Steel Frames: Hat-shaped, galvanized sheet steel channels, minimum of 16 gage (0.064 inch thick), with mitered and tabbed or welded corners; frames with face flanges where indicated for attaching directly to walls and box frames where indicated for installing in ducts. Equivalent aluminum framed dampers are acceptable.
2. Roll-Formed Steel Blades: 16 gage (0.064-inch-thick), 3V style galvanized sheet steel.
3. Blade Axles: Galvanized steel.
4. Bearings: Molded synthetic.
5. Tie Bars and Brackets: Galvanized steel.
6. Pressure rating: Up to 4” wg at 2000 fpm.

F. Round and Oval Volume Dampers: Up to 24” diameter, single-blade, galvanized steel, 20 gage (0.04”) blade, factory or shop fabricated damper. Provide with galvanized steel square axel, molded nylon bearings, and locking quadrant device.

G. Round Spin-In Fittings: Sheet metal conical spin-in round branch take-off complete with manual volume damper and locking quadrant. Where rectangular duct sizes do not allow a conical fitting, a straight tap shall be allowed.

H. Locking Quadrant Air Flow Balancing Device: Provide locking air-flow balancing device on all manual volume dampers. Device shall Rossi model “Everlock” type positive locking damper handle with spring-loading trigger handle with multi-postion

notches for incremental air flow balancing with positive, vibration proof, setting. Standard wing-nut style locking quadrants are NOT acceptable. Include elevated 1.5" or 2" platform for insulated duct mounting. Where critical infininite air flow adjustment is noted or called for, provide a Rossi Twistknob sytle locking devices in lieu of the multi-position device.

I. Volume dampers located above ceilings and in non-accessible locations shall be equipped with Young Regulator Co. Bowden cable and worm gear assembly, with ceiling mounted adjustment assembly and stainless steel cover plate.

2.4 TURNING VANES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. United McGill
2. Tuttle and Bailey
3. Air Control Products
4. Aero/Dyne.

B. Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for vanes and vane runners. Vane runners shall automatically align vanes.

C. Manufactured Turning Vanes: Fabricate single-vane, curved blades of galvanized sheet steel; support with bars perpendicular to blades and set into vane runners suitable for duct mounting.

D. Turning Vanes in 4" Duct Pressure Class shall be high efficiency type equal to H-E-P as manufactured by Aero/Dyne Co. constructed with 2" long airfoil leading edge and 3" long trailing edge.

2.5 DUCT/PLENUM MOUNTED ACCESS DOORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Elmdor.
2. CESCO Products.
3. Ductmate Industries, Inc.
4. Duro Dyne Corp.
5. McGill AirFlow Corporation.
6. Nailor Industries Inc.
7. Pottorff.
8. United Enertech

B. General Description: Fabricate in accordance with SMACNA HVAC Duct Construction Standards – Metal and Flexible and suitable for duct pressure class.

C. Fabrication: Rigid and close fitting of galvanized steel with sealing gaskets, quick fastening locking devices, and continuous piano hinge. For insulated ductwork, install minimum 1 inch thick insulation with sheet metal cover.

D. Less than 12 inches square: secure with sash locks.

E. Up to 18 inches square: secure with two sash locks.

F. Up to 24 x 48 inches: secure with two compression latches with outside and inside handles.

G. Access doors with sheet metal screw fasteners are not acceptable.

H. Round Duct Sandwich Type Access Doors: Fully removable dual panel door. 22 gauge galv. steel door panel construction up to 12" diameter ducts, 20 gauge for larger diameter ducts. Closed cell foam gasket. Molded poly handles with metal hardware. Rated +20" wg to -10" wg at -20 deg. F to 200 deg. F.

2.6 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Duro Dyne Corp.
2. Ventfabrics, Inc.

B. UL listed fire-retardant neoprene coated woven glass fiber fabric and in compliance with NFPA 90A, approximately 3" wide, crimped into metal edging strip. Weight: 30 oz/sq yd.

2.7 FLEXIBLE DUCTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Thermaflex
2. Genflex
3. Thermold
4. Wiremold
5. JPL

B. Up to 2" W.G. Pressure Class:
1. Flexible duct shall be a factory assembly consisting of a spring steel helix, inner liner wrapped with 1" thick fiberglass insulation and a vapor barrier outer jacket. Composite assembly, including insulation and a vapor barrier, shall meet U.L. 181 and the Class 1 requirements of NFPA 90-A.

C. Flexible Duct Clamps: Nylon strap in sizes 3 through 18 inches to suit duct size.

2.8 DUCT ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 APPLICATION AND INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts.

B. Provide duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install gravity backdraft dampers on relief air duct nearest to outside wall where indicated.

D. Install manual balancing volume dampers in ducts with acoustic liner in a manner to avoid damage to and erosion of duct liner. Provide edge seals on duct liner before and after damper.

E. Provide manual balancing volume dampers at points on supply, return, and exhaust systems where branch take-offs lead from larger ducts as required for air balancing. If damper is not a part of a manufactured fitting, install at a minimum of two duct widths from branch takeoff.

F. Provide manual balancing volume dampers on ALL duct take-off to diffusers, grilles, and registers, regardless of whether or not separate dampers are specified as a part of the diffuser, grille, or register assembly. Locate volume damper closest to take off point, furthest from diffuser, for sound control purposes. Where volume damper locking quandrant assemblies are not accessible or are located above hard ceilings, provide a Young Regulator Co. Bowden Cable Assembly remote regulator.

G. Provide test holes at fan inlets and outlets and elsewhere as required to balance the system.

H. Install duct access doors to allow for inspecting, adjusting and maintaining accessories as follows:
   1. At motorized control dampers.
   2. At backdraft dampers.
   3. Air flow measuring stations.
   4. Duct mounted controls or components, filters, etc. that require internal access for inspection or cleaning.

I. Duct access doors shall be installed in the largest size necessary for access or inspection of the devices served. Locate access door on face of duct most readily accessible for personnel and where clearance from adjacent building services in available.

J. Label ductwork according to Division 23 Section "Mechanical Identification."

K. Install flexible connectors immediately adjacent to equipment in ducts associated with fans and motorized equipment supported by vibration isolators.

L. Connect flexible ducts to metal ducts with adhesive plus draw bands.

M. Install duct test holes where indicated and required for testing and balancing purposes.

N. Connect supply air outlets to low pressure ducts with maximum 60-inch lengths of flexible duct clamped or strapped in place in locations indicated on the plan. Provide spin-in fittings to connect low pressure round ducts to rectangular ducts.

3.2 ADJUSTING

A. Adjust duct accessories for proper operation. Assure that all dampers rotate smoothly, all access doors are accessible and are easy to open and close. Repair or replace damaged items.

B. Final positioning of manual-volume dampers is specified in Division 23 Section "Testing, Adjusting, and Balancing."

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Ceiling, wall and duct mounted diffusers, registers and grilles.

1.2 SUBMITTALS

A. Product Data: For each product indicated, include the following:
   1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.

B. Diffuser, Register, and Grille Schedule, Louvers, Roof Hoods & Louvered Penthouses: Indicate Drawing designation, model number, size, and accessories furnished.

1.3 QUALITY ASSURANCE

A. Take-off and quantities: The contractor shall be responsible for determining types, sizes and quantities of air outlets as indicated on the drawings. Carefully coordinate outlet type and frame styles with ceiling types to assure compatibility (i.e. lay-in T-bar, gyp. bd., etc.). Where indicated outlet type and ceiling type appear to be in conflict, contact the A/E for direction before preparing submittals.

B. Spare air outlets and damaged material: Allow for extra air outlets of each size and type to accommodate damaged units (both shipping and installation causes), as well as to provide a ready replacement supply for lost or misplaced outlets.

PART 2 - PRODUCTS

2.1 AIR OUTLETS

A. Manufacturers:
   1. Price Industries
   2. Krueger
   3. Nailor Industries

B. Registers, grilles and ceiling diffusers, shall be furnished in standard white unless noted otherwise on schedule. All diffusers shall meet performance of the specified diffusers. See schedule for model numbers and types.

C. Diffusers scheduled to be installed in suspended T-bar type ceiling shall fit within grid system and rest evenly on tees within the specified grid. Diffuser frame dimensions shall be selected to fit T-bar grids. See Architectural plans for type and size of suspended ceiling system.

D. Diffusers, grilles and registers to be installed in fire rated ceiling assemblies shall be provided with radiation dampers. Refer to Div. 23 Section “Duct Accessories”.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install diffusers, registers, grilles level and plumb. Provide square-to-round transitions on supply air diffusers where required to connect to round flexible ducts. Connect flex duct to plenum with nylon drawbands.

B. Ceiling Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practicable. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers. Seal exhaust and return grilles to riser ducts in a manner that does not allow ceiling plenum air to bypass in to duct connections.

D. Wall mounted grilles: Set wall mounted grilled with horizontal blades in a manner so that the interior of the ductwork is not visible through the face of the grille (i.e. point high sidewall grilles upward).

E. Install manual volume dampers on all supply air grilles and exhaust air grilles with scheduled air volumes (locate at branch duct take-offs, not at diffuser). Where volume dampers are not accessible through ceiling, install remote, ceiling mounted regulator assemblies. Return air and relief air grilles with variable air flow volumes do not require volume dampers unless otherwise noted.

F. Diffusers, registers and grilles installed in rated ceiling assemblies shall be provided with radiation dampers and non-asbestos thermal insulation blanket on portion of grille that extends beyond grille face (i.e. T-bar ceilings)

G. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

H. Repair damaged finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

I. Paint visible surfaces behind air outlets flat black.

J. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

3.2 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing. Readjust air patterns if necessary, after air balancing, in order to avoid drafts or other objectionable air motion.

B. Adjust blades on sidewall & duct mounted grilles to maximize air flow to occupied zones.

C. Clean all diffusers, grilles and registers to remove smudges and debris. Use touch-up paint to repair minor scratches.

D. Where grille blades are adjustable, set all blades at equal spacing for a clean appearance, unless directed otherwise for airflow directional purposes.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Manufactured units.

B. Casing.

C. Condenser coils.

D. Fan requirements.

E. Controls.

1.2 RELATED REQUIREMENTS

A. Section 23 23 00 - Refrigerant Piping.

B. Section 26 05 83 - Wiring Connections: Electrical characteristics and wiring connections.

1.3 REFERENCE STANDARDS

A. AHRI 210/240 - Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2023.

B. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2022, with Addendum (2024).

C. ASHRAE Std 20 - Methods of Laboratory Testing Remote Mechanical-Draft Air-Cooled Refrigerant Condensers; 2019.

D. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.

F. UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical; Current Edition, Including All Revisions.

1.4 SUBMITTALS

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

B. Product Data: Provide rated capacities, weights, accessories, electrical requirements, and wiring diagrams.

C. Shop Drawings: Indicate components, assembly, dimensions, weights and loading, required clearances, and location and size of field connections. Include schematic

layouts showing condenser, refrigeration compressors, cooling coils, refrigerant piping and accessories required for complete system.

D. Operation and Maintenance Data: Include start-up instructions, maintenance instructions, parts lists, controls, and accessories.

E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's installation instruction for rigging, unloading and transporting units.

B. Protect units on site from physical damage. Protect coils.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Provide the basis of design as listed on the drawings or equivalent from the manufacturer listed below. Substitutions shall be prior approved.
1. Liebert.

2.2 GENERAL

A. Provide packaged, factory assembled, pre-wired unit, suitable for outdoor use consisting of casing, condensing coil and fans, integral sub-cooling coil liquid accumulator.

B. Construction and Ratings: In accordance with AHRI 210/240 and UL 207. Testing shall be in accordance with ASHRAE Std 20.

C. Performance Ratings: Energy Efficient Rating (EER)/Coefficient of Performance (COP) not less than prescribed by ASHRAE Std 90.1 I-P, in combination with compressor units.

D. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.

2.3 CASING

A. House components in welded steel frame with steel panels with weather resistant, baked enamel finish.

B. Mount starters, disconnects, and controls in weatherproof panel provided with full opening access doors. Provide mechanical interlock to disconnect power when door is opened.

C. Provide removable access doors or panels with quick fasteners.

2.4 CONDENSER COILS

A. Coils: Aluminum fins mechanically bonded to seamless copper tubing. Provide sub-cooling circuits. Air test under water to 425 psig (2900 kPa), and vacuum dehydrate. Seal with holding charge of nitrogen.

B. Coil Guard: Expanded metal with lint screens.

2.5 FAN REQUIREMENTS

A. Vertical discharge direct driven propeller type condenser fans with fan guard on discharge, equipped with roller or ball bearings with grease fittings extended to outside of casing.

B. Weatherproof motors suitable for outdoor use, single phase permanent split capacitor or 3 phase, with permanent lubricated ball bearings and built-in current and thermal overload protection.

2.6 CONTROLS

A. Provide factory wired and mounted control panel, NEMA 250, containing fan motor starters, fan cycling thermostats, compressor interlock, and control transformer.

B. Provide controls to permit operation down to -10 degrees F ambient temperature.

C. Provide thermostat to cycle fan motors in response to outdoor ambient temperature.

D. Provide head pressure switch to cycle fan motors in response to refrigerant condensing pressure.

E. Provide solid state control to vary speed of one condenser fan motor in response to refrigerant condensing pressure.

F. Provide electronic low ambient control consisting of mixing damper assembly, controlled to maintain constant refrigerant condensing pressure.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide for connection to electrical service.

C. Provide connection to refrigeration piping system. Comply with ASHRAE Std 15.

D. Provide cooling season start-up, winter season shut-down service, for first year of operation.

E. Shut-down system if initial start-up and testing takes place in winter and machines are to remain inoperative. Repeat start-up and testing operation at beginning of first cooling season.

END OF SECTION 23 63 13

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data: Provide for manufactured products and assemblies. Indicate water, drain, refrigeration, rough-in connections, and electrical characteristics and connection requirements.

B. Shop Drawings: Indicate manufactured products and assemblies. Indicate water, drain, refrigeration, rough-in connections, and electrical characteristics and connection requirements.

C. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.02 QUALITY ASSURANCE

A. Comply with NFPA 90A for the installation of computer room air conditioning units.

1.03 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide the basis of design as listed on the drawings or equivalent from the manufacturer listed below. Substitutions shall be prior approved.
1. Liebert.

2.02 AIR CONDITIONING UNITS

A. Assembly: Up-flow air delivery, in draw-through configuration.

B. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.

2.03 CABINET AND FRAME

A. Structural Frame: 10 gauge, 0.1345 inch welded steel suitably braced for rigidity, capable of supporting compressors and other mechanical equipment and fittings with welded tubular steel floor stand with adjustable legs and vibration isolation pads.

2.04 EVAPORATOR FANS AND MOTORS

A. Fans: Double inlet, forward curved centrifugal fans, statically and dynamically balanced, on steel shaft with self-aligning grease lubricated ball bearings, and V-belt drive.

2.05 COMPRESSORS

A. Type: Semi-hermetic with suction gas cooled motors, vibration isolators, thermal overloads, oil sight glass, manual reset high pressure switch, pump down low pressure switch, suction line strainer, reversible oil pumps, 1750 rpm.

2.06 EVAPORATOR COILS

A. Alternate row circuits, direct expansion cooling coils of seamless copper tubes expanded into aluminum fins in A-frame configuration.

2.07 CONDENSERS

A. Air Cooled Refrigerant Condenser:
1. Corrosion resistant cabinet.

2. Copper tube aluminum fin coils arranged for two circuits.

3. Multiple direct drive propeller fans with permanently lubricated ball bearings.

4. Single phase motors with internal overload protection.

5. Refer to Section 23 63 13 - Air Cooled Refrigerant Condensers.

6. Provide capacity control by cycling fans.

2.08 FILTERS

A. Media: Pleated, lofted, non-woven, reinforced cotton fabric; supported and bonded to welded wire grid; enclosed in cardboard frame; 2 inch (50 mm) nominal thickness.

B. Minimum Efficiency Reporting Value (MERV): 13, when tested in accordance with ASHRAE Std 52.2.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide for connection to electrical service.

C. Provide connection to refrigeration piping system. Comply with ASHRAE Std 15.

D. Provide cooling season start-up, winter season shut-down service, for first year of operation.

E. Shut-down system if initial start-up and testing takes place in winter and machines are to remain inoperative. Repeat start-up and testing operation at beginning of first cooling season.

END OF SECTION 23 81 24

PART 1 GENERAL

1.1 SUBMITTALS

A. Sustainable Design Documentation: Submit certification of removal and appropriate disposal of abandoned cables containing lead stabilizers.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.1 PREPARATION

A. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

B. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.

END OF SECTION

PART 1 GENERAL

1.1 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

1.2 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.1 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
   1. Exceptions:
      a. Use variable-frequency drive cable for connection between variable-frequency motor controllers and associated motors.

C. Nonmetallic-sheathed cable is not permitted.

D. Service entrance cable is not permitted.

E. Armored cable is not permitted.

F. Metal-clad cable is not permitted.

2.2 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

D. Comply with NEMA WC 70.

E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

G. Conductors for Grounding and Bonding: Also comply with Section 26 05 26.

H. Conductor Material:
1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
3. Tinned Copper Conductors: Comply with ASTM B33.

I. Minimum Conductor Size:
1. Branch Circuits: 12 AWG.

J. Conductor Color Coding:
1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
2. Color Coding Method: Integrally colored insulation.
3. Color Code:
   a. 480Y/277 V, 3 Phase, 4 Wire System:
      1) Phase A: Brown.
      2) Phase B: Orange.
      3) Phase C: Yellow.
      4) Neutral/Grounded: Gray.
   b. 208Y/120 V, 3 Phase, 4 Wire System:
      1) Phase A: Black.
      2) Phase B: Red.
      3) Phase C: Blue.
      4) Neutral/Grounded: White.
   c. Equipment Ground, All Systems: Green.

2.3 SINGLE CONDUCTOR BUILDING WIRE

A. Description: Single conductor insulated wire.

B. Conductor Stranding:
1. Feeders and Branch Circuits:
   a. Size 10 AWG and Smaller: Solid.
   b. Size 8 AWG and Larger: Stranded.

C. Insulation Voltage Rating: 600 V.

D. Insulation:
1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.

2.4 VARIABLE-FREQUENCY DRIVE CABLE

A. Description: Flexible motor supply cable listed and labeled as complying with UL 2277 in accordance with NFPA 79; specifically designed for use with variable frequency drives and associated nonlinear power distortions.

B. Conductor Stranding: Stranded.

C. Insulation Voltage Rating: 1000 V.

D. Insulation: Use only thermoset insulation types; thermoplastic insulation types are not permitted.

E. Grounding: Full-size integral equipment grounding conductor or symmetrical arrangement of multiple conductors of equivalent size.

F. Provide metallic shielding.

G. Jacket: PVC or Chlorinated Polyethylene (CPE).

2.5 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

C. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

PART 3 EXECUTION

3.1 INSTALLATION

A. Circuiting Requirements:
1. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
2. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

B. Install products in accordance with manufacturer's instructions.

C. Perform work in accordance with NECA 1 (general workmanship).

D. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.

E. Variable-Frequency Drive Cable: Terminate shielding at both variable-frequency motor controller and associated motor using glands or termination kits recommended by manufacturer.

F. Make wiring connections using specified wiring connectors.

G. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.

H. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

I. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION

PART 1 GENERAL

1.1 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

1.2 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING REQUIREMENTS

A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.

B. Do not use products for applications other than as permitted by NFPA 70 and product listing.

C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

E. Grounding System Resistance:
1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Engineer of Record. Precipitation within the previous 48 hours does not constitute normally dry conditions.
2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.

F. Bonding and Equipment Grounding:
1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.

4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

2.2 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
   1. Provide products listed, classified, and labeled as suitable for the purpose intended.
   2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 05 26:
   1. Use insulated copper conductors unless otherwise indicated.
      a. Exceptions:
         1) Use bare copper conductors where installed underground in direct contact with earth.

C. Connectors for Grounding and Bonding:
   1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
   2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
   3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Make grounding and bonding connections using specified connectors.
   1. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.

END OF SECTION

PART 1 GENERAL

1.1 SUBMITTALS

A. Installer's qualification statement.

1.2 QUALITY ASSURANCE

A. Installer Qualifications for Powder-Actuated Fasteners: Certified by fastener system manufacturer with current operator's license.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
   1. Comply with the following. Where requirements differ, comply with most stringent.
      a. NFPA 70.
      b. Applicable building code.
      c. Requirements of authorities having jurisdiction.
   2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of electrical work.
   3. Provide products listed, classified, and labeled as suitable for purpose intended, where applicable.
   4. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for load to be supported with minimum safety factor of _____. Include consideration for vibration, equipment operation, and shock loads where applicable.
   5. Do not use products for applications other than as permitted by NFPA 70 and product listing.
   6. Steel Components: Use corrosion-resistant materials suitable for environment where installed.
      a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
      b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps and clamps suitable for conduit or cable to be supported.
   1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
   2. Conduit Clamps: Bolted type unless otherwise indicated.

C. Metal Channel/Strut Framing Systems:
   1. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
   2. Comply with MFMA-4.

D. Hanger Rods: Threaded, zinc-plated steel unless otherwise indicated.

E. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.
2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
3. Steel: Use beam clamps, machine bolts, or welded threaded studs.
4. Hammer-driven anchors and fasteners are not permitted.
5. Preset Concrete Inserts: Continuous metal channel/strut and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
   a. Manufacturer: Same as manufacturer of metal channel/strut framing system.
   b. Comply with MFMA-4.
   c. Channel Material: Use galvanized steel.
6. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install hangers and supports in accordance with NECA 1.

C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

E. Unless specifically indicated or approved by owner, do not provide support from suspended ceiling support system or ceiling grid.

F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

G. Equipment Support and Attachment:
1. Use metal, fabricated supports or supports assembled from metal channel/strut to support equipment as required.
2. Use metal channel/strut secured to studs to support equipment surface mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
3. Use metal channel/strut to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

END OF SECTION

PART 1 GENERAL

1.1 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

PART 2 PRODUCTS

2.1 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, manufacturer's instructions, and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.

C. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).

D. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC).

E. Flexible Connections to Vibrating Equipment:
1. Dry Locations: Use flexible metal conduit (FMC).
2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit (LFMC).
3. Maximum Length: 6 feet (1.8 m) unless otherwise indicated.

2.2 CONDUIT - GENERAL REQUIREMENTS

A. Comply with NFPA 70.

B. Provide conduit, fittings, supports, and accessories required for complete raceway system.

C. Provide products listed, classified, and labeled as suitable for purpose intended.

D. Minimum Conduit Size, Unless Otherwise Indicated:
1. Branch Circuits: 3/4-inch (21 mm) trade size.

E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.3 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

B. Fittings:
1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
2. Material: Use steel or malleable iron.
3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.4 GALVANIZED STEEL INTERMEDIATE METAL CONDUIT (IMC)

A. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.

B. Fittings:
1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 1242.
2. Material: Use steel or malleable iron.
3. Connectors and Couplings: Use threaded or threadless type fittings.

2.5 FLEXIBLE METAL CONDUIT (FMC)

A. Description: NFPA 70, Type FMC standard-wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems.

B. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
2. Material: Use steel or malleable iron.

2.6 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

B. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
2. Material: Use steel or malleable iron.

2.7 GALVANIZED STEEL ELECTRICAL METALLIC TUBING (EMT)

A. Description: NFPA 70, Type EMT galvanized steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

B. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

2. Material: Use steel or malleable iron.
3. Connectors and Couplings: Use compression/gland or set-screw type.
   a. Do not use indenter type connectors and couplings.

2.8 ALUMINUM ELECTRICAL METALLIC TUBING (EMT)

A. Description: NFPA 70, Type EMT aluminum electrical metallic tubing listed and labeled as complying with UL 797A.

B. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B; listed for use with aluminum EMT.
2. Material: Use aluminum.
3. Connectors and Couplings: Use compression/gland or set-screw type.
   a. Do not use indenter type connectors and couplings.

2.9 ACCESSORIES

A. Conduit Joint Compound: Corrosion-resistant, electrically conductive compound listed as complying with UL 2419; suitable for use with conduit to be installed.

B. Pull Strings: Use nylon or polyester tape with average breaking strength of not less than 1,250 lbf (5.6 kN).

C. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for conduits and roofing system to be installed; designed to accommodate existing penetrations where applicable.

D. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install conduit in accordance with NECA 1.

C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

D. Install intermediate metal conduit (IMC) in accordance with NECA 101.

E. Conduit Routing:
1. Arrange conduit to provide no more than equivalent of four 90-degree bends between pull points.
2. Arrange conduit to provide no more than 150 feet (46 m) between pull points.
3. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.

F. Conduit Support:
   1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 26 05 29.
   2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

G. Connections and Terminations:
   1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
   2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
   3. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
   4. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
   5. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.

H. Penetrations:
   1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
   2. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
   3. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
   4. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
   5. Install firestopping to preserve fire resistance rating of partitions and other elements.

I. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
   1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
   2. Where conduits are subject to earth movement by settlement or frost.

J. Conduit Sealing:
   1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
      a. Where conduits enter building from outside.
      b. Where service conduits enter building from underground distribution system.
      c. Where conduits enter building from underground.
      d. Where conduits may transport moisture to contact live parts.

2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
   a. Where conduits pass from outdoors into conditioned interior spaces.
   b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

K. Provide pull string in each empty conduit and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches (300 mm) at each end.

END OF SECTION

PART 1 GENERAL

1.1 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures and underground boxes/enclosures.

1.2 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.1 BOXES

A. General Requirements:
   1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
   2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
   3. Provide products listed, classified, and labeled as suitable for the purpose intended.
   4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
   5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
   1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
   2. Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
      a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.

E. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.

F. Box Supports:
   1. Secure and support boxes in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.

G. Install boxes as required to preserve insulation integrity.

H. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

I. Install firestopping to preserve fire resistance rating of partitions and other elements.

END OF SECTION

PART 1 GENERAL

1.1 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets including dimensions, knockout sizes and locations, materials, fabrication details, finishes, service condition requirements, and accessories.
   1. Surface Raceway Systems: Include information on fill capacities for conductors and cables.

1.2 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.1 RACEWAY REQUIREMENTS

A. Provide all components, fittings, supports, and accessories required for a complete raceway system.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Do not use raceways for applications other than as permitted by NFPA 70 and product listing.

2.2 SURFACE RACEWAY SYSTEMS

A. Surface Metal Raceways: Listed and labeled as complying with UL 5.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install raceways plumb and level.

D. Secure and support raceways in accordance with Section 26 05 29 at intervals complying with NFPA 70 and manufacturer's requirements.

E. Close unused raceway openings.

END OF SECTION

PART 1 GENERAL

1.1 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.1 IDENTIFICATION REQUIREMENTS

A. Identification for Equipment:
1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
   a. Switchboards:
      1) Identify ampere rating.
      2) Identify voltage and phase.
      3) Identify power source and circuit number. Include location when not within sight of equipment.
      4) Use identification nameplate to identify main overcurrent protective device.
      5) Use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
   b. Panelboards:
      1) Identify ampere rating.
      2) Identify voltage and phase.
      3) Identify power source and circuit number. Include location when not within sight of equipment.
      4) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
      5) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
   c. Enclosed switches, circuit breakers, and motor controllers:
      1) Identify voltage and phase.
      2) Identify power source and circuit number. Include location when not within sight of equipment.
      3) Identify load(s) served. Include location when not within sight of equipment.
2. Service Equipment:
   a. Use identification nameplate to identify each service disconnecting means.
   b. For buildings or structures supplied by more than one service, or any combination of branch circuits, feeders, and services, use identification nameplate or means of identification acceptable to authority having jurisdiction at each service disconnecting means to identify all other services, feeders, and branch circuits supplying that building or structure. Verify format and descriptions with authority having jurisdiction.
3. Use voltage marker to identify highest voltage present for each piece of electrical equipment.

4. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.
5. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.
   a. Minimum Size: 3.5 by 5 inches (89 mm by 127 mm).
   b. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.
   c. Service Equipment: Include the following information in accordance with NFPA 70.
      1) Nominal system voltage.
      2) Available fault current.
      3) Clearing time of service overcurrent protective device(s).
      4) Date label applied.

B. Identification for Conductors and Cables:
   1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 05 19.
   2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

C. Identification for Raceways:
   1. Use voltage markers to identify highest voltage present for accessible conduits at maximum intervals of 20 feet (6.1 m).
   2. Use voltage markers to identify highest voltage present for wireways at maximum intervals of 20 feet (6.1 m).

2.2 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
   1. Materials:
      a. Indoor Clean, Dry Locations: Use plastic nameplates.
   2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.

B. Identification Labels:
   1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
   2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Equipment Identification:
   1. Minimum Size: 1 inch (25 mm) by 2.5 inches (64 mm).
   2. Legend:

a. Equipment designation or other approved description.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height:
   a. Equipment Designation: 1/2 inch (13 mm).
5. Color:
   a. Normal Power System: White text on black background.

2.3 WIRE AND CABLE MARKERS

A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

C. Legend: Power source and circuit number or other designation indicated.

D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

E. Minimum Text Height: 1/8 inch (3 mm).

F. Color: Black text on white background unless otherwise indicated.

2.4 VOLTAGE MARKERS

A. Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth, or vinyl snap-around type markers.

B. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.

C. Minimum Size:
   1. Markers for Equipment: 1 1/8 by 4 1/2 inches (29 by 110 mm).
   2. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.

D. Legend:
   1. Markers for Voltage Identification: Highest voltage present.

E. Color: Black text on orange background unless otherwise indicated.

2.5 WARNING SIGNS AND LABELS

A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

B. Warning Signs:
   1. Materials:

a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.

2. Minimum Size: 7 by 10 inches (178 by 254 mm) unless otherwise indicated.

C. Warning Labels:
1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
3. Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

C. Secure rigid signs using stainless steel screws.

END OF SECTION