Project Manual

WSU Sunrise Orchard Irrigation Line and Pond

Washington State University
Wenatchee, WA

Project No. 1262-2020
Issued 3/9/2023
Washington State University
Facility Services, Capital

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

CIVIL ENGINEERS:

Erlandsen and Assoc
250 Simon St SE
East Wentachee, WA
Phone: (509) 884-2562

Specification Sections 02 22 thru 33 41

Place Stamp Here

END OF ARCHITECTURAL / ENGINEERING STAMPS

CONDITIONS OF THE CONTRACT

00 11 13 Advertisement for Bids
00 21 13 Instructions to Bidders
00 42 13 Form of Proposal: Base Bid & Alternate Bids
00 50 00 Agreement between Owner and Contractor
00 72 00 General Conditions for Washington State Facilities Construction with Washington State University Amendments

DIVISION 01 GENERAL REQUIREMENTS

01 11 00 Summary of Work
01 26 00 Change Order Procedures
01 29 00 Applications for Payment
Current Prevailing Wage Rates
01 29 73 Schedule of Values
01 31 19 Project Meetings
01 31 23 Coordination
01 32 13 Progress Schedule
01 32 33 Construction Photographs
01 33 00 Submittals
01 35 16 Alteration Procedures
01 41 00 Regulatory Requirements
01 41 19 Special Provisions
01 45 00 Quality Control
01 45 23 Testing Laboratory Services
01 45 34 Contract Performance Evaluation Program
01 50 00 Construction Facilities & Temporary Controls
01 60 00 Material and Equipment
01 70 00 Project Close-Out
01 71 23 Field Engineering
01 74 19 Construction Waste Management
01 78 23 Operation & Maintenance Manuals
01 78 39 Project Record

DIVISION 02 EXISTING CONDITIONS

02 22 00 Earthwork
02 41 00 Demolition
02 80 00 Landscape Restoration

DIVISION 03 CONCRETE

03 10 00 Concrete Formwork
03 20 00 Concrete Reinforcement
03 30 00 Cast-In-Place Concrete

DIVISION 05 METALS

05 50 00 Metal Fabrications

DIVISION 26 ELECTRICAL

26 0 500 General Electrical Requirements
26 05 19 Wire and Cable
26 05 23 Low-Voltage Electrical Power Conductors and Cables
26 05 26 Grounding and Bonding for Electrical Systems
26 05 29 Hangers and Supports for Electrical Systems
26 05 53 Identification for Electrical Systems
26 27 00 Service and Metering

DIVISION 31 EARTHWORK

31 11 00 Clearing and Grubbing
31 20 00 Earthwork
31 23 33 Trenching and Backfilling

DIVISION 32 EXTERIOR IMPROVEMENTS

32 31 00 Fences and Gates

DIVISION 33 UTILITIES

33 11 00 Water Distribution
33 41 01 High Density Polyethylene Pipe

END OF SECTION 00 01 10

Washington State University
WSU Sunrise Orchard Irrigation Line and Pond
Wenatchee, WA

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

Project Scope: Construct 2.5 million gallon irrigation storage pond at orchard site with secondary pump system intended to be used as the main irrigation supply. Substantial Completion shall be achieved by June 1, 2023. Bid shall be based on this Contract Time.

Project Physical address: 75 Sunrise Ct., Rock Island, WA 98850

Bid Estimate: $600,000 - $650,000

Bids will be received prior to 2:00 p.m. Thursday, March 30, 2023; 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/95510331115?from=addon or Phone 253-215-8782 and entering Meeting ID 955 1033 1115. Attendance in person is not allowed.

A pre-bid conference for general contractors will be held at 10:00 a.m. on Tuesday, March 21, 2023. Attendees may attend by Zoom https://wsu.zoom.us/j/99137076261?from=addon or Phone 253-215-8782 and entering Meeting ID 991 3707 6261. Attendance in person is not allowed.

Bid documents may be obtained at https://facilities.wsu.edu/facilities-services-capital/contractors/. Contractors who would like to be included on the Planholder's list shall either attend the pre-bid meeting or request to be added by emailing contracts@wsu.edu.

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

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. The pre-bid conference will be held virtually by zoom. Bidders shall refer to the Advertisement for bids for the link to the meeting.

B. The University is requiring that Zoom be downloaded and installed via a computer client rather than connecting through a web browser plugin. The computer client can be found here: https://support.zoom.us/hc/en-us/articles/207373866-Zoom-Installers

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.
    b. Not used.
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 - WSU Sunrise Orchard Irrigation Line and Pond". 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 consist 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 – NOT USED

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. The ability, capacity, and skill of bidder to perform the service required;
2. The experience and efficiency of bidder;
3. Whether bidder can perform the Contract within the time specified;
4. The satisfactory completion of previous contracts or services;
5. Such other information having a bearing on the decision to accept a bid proposal.

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 five-years experience or three projects of comparable size and scope to this Project will be required for Contractor's Project Manager, Project Engineer, and superintendent.

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, if any.

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
WSU Sunrise Orchard Irrigation Line and Pond
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 "WSU Sunrise Orchard Irrigation Line and Pond" 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 ($_____),
including trench-excavation safety provisions if required. The amount of trench-excavation safety provisions included above is $_____,

B. UNIT PRICES – NOT USED

C. ALTERNATES – NOT USED

D. REINSTATEMENT OF BID ALTERNATES – NOT USED

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

WSU Sunrise Orchard Irrigation Line and Pond

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):	Erlandsen & Associates, Inc. 210 N. Bridge Street Brewster, WA 98812
PROJECT:	WSU Sunrise Orchard Irrigation Line and Pond 75 Sunrise Ct. Rock Island, WA 98850

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 by March 1, 2024, subject to adjustments as provided in the Contract Documents, and shall achieve Final Completion not later than Ninety (90) 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 two dollars and one cent ($202.01) per Day for each Day beyond the contractual date for Substantial Completion that Substantial Completion is not timely achieved, and subsequently Two hundred two dollars and one cent ($202.01) 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)
None		

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:

Adam Ferry
Project Manager
Facilities Services, Capital

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:	**CONTRACTOR:**
WASHINGTON STATE UNIVERSITY	**FIRM NAME**
	WA CONTRACTOR LICENSE NUMBER
(Signature) (Date)	(Signature) (Date)
(Printed Name)	(Printed Name)
Assistant Vice President, Capital and Operations Facilities Operations	(Title)

END OF SECTION 00 50 00

Section **Description**

PART 1 - GENERAL PROVISIONS 3

1.01 DEFINITIONS 3
1.02 ORDER OF PRECEDENCE 5
1.03 EXECUTION AND INTENT 6

PART 2 - INSURANCE AND BONDS 6

2.01 CONTRACTOR'S LIABILITY INSURANCE 6
2.02 COVERAGE LIMITS 8
2.03 INSURANCE COVERAGE CERTIFICATES 8
2.04 PAYMENT AND PERFORMANCE BONDS 8
2.05 ALTERNATIVE SURETY 8
2.06 BUILDER'S RISK 9

PART 3 - TIME AND SCHEDULE 9

3.01 PROGRESS AND COMPLETION 9
3.02 CONSTRUCTION SCHEDULE 9
3.03 OWNER'S RIGHT TO SUSPEND THE WORK FOR CONVENIENCE 10
3.04 OWNER'S RIGHT TO STOP AND/OR CARRY OUT THE WORK FOR CAUSE 11
3.05 DELAY 11
3.06 NOTICE TO OWNER OF LABOR DISPUTES 13
3.07 DAMAGES FOR FAILURE TO ACHIEVE TIMELY COMPLETION 13

PART 4 - SPECIFICATIONS, DRAWINGS, AND OTHER DOCUMENTS 13

4.01 DISCREPANCIES AND CONTRACT DOCUMENT REVIEW 13
4.02 PROJECT RECORD 14
4.03 SUBMITTALS 15
4.04 ORGANIZATION OF SPECIFICATIONS 16
4.05 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS, AND OTHER DOCUMENTS 16

PART 5 - PERFORMANCE 17

5.01 CONTRACTOR CONTROL AND SUPERVISION 17
5.02 PERMITS, FEES, AND NOTICES 17
5.03 PATENTS AND ROYALTIES 18
5.04 PREVAILING WAGES 18
5.05 HOURS OF LABOR 19
5.06 NONDISCRIMINATION 19
5.07 SAFETY PRECAUTIONS 20
5.08 OPERATIONS, MATERIAL HANDLING, AND STORAGE AREAS 22
5.09 PRIOR NOTICE OF EXCAVATION 22
5.10 UNFORESEEN PHYSICAL CONDITIONS 22
5.11 PROTECTION OF EXISTING STRUCTURES, EQUIPMENT, VEGETATION, UTILITIES AND IMPROVEMENTS 23
5.12 LAYOUT OF WORK 23
5.13 MATERIAL AND EQUIPMENT 24
5.14 AVAILABILITY AND USE OF UTILITY SERVICES 24
5.15 TESTS AND INSPECTION 24
5.16 CORRECTION OF NONCONFORMING WORK 25
5.17 CLEAN UP 26
5.18 ACCESS TO WORK 27
5.19 OTHER CONTRACTS 27

Section **Description**

5.20 SUBCONTRACTORS AND SUPPLIERS 27
5.21 WARRANTY OF CONSTRUCTION 29
5.22 INDEMNIFICATION 29

PART 6 - PAYMENTS AND COMPLETION 30

6.01 CONTRACT SUM 30
6.02 SCHEDULE OF VALUES 30
6.03 APPLICATION FOR PAYMENT 30
6.04 PROGRESS PAYMENTS 31
6.05 PAYMENTS WITHHELD 32
6.06 RETAINAGE, BOND CLAIM RIGHTS, AND LIENS 33
6.07 SUBSTANTIAL COMPLETION 33
6.08 PRIOR OCCUPANCY 34
6.09 FINAL COMPLETION, ACCEPTANCE, AND PAYMENT 35

PART 7 - CHANGES 36

7.01 CHANGE IN THE WORK 36
7.02 CHANGE IN THE CONTRACT SUM 37
7.03 CHANGE IN THE CONTRACT TIME 40

PART 8 - CLAIMS AND DISPUTE RESOLUTION 41

8.01 CLAIMS 41
8.02 INFORMAL RESOLUTION OF DISPUTES 42
8.03 FORMAL RESOLUTION OF CLAIMS 43
8.04 CLAIMS PROCESS 44

PART 9 - TERMINATION OF THE WORK 48

9.01 TERMINATION BY OWNER FOR CAUSE 48
9.02 TERMINATION BY OWNER FOR CONVENIENCE 49
9.03 TERMINATION BY CONTRACTOR FOR CAUSE 50

PART 10 - MISCELLANEOUS PROVISIONS 50

10.01 GOVERNING LAW 50
10.02 SUCCESSORS AND ASSIGNS 50
10.03 MEANING OF WORDS 51
10.04 RIGHTS AND REMEDIES 51
10.05 CONTRACTOR REGISTRATION AND COMPLIANCE 51
10.06 TIME COMPUTATIONS 52
10.07 RECORDS RETENTION 52
10.08 THIRD-PARTY AGREEMENTS 52
10.09 ANTITRUST ASSIGNMENT 52
10.10 HEADINGS AND CAPTIONS 52
10.11 INDEPENDENT CONTRACTOR 52
10.12 OWNER'S ROLE 52

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, flood, wind, temporary buildings, earthquake, debris removal including demolition, and 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, sex, age, marital status, or the presence of any physical, sensory, or mental disability, Vietnam era veteran status, or disabled veteran status, 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, sex, age, marital status, or the presence of any physical, sensory, or mental 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

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:

1. Construct 2.5 million gallon irrigation storage pond at orchard site with secondary pump system intended to be used as the main irrigation supply.

C. Expected Owner-supplied Contractor-installed Work: None

D. Expected Work by Owner: None

1.02 SCHEDULE OF ALTERNATES – NOT USED

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, as are others involved as members of the Owner team working on the Project:

a. Architect/Engineer: Erlandsen & Associates, Inc., Brewster, WA

1.06 SPECIAL CONDITIONS

A. Site Access:

1. This project crosses multiple entities of ownership, private and public. access to the site will be contained to specific points that must be followed.

END OF SECTION 01 11 00

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/Douglass 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: 03/09/2023

County	Trade	Job Classification	Wage	Holiday	Overtime	Note	*Risk Class
Douglas	Asbestos Abatement Workers	Journey Level	$50.62	7B	1M	8Z	View
Douglas	Boilermakers	Journey Level	$74.29	5N	1C		View
Douglas	Brick Mason	Journey Level	$55.44	5A	1M		View
Douglas	Building Service Employees	Janitor	$15.74		1		View
Douglas	Building Service Employees	Shampooer	$15.74		1		View
Douglas	Building Service Employees	Waxer	$15.74		1		View
Douglas	Building Service Employees	Window Cleaner	$15.74		1		View
Douglas	Cabinet Makers (In Shop)	Journey Level	$15.74		1		View
Douglas	Carpenters	Acoustical Workers	$71.53	15J	4C		View
Douglas	Carpenters	Bridge, Dock & Wharf Carpenter	$71.53	15J	4C		View
Douglas	Carpenters	Journey Level	$71.53	15J	4C		View
Douglas	Carpenters	Scaffold/Shoring Erecting & Dismantling	$71.53	15J	4C		View
Douglas	Cement Masons	Journey Level	$52.83	7B	1N		View
Douglas	Divers & Tenders	Bell / Vehicle or Submersible Operator (not under pressure)	$126.05	15J	4C		View
Douglas	Divers & Tenders	Dive Supervisor/Master	$89.94	15J	4C		View
Douglas	Divers & Tenders	Diver	$126.05	15J	4C		View
Douglas	Divers & Tenders	Diver - 101 to 150 Feet	$129.05	15J	4C		View
Douglas	Divers & Tenders	Diver - 151 to 220 Feet	$130.05	15J	4C		View
Douglas	Divers & Tenders	Diver - 221 Feet and Deeper	$131.05	15J	4C		View
Douglas	Divers & Tenders	Diver - 50 to 100 Feet	$128.05	15J	4C		View
Douglas	Divers & Tenders	Diver on Standby	$84.94	15J	4C		View
Douglas	Divers & Tenders	Diver Tender	$77.16	15J	4C		View
Douglas	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 0-30.00 PSI	$89.09	15J	4C		View
Douglas	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 30.01 - 44.00 PSI	$94.09	15J	4C		View

Douglas	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 44.01 - 54.00 PSI	$98.09	15J	4C		View
Douglas	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 54.01 - 60.00 PSI	$103.09	15J	4C		View
Douglas	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 60.01 - 64.00 PSI	$105.59	15J	4C		View
Douglas	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 64.01 - 68.00 PSI	$110.59	15J	4C		View
Douglas	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 68.01 - 70.00 PSI	$112.59	15J	4C		View
Douglas	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 70.01 - 72.00 PSI	$114.59	15J	4C		View
Douglas	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 72.01 - 74.00 PSI	$116.59	15J	4C		View
Douglas	Divers & Tenders	Manifold Operator	$77.16	15J	4C		View
Douglas	Divers & Tenders	Manifold Operator Mixed Gas	$82.16	15J	4C		View
Douglas	Divers & Tenders	Remote Operated Vehicle Operator/Technician	$77.16	15J	4C		View
Douglas	Divers & Tenders	Remote Operated Vehicle Tender	$71.98	15J	4C		View
Douglas	Dredge Workers	Assistant Engineer	$76.56	5D	3F		View
Douglas	Dredge Workers	Assistant Mate (Deckhand)	$75.97	5D	3F		View
Douglas	Dredge Workers	Boatmen	$76.56	5D	3F		View
Douglas	Dredge Workers	Engineer Welder	$78.03	5D	3F		View
Douglas	Dredge Workers	Leverman, Hydraulic	$79.59	5D	3F		View
Douglas	Dredge Workers	Mates	$76.56	5D	3F		View
Douglas	Dredge Workers	Oiler	$75.97	5D	3F		View
Douglas	Drywall Applicator	Journey Level	$71.53	15J	4C		View
Douglas	Drywall Tapers	Journey Level	$48.68	7E	1P		View
Douglas	Electrical Fixture Maintenance Workers	Journey Level	$15.74		1		View
Douglas	Electricians - Inside	Cable Splicer	$84.67	7H	1E		View
Douglas	Electricians - Inside	Construction Stock Person	$41.31	7H	1D		View
Douglas	Electricians - Inside	Journey Level	$79.64	7H	1E		View
Douglas	Electricians - Motor Shop	Craftsman	$15.74		1		View
Douglas	Electricians - Motor Shop	Journey Level	$15.74		1		View
Douglas	Electricians - Powerline Construction	Cable Splicer	$93.00	5A	4D		View
Douglas	Electricians - Powerline Construction	Certified Line Welder	$85.42	5A	4D		View
Douglas	Electricians - Powerline Construction	Groundperson	$55.27	5A	4D		View
Douglas	Electricians - Powerline Construction	Heavy Line Equipment Operator	$85.42	5A	4D		View

Douglas	Electricians - Powerline Construction	Journey Level Lineperson	$85.42	5A	4D		View
Douglas	Electricians - Powerline Construction	Line Equipment Operator	$73.35	5A	4D		View
Douglas	Electricians - Powerline Construction	Meter Installer	$55.27	5A	4D	8W	View
Douglas	Electricians - Powerline Construction	Pole Sprayer	$85.42	5A	4D		View
Douglas	Electricians - Powerline Construction	Powderperson	$63.50	5A	4D		View
Douglas	Electronic Technicians	Electronic Technicians Journey Level	$51.68	5B	1B		View
Douglas	Elevator Constructors	Mechanic	$107.49	7D	4A		View
Douglas	Elevator Constructors	Mechanic In Charge	$116.13	7D	4A		View
Douglas	Fabricated Precast Concrete Products	Journey Level	$15.74		1		View
Douglas	Fabricated Precast Concrete Products	Journey Level - In-Factory Work Only	$15.74		1		View
Douglas	Fence Erectors	Fence Erector	$50.62	7B	1M	8Z	View
Douglas	Flaggers	Journey Level	$47.88	7B	1M	8Z	View
Douglas	Glaziers	Journey Level	$40.20	7L	4L		View
Douglas	Heat & Frost Insulators And Asbestos Workers	Journey Level	$84.84	15H	11C		View
Douglas	Heating Equipment Mechanics	Journey Level	$65.36	6Z	1B		View
Douglas	Hod Carriers & Mason Tenders	Journey Level	$48.46	7B	1M	8Z	View
Douglas	Industrial Power Vacuum Cleaner	Journey Level	$15.74		1		View
Douglas	Inland Boatmen	Journey Level	$15.74		1		View
Douglas	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Cleaner Operator, Foamer Operator	$15.74		1		View
Douglas	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Grout Truck Operator	$15.74		1		View
Douglas	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Head Operator	$15.74		1		View
Douglas	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Technician	$15.74		1		View
Douglas	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Tv Truck Operator	$15.74		1		View
Douglas	Insulation Applicators	Journey Level	$71.53	15J	4C		View
Douglas	Ironworkers	Journeyman	$68.91	15K	11N		View
Douglas	Laborers	Air And Hydraulic Track Drill	$51.20	7B	1M	8Z	View
Douglas	Laborers	Asphalt Raker	$51.20	7B	1M	8Z	View
Douglas	Laborers	Asphalt Roller, Walking	$50.91	7B	1M	8Z	View
Douglas	Laborers	Brick Pavers	$50.62	7B	1M	8Z	View
Douglas	Laborers	Brush Hog Feeder	$50.62	7B	1M	8Z	View
Douglas	Laborers	Brush Machine	$51.20	7B	1M	8Z	View

Douglas	Laborers	Caisson Worker, Free AIr	$51.20	7B	1M	8Z	View
Douglas	Laborers	Carpenter Tender	$50.62	7B	1M	8Z	View
Douglas	Laborers	Cement Finisher Tender	$50.91	7B	1M	8Z	View
Douglas	Laborers	Cement Handler	$50.62	7B	1M	8Z	View
Douglas	Laborers	Chain Saw Operator & Faller	$51.20	7B	1M	8Z	View
Douglas	Laborers	Clean-up Laborer	$50.62	7B	1M	8Z	View
Douglas	Laborers	Compaction Equipment	$50.91	7B	1M	8Z	View
Douglas	Laborers	Concrete Crewman	$50.62	7B	1M	8Z	View
Douglas	Laborers	Concrete Saw, Walking	$50.91	7B	1M	8Z	View
Douglas	Laborers	Concrete Signalman	$50.62	7B	1M	8Z	View
Douglas	Laborers	Concrete Stack	$51.20	7B	1M	8Z	View
Douglas	Laborers	Confined Space Attendant	$50.62	7B	1M	8Z	View
Douglas	Laborers	Construction Specialist	$51.39	7B	1M	8Z	View
Douglas	Laborers	Crusher Feeder	$50.62	7B	1M	8Z	View
Douglas	Laborers	Demolition	$50.62	7B	1M	8Z	View
Douglas	Laborers	Demolition Torch	$50.91	7B	1M	8Z	View
Douglas	Laborers	Dope Pot Fireman, Non-mechanical	$50.91	7B	1M	8Z	View
Douglas	Laborers	Driller Helper (when Required To Move & Position Machine)	$50.91	7B	1M	8Z	View
Douglas	Laborers	Drills With Dual Masts	$51.50	7B	1M	8Z	View
Douglas	Laborers	Dry Stack Walls	$50.62	7B	1M	8Z	View
Douglas	Laborers	Dumpman	$50.62	7B	1M	8Z	View
Douglas	Laborers	Erosion Control Laborer	$50.62	7B	1M	8Z	View
Douglas	Laborers	Firewatch	$50.62	7B	1M	8Z	View
Douglas	Laborers	Form Cleaning Machine Feeder, Stacker	$50.62	7B	1M	8Z	View
Douglas	Laborers	Form Setter, Paving	$50.91	7B	1M	8Z	View
Douglas	Laborers	General Laborer	$50.62	7B	1M	8Z	View
Douglas	Laborers	Grade Checker	$53.33	7B	1M	8Z	View
Douglas	Laborers	Grout Machine Header Tender	$50.62	7B	1M	8Z	View
Douglas	Laborers	Guard Rail	$50.62	7B	1M	8Z	View
Douglas	Laborers	Gunite	$51.20	7B	1M	8Z	View
Douglas	Laborers	Hazardous Waste Worker (level A)	$51.50	7B	1M	8Z	View
Douglas	Laborers	Hazardous Waste Worker (level B)	$51.20	7B	1M	8Z	View
Douglas	Laborers	Hazardous Waste Worker (level C)	$50.91	7B	1M	8Z	View
Douglas	Laborers	Hazardous Waste Worker (level D)	$50.62	7B	1M	8Z	View
Douglas	Laborers	Hdpe Or Similar Liner Installer	$50.62	7B	1M	8Z	View
Douglas	Laborers	High Scaler	$51.20	7B	1M	8Z	View
Douglas	Laborers	Jackhammer Operator Miner, Class "b"	$50.91	7B	1M	8Z	View
Douglas	Laborers	Laser Beam Operator	$51.20	7B	1M	8Z	View
Douglas	Laborers	Miner, Class "a"	$50.62	7B	1M	8Z	View
Douglas	Laborers	Miner, Class "c"	$51.20	7B	1M	8Z	View

Douglas	Laborers	Miner, Class "d"	$51.50	7B	1M	8Z	View
Douglas	Laborers	Monitor Operator, Air Track Or Similar Mounting	$51.20	7B	1M	8Z	View
Douglas	Laborers	Mortar Mixer	$51.20	7B	1M	8Z	View
Douglas	Laborers	Nipper	$50.62	7B	1M	8Z	View
Douglas	Laborers	Nozzleman	$51.20	7B	1M	8Z	View
Douglas	Laborers	Nozzleman, Water (to Include Fire Hose), Air Or Steam	$50.91	7B	1M	8Z	View
Douglas	Laborers	Pavement Breaker, 90 Lbs. & Over	$51.20	7B	1M	8Z	View
Douglas	Laborers	Pavement Breaker, Under 90 Lbs.	$50.91	7B	1M	8Z	View
Douglas	Laborers	Pilot Car	$47.88	7B	1M	8Z	View
Douglas	Laborers	Pipelayer	$51.20	7B	1M	8Z	View
Douglas	Laborers	Pipelayer, Corrugated Metal Culvert And Multi-Plate	$51.20	7B	1M	8Z	View
Douglas	Laborers	Pipewrapper	$51.20	7B	1M	8Z	View
Douglas	Laborers	Plasterer Tenders	$51.20	7B	1M	8Z	View
Douglas	Laborers	Pot Tender	$50.91	7B	1M	8Z	View
Douglas	Laborers	Powderman	$52.97	7B	1M	8Z	View
Douglas	Laborers	Powederman Helper	$50.91	7B	1M	8Z	View
Douglas	Laborers	Power Buggy Operator	$50.91	7B	1M	8Z	View
Douglas	Laborers	Power Tool Operator, Gas, Electric, Pneumatic	$50.91	7B	1M	8Z	View
Douglas	Laborers	Railroad Equipment, Power Driven, Except Dual Mobile	$50.91	7B	1M	8Z	View
Douglas	Laborers	Railroad Power Spiker Or Puller, Dual Mobile	$50.91	7B	1M	8Z	View
Douglas	Laborers	Remote Equipment Operator	$51.50	7B	1M	8Z	View
Douglas	Laborers	Remote Equipment Operator (i.e Compaction And Demolition)	$50.91	7B	1M	8Z	View
Douglas	Laborers	Rigger/signal Person	$50.91	7B	1M	8Z	View
Douglas	Laborers	Riprap Person	$50.62	7B	1M	8Z	View
Douglas	Laborers	Rodder & Spreader	$50.91	7B	1M	8Z	View
Douglas	Laborers	Sand Hogs Under Compressed Air Conditions	$95.15	7B	1M	8Z	View
Douglas	Laborers	Sandblast Tailhoseman	$50.62	7B	1M	8Z	View
Douglas	Laborers	Scaffold Erector, Wood Or Steel	$50.62	7B	1M	8Z	View
Douglas	Laborers	Scaleman	$47.88	7B	1M	8Z	View
Douglas	Laborers	Stake Jumper	$50.62	7B	1M	8Z	View
Douglas	Laborers	Structural Mover	$50.62	7B	1M	8Z	View
Douglas	Laborers	Tailhoseman (water Nozzle)	$50.62	7B	1M	8Z	View
Douglas	Laborers	Timber Bucker & Faller (by Hand)	$50.62	7B	1M	8Z	View
Douglas	Laborers	Track Laborer (rr)	$50.62	7B	1M	8Z	View
Douglas	Laborers	Traffic Control Laborer	$47.88	7B	1M	8Z	View
Douglas	Laborers	Traffic Control Supervisor	$50.62	7B	1M	8Z	View
Douglas	Laborers	Trencher, Shawnee	$50.91	7B	1M	8Z	View

Douglas	Laborers	Trenchless Technology Technician	$51.20	7B	1M	8Z	View
Douglas	Laborers	Truck Loader	$50.62	7B	1M	8Z	View
Douglas	Laborers	Truck Mounted Attenuator	$47.88	7B	1M	8Z	View
Douglas	Laborers	Tugger Operator	$50.91	7B	1M	8Z	View
Douglas	Laborers	Vibrators, All	$51.20	7B	1M	8Z	View
Douglas	Laborers	Wagon Drills	$50.91	7B	1M	8Z	View
Douglas	Laborers	Water Pipe Liner	$50.91	7B	1M	8Z	View
Douglas	Laborers	Welder, Electrical, Manual Or Automatic (hdpe Or Similar Pipe And Liner)	$51.50	7B	1M	8Z	View
Douglas	Laborers	Well-point Person	$50.62	7B	1M	8Z	View
Douglas	Laborers	Wheelbarrow, Power Driven	$50.91	7B	1M	8Z	View
Douglas	Laborers	Window Washer, Cleaner	$47.88	7B	1M	8Z	View
Douglas	Laborers - Underground Sewer & Water	General Laborer & Topman	$51.20	7B	1M	8Z	View
Douglas	Laborers - Underground Sewer & Water	Pipe Layer	$51.20	7B	1M	8Z	View
Douglas	Landscape Construction	Landscape Laborer	$47.88	7B	1M	8Z	View
Douglas	Landscape Construction	Landscape Operator	$75.51	15J	11G	8X	View
Douglas	Landscape Maintenance	Groundskeeper	$15.74		1		View
Douglas	Lathers	Journey Level	$71.53	15J	4C		View
Douglas	Marble Setters	Journey Level	$55.44	5A	1M		View
Douglas	Metal Fabrication (In Shop)	Fitter	$15.74		1		View
Douglas	Metal Fabrication (In Shop)	Laborer	$15.74		1		View
Douglas	Metal Fabrication (In Shop)	Machine Operator	$15.74		1		View
Douglas	Metal Fabrication (In Shop)	Painter	$15.74		1		View
Douglas	Metal Fabrication (In Shop)	Welder	$15.74		1		View
Douglas	Millwright	Journey Level	$73.08	15J	4C		View
Douglas	Modular Buildings	Journey Level	$15.74		1		View
Douglas	Painters	Commercial Painter	$43.01	6Z	1W		View
Douglas	Painters	Industrial Painter	$50.32	6Z	1W	9D	View
Douglas	Pile Driver	Crew Tender	$77.16	15J	4C		View
Douglas	Pile Driver	Journey Level	$71.98	15J	4C		View
Douglas	Plasterers	Journey Level	$53.51	7K	1N		View
Douglas	Playground & Park Equipment Installers	Journey Level	$15.74		1		View
Douglas	Plumbers & Pipefitters	Journey Level	$88.41	6Z	1Q		View
Douglas	Power Equipment Operators	Asphalt Plant Operators	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Assistant Engineer	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Barrier Machine (zipper)	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Batch Plant Operator: concrete	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Boat Operator	$76.79	7A	11H	8X	View
Douglas	Power Equipment Operators	Bobcat	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Brokk - Remote Demolition Equipment	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Brooms	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Bump Cutter	$76.09	15J	11G	8X	View

Douglas	Power Equipment Operators	Cableways	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Chipper	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Compressor	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Concrete Finish Machine - Laser Screed	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Concrete Pump - Mounted Or Trailer High Pressure Line Pump, Pump High Pressure	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Concrete Pump: Truck Mount With Boom Attachment Over 42 M	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Concrete Pump: Truck Mount With Boom Attachment Up To 42m	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Conveyors	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Cranes Friction: 200 tons and over	$79.13	7A	11H	8X	View
Douglas	Power Equipment Operators	Cranes, A-frame: 10 tons and under	$72.22	7A	11H	8X	View
Douglas	Power Equipment Operators	Cranes: 100 tons through 199 tons, or 150' of boom (including jib with attachments)	$77.56	7A	11H	8X	View
Douglas	Power Equipment Operators	Cranes: 20 tons through 44 tons with attachments	$76.11	7A	11H	8X	View
Douglas	Power Equipment Operators	Cranes: 200 tons- 299 tons, or 250' of boom including jib with attachments	$78.36	7A	11H	8X	View
Douglas	Power Equipment Operators	Cranes: 300 tons and over or 300' of boom including jib with attachments	$79.13	7A	11H	8X	View
Douglas	Power Equipment Operators	Cranes: 45 tons through 99 tons, under 150' of boom(including jib with attachments)	$76.79	7A	11H	8X	View
Douglas	Power Equipment Operators	Cranes: Friction cranes through 199 tons	$78.36	7A	11H	8X	View
Douglas	Power Equipment Operators	Cranes: through 19 tons with attachments, a-frame over 10 tons	$75.53	7A	11H	8X	View
Douglas	Power Equipment Operators	Crusher	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Deck Engineer/Deck Winches (power)	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Derricks, On Building Work	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Dozers D-9 & Under	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Drill Oilers: Auger Type, Truck Or Crane Mount	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Drilling Machine	$77.54	15J	11G	8X	View
Douglas	Power Equipment Operators	Elevator and man-lift: permanent and shaft type	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Finishing Machine, Bidwell And Gamaco & Similar Equipment	$76.09	15J	11G	8X	View

Douglas	Power Equipment Operators	Forklift: 3000 lbs and over with attachments	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Forklifts: under 3000 lbs. with attachments	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Grade Engineer: Using Blue Prints, Cut Sheets, Etc	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Gradechecker/Stakeman	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Guardrail Punch	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Hard Tail End Dump Articulating Off- Road Equipment 45 Yards. & Over	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Hard Tail End Dump Articulating Off-road Equipment Under 45 Yards	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Horizontal/Directional Drill Locator	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Horizontal/Directional Drill Operator	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Hydralifts/Boom Trucks Over 10 Tons	$75.53	7A	11H	8X	View
Douglas	Power Equipment Operators	Hydralifts/boom trucks: 10 tons and under	$72.22	7A	11H	8X	View
Douglas	Power Equipment Operators	Leverman	$78.33	15J	11G	8X	View
Douglas	Power Equipment Operators	Loader, Overhead, 6 Yards. But Not Including 8 Yards	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Loaders, Overhead Under 6 Yards	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Loaders, Plant Feed	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Loaders: Elevating Type Belt	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Locomotives, All	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Material Transfer Device	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Mechanics: All (Leadmen - $0.50 per hour over mechanic)	$77.54	15J	11G	8X	View
Douglas	Power Equipment Operators	Motor Patrol Graders	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Mucking Machine, Mole, Tunnel Drill, Boring, Road Header And/or Shield	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Oil Distributors, Blower Distribution & Mulch Seeding Operator	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Outside Hoists (Elevators and Manlifts), Air Tuggers, Strato	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Overhead, bridge type Crane: 20 tons through 44 tons	$76.11	7A	11H	8X	View
Douglas	Power Equipment Operators	Overhead, bridge type: 100 tons and over	$77.56	7A	11H	8X	View
Douglas	Power Equipment Operators	Overhead, bridge type: 45 tons through 99 tons	$76.79	7A	11H	8X	View
Douglas	Power Equipment Operators	Pavement Breaker	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Pile Driver (other Than Crane Mount)	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Plant Oiler - Asphalt, Crusher	$75.51	15J	11G	8X	View

Douglas	Power Equipment Operators	Posthole Digger, Mechanical	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Power Plant	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Pumps - Water	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Quad 9, Hd 41, D10 And Over	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Quick Tower: no cab, under 100 feet in height base to boom	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Remote Control Operator On Rubber Tired Earth Moving Equipment	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Rigger and Bellman	$72.22	7A	11H	8X	View
Douglas	Power Equipment Operators	Rigger/Signal Person, Bellman(Certified)	$75.53	7A	11H	8X	View
Douglas	Power Equipment Operators	Rollagon	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Roller, Other Than Plant Mix	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Roller, Plant Mix Or Multi-lift Materials	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Roto-mill, Roto-grinder	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Saws - Concrete	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Scraper, Self Propelled Under 45 Yards	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Scrapers - Concrete & Carry All	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Scrapers, Self-propelled: 45 Yards And Over	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Service Engineers: Equipment	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Shotcrete/Gunite Equipment	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Shovel, Excavator, Backhoe, Tractors Under 15 Metric Tons	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Shovel, Excavator, Backhoe: Over 30 Metric Tons To 50 Metric Tons	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Shovel, Excavator, Backhoes, Tractors: 15 To 30 Metric Tons	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Shovel, Excavator, Backhoes: Over 50 Metric Tons To 90 Metric Tons	$77.54	15J	11G	8X	View
Douglas	Power Equipment Operators	Shovel, Excavator, Backhoes: Over 90 Metric Tons	$78.33	15J	11G	8X	View
Douglas	Power Equipment Operators	Slipform Pavers	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Spreader, Topsider & Screedman	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Subgrader Trimmer	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Tower Bucket Elevators	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Tower Crane: over 175' through 250' in height, base to boom	$78.36	7A	11H	8X	View
Douglas	Power Equipment Operators	Tower crane: up to 175' in height base to boom	$77.56	7A	11H	8X	View
Douglas	Power Equipment Operators	Tower Cranes: over 250' in height from base to boom	$79.13	7A	11H	8X	View
Douglas	Power Equipment Operators	Transporters, All Track Or Truck Type	$76.77	15J	11G	8X	View

Douglas	Power Equipment Operators	Trenching Machines	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators	Truck Crane Oiler/Driver: 100 tons and over	$76.11	7A	11H	8X	View
Douglas	Power Equipment Operators	Truck crane oiler/driver: under 100 tons	$75.53	7A	11H	8X	View
Douglas	Power Equipment Operators	Truck Mount Portable Conveyor	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Vac Truck (Vactor Guzzler, Hydro Excavator)	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators	Welder	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators	Wheel Tractors, Farmall Type	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators	Yo Yo Pay Dozer	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Asphalt Plant Operators	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Assistant Engineer	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Barrier Machine (zipper)	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Batch Plant Operator, Concrete	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Boat Operator	$76.79	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Bobcat	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Brokk - Remote Demolition Equipment	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Brooms	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Bump Cutter	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Cableways	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Chipper	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Compressor	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Concrete Finish Machine - Laser Screed	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Concrete Pump - Mounted Or Trailer High Pressure Line Pump, Pump High Pressure	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Concrete Pump: Truck Mount With Boom Attachment Over 42 M	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Concrete Pump: Truck Mount With Boom Attachment Up To 42m	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Conveyors	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Cranes Friction: 200 tons and over	$79.13	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Cranes, A-frame: 10 tons and under	$72.22	7A	11H	8X	View

Douglas	Power Equipment Operators-Underground Sewer & Water	Cranes: 100 tons through 199 tons, or 150' of boom (including jib with attachments)	$77.56	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Cranes: 20 tons through 44 tons with attachments	$76.11	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Cranes: 20 tons through 44 tons with attachments	$76.11	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Cranes: 200 tons- 299 tons, or 250' of boom including jib with attachments	$78.36	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Cranes: 300 tons and over or 300' of boom including jib with attachments	$79.13	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Cranes: 45 tons through 99 tons, under 150' of boom(including jib with attachments)	$76.79	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Cranes: Friction cranes through 199 tons	$78.36	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Cranes: through 19 tons with attachments, a-frame over 10 tons	$75.53	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Crusher	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Deck Engineer/Deck Winches (power)	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Derricks, On Building Work	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Dozers D-9 & Under	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Drill Oilers: Auger Type, Truck Or Crane Mount	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Drilling Machine	$77.54	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Elevator and man-lift: permanent and shaft type	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Finishing Machine, Bidwell And Gamaco & Similar Equipment	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Forklift: 3000 lbs and over with attachments	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Forklifts: under 3000 lbs. with attachments	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Grade Engineer: Using Blue Prints, Cut Sheets, Etc	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Gradechecker/Stakeman	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Guardrail Punch	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Hard Tail End Dump Articulating Off- Road Equipment 45 Yards. & Over	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Hard Tail End Dump Articulating Off-road	$76.09	15J	11G	8X	View

		Equipment Under 45 Yards					
Douglas	Power Equipment Operators-Underground Sewer & Water	Horizontal/Directional Drill Locator	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Horizontal/Directional Drill Operator	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Hydralifts/boom trucks: 10 tons and under	$72.22	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Hydralifts/boom trucks: over 10 tons	$75.53	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Leverman	$78.33	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Loader, Overhead, 6 Yards. But Not Including 8 Yards	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Loaders, Overhead Under 6 Yards	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Loaders, Plant Feed	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Loaders: Elevating Type Belt	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Locomotives, All	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Material Transfer Device	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Mechanics: All (Leadmen - $0.50 per hour over mechanic)	$77.54	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Motor Patrol Graders	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Mucking Machine, Mole, Tunnel Drill, Boring, Road Header And/or Shield	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Oil Distributors, Blower Distribution & Mulch Seeding Operator	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Outside Hoists (Elevators and Manlifts), Air Tuggers, Strato	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Overhead, bridge type Crane: 20 tons through 44 tons	$76.11	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Overhead, bridge type: 100 tons and over	$77.56	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Overhead, bridge type: 45 tons through 99 tons	$76.79	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Pavement Breaker	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Pile Driver (other Than Crane Mount)	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Plant Oiler - Asphalt, Crusher	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Posthole Digger, Mechanical	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Power Plant	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Pumps - Water	$72.20	15J	11G	8X	View

Douglas	Power Equipment Operators-Underground Sewer & Water	Quad 9, Hd 41, D10 And Over	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Quick Tower: no cab, under 100 feet in height base to boom	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Remote Control Operator On Rubber Tired Earth Moving Equipment	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Rigger and Bellman	$72.22	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Rigger/Signal Person, Bellman(Certified)	$75.53	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Rollagon	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Roller, Other Than Plant Mix	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Roller, Plant Mix Or Multi-lift Materials	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Roto-mill, Roto-grinder	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Saws - Concrete	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Scraper, Self Propelled Under 45 Yards	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Scrapers - Concrete & Carry All	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Scrapers, Self-propelled: 45 Yards And Over	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Shotcrete/Gunite Equipment	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoe, Tractors Under 15 Metric Tons	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoe: Over 30 Metric Tons To 50 Metric Tons	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoes, Tractors: 15 To 30 Metric Tons	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoes: Over 50 Metric Tons To 90 Metric Tons	$77.54	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoes: Over 90 Metric Tons	$78.33	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Slipform Pavers	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Spreader, Topsider & Screedman	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Subgrader Trimmer	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Tower Bucket Elevators	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Tower Crane: over 175' through 250' in height, base to boom	$78.36	7A	11H	8X	View

Douglas	Power Equipment Operators-Underground Sewer & Water	Tower crane: up to 175' in height base to boom	$77.56	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Tower Cranes: over 250' in height from base to boom	$79.13	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Transporters, All Track Or Truck Type	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Trenching Machines	$75.51	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Truck Crane Oiler/Driver: 100 tons and over	$76.11	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Truck Crane Oiler/Driver: 100 tons and over	$76.11	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Truck crane oiler/driver: under 100 tons	$75.53	7A	11H	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Truck Mount Portable Conveyor	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Vac Truck (Vactor Guzzler, Hydro Excavator)	$76.09	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Welder	$76.77	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Wheel Tractors, Farmall Type	$72.20	15J	11G	8X	View
Douglas	Power Equipment Operators-Underground Sewer & Water	Yo Yo Pay Dozer	$76.09	15J	11G	8X	View
Douglas	Power Line Clearance Tree Trimmers	Journey Level In Charge	$57.22	5A	4A		View
Douglas	Power Line Clearance Tree Trimmers	Spray Person	$54.32	5A	4A		View
Douglas	Power Line Clearance Tree Trimmers	Tree Equipment Operator	$57.22	5A	4A		View
Douglas	Power Line Clearance Tree Trimmers	Tree Trimmer	$51.18	5A	4A		View
Douglas	Power Line Clearance Tree Trimmers	Tree Trimmer Groundperson	$38.99	5A	4A		View
Douglas	Refrigeration & Air Conditioning Mechanics	Journey Level	$88.41	6Z	1Q		View
Douglas	Residential Brick Mason	Journey Level	$34.97		1		View
Douglas	Residential Carpenters	Journey Level	$23.10		1		View
Douglas	Residential Cement Masons	Journey Level	$20.67		1		View
Douglas	Residential Drywall Applicators	Journey Level	$24.77		1		View
Douglas	Residential Drywall Tapers	Journey Level	$15.74		1		View
Douglas	Residential Electricians	Journey Level	$44.85	7F	1D		View
Douglas	Residential Glaziers	Journey Level	$16.50		1		View
Douglas	Residential Insulation Applicators	Journey Level	$15.74		1		View
Douglas	Residential Laborers	Journey Level	$20.46		1		View
Douglas	Residential Marble Setters	Journey Level	$34.97		1		View
Douglas	Residential Painters	Journey Level	$15.74		1		View
Douglas	Residential Plumbers & Pipefitters	Journey Level	$21.92		1		View

Douglas	Residential Refrigeration & Air Conditioning Mechanics	Journey Level	$17.25		1		View
Douglas	Residential Sheet Metal Workers	Journey Level (Field or Shop)	$65.36	5I	1B		View
Douglas	Residential Soft Floor Layers	Journey Level	$20.40		1		View
Douglas	Residential Sprinkler Fitters (Fire Protection)	Journey Level	$16.15		1		View
Douglas	Residential Stone Masons	Journey Level	$34.97		1		View
Douglas	Residential Terrazzo Workers	Journey Level	$15.74		1		View
Douglas	Residential Terrazzo/Tile Finishers	Journey Level	$22.48		1		View
Douglas	Residential Tile Setters	Journey Level	$15.74		1		View
Douglas	Roofers	Journey Level	$44.79	5I	1R		View
Douglas	Roofers	Using Irritable Bituminous Materials	$46.79	5I	1R		View
Douglas	Sheet Metal Workers	Journey Level (Field or Shop)	$65.36	6Z	1B		View
Douglas	Sign Makers & Installers (Electrical)	Journey Level	$88.45	7F	1E		View
Douglas	Sign Makers & Installers (Non-Electrical)	Journey Level	$16.14		1		View
Douglas	Soft Floor Layers	Journey Level	$55.76	5A	3J		View
Douglas	Solar Controls For Windows	Journey Level	$15.74		1		View
Douglas	Sprinkler Fitters (Fire Protection)	Journey Level	$65.00	7J	1R		View
Douglas	Stage Rigging Mechanics (Non Structural)	Journey Level	$15.74		1		View
Douglas	Stone Masons	Journey Level	$55.44	5A	1M		View
Douglas	Street And Parking Lot Sweeper Workers	Journey Level	$15.74		1		View
Douglas	Surveyors	Assistant Construction Site Surveyor	$75.53	7A	11H	8X	View
Douglas	Surveyors	Chainman	$72.22	7A	11H	8X	View
Douglas	Surveyors	Construction Site Surveyor	$76.79	7A	11H	8X	View
Douglas	Surveyors	Drone Operator (when used in conjunction with survey work only)	$72.22	7A	11H	8X	View
Douglas	Surveyors	Ground Penetrating Radar Operator	$72.22	7A	11H	8X	View
Douglas	Telecommunication Technicians	Telecom Technician Journey Level	$51.68	5B	1B		View
Douglas	Telephone Line Construction - Outside	Cable Splicer	$39.15	5A	2B		View
Douglas	Telephone Line Construction - Outside	Hole Digger/Ground Person	$26.29	5A	2B		View
Douglas	Telephone Line Construction - Outside	Telephone Equipment Operator (Light)	$32.72	5A	2B		View
Douglas	Telephone Line Construction - Outside	Telephone Lineperson	$37.00	5A	2B		View
Douglas	Terrazzo Workers	Journey Level	$43.81	5A	1M		View
Douglas	Tile Setters	Journey Level	$43.81	5A	1M		View
Douglas	Tile, Marble & Terrazzo Finishers	Journey Level	$35.93	5A	1M		View

Douglas	Traffic Control Stripers	Journey Level	$51.90	7A	1K		View
Douglas	Truck Drivers	Asphalt Mix Over 20 Yards	$57.60	5D	1V	8M	View
Douglas	Truck Drivers	Asphalt Mix To 20 Yards	$57.40	5D	1V	8M	View
Douglas	Truck Drivers	Dump Truck	$57.40	5D	1V	8M	View
Douglas	Truck Drivers	Dump Truck & Trailer	$57.60	5D	1V	8M	View
Douglas	Truck Drivers	Other Trucks	$57.29	5D	1V	8M	View
Douglas	Truck Drivers - Ready Mix	Transit Mixers 20 yards and under	$57.60	5D	1V	8M	View
Douglas	Truck Drivers - Ready Mix	Transit Mixers over 20 yards	$57.94	5D	1V	8M	View
Douglas	Well Drillers & Irrigation Pump Installers	Irrigation Pump Installer	$15.74		1		View
Douglas	Well Drillers & Irrigation Pump Installers	Oiler	$15.74		1		View
Douglas	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.

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.

Overtime Codes Continued

1. 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.

   O. All hours worked on Sundays and holidays shall be paid at one and one-half times 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.

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.

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).

Overtime Codes Continued

4. V. Work performed in excess of ten (10) hours of straight time per day when four ten (10) hour shifts are established or outside the normal shift (5 am to 6pm), and all work on Saturdays, except for make-up days shall be paid at time and one-half (1 ½) the straight time rate.

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.

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.

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.

Overtime Codes Continued

11. 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.

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.

Overtime Codes Continued

11. 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.

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.

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).

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).

Holiday Codes Continued

6. 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.

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.

   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.

Holiday Codes Continued

7. 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.

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, 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.

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.

Note Codes Continued

8. 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.

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.

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.

Note Codes Continued

9.	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 bi weekly once construction has begun and as required leading up to construction.

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. 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.

B. 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.

C. 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.

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. Updates:

1. The Contractor is required to prepare and submit an updated Progress (Bar Chart) Schedule as agreed upon at the Pre-construction Meeting.

2. The Contractor and Owner’s Designated Representative will review the updated schedule and will discuss any differences or issues raised. Decisions made and agreed to by all parties are binding. However, no contracted completion dates will be modified except by an approved Contract Change Proposal and subsequent Change Order.

3. Timely submission of updates is of significant and crucial importance to the management of this Project. Lack of or late receipt of updates diminishes their value to the Project. Therefore, at the Owner’s Designated Representative discretion, partial payment may be withheld for a late update as may be determined by the Owner’s Designated Representative in consideration of the value of the update at the time of receipt, the circumstances of the late submittal, and the level of progress achieved on the Project.

C. 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.

D. 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.

E. 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 7 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. SWPP (Storm Water Pollution Prevention Plan)
11. Demolition Plan
12. Traffic Control Plan
13. 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 Douglas County Building Department, 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 Douglas County Building Department 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 Douglas County 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 Douglas County Building Department 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. Contractor shall provide temporary restroom facilities. Facilities shall not directly or indirectly drain or discharge onto Owner property or any waters of the State. Place where directed at the time Work begins; maintain in sanitary condition. Remove upon completion of the Work and disinfect the premises.

B. Use of permanent and/or existing Owner’s facilities is not allowed.

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. Contractor 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. Contractor will provide and service containers for all wastes.

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. 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 #3300, General Campus - Wenatchee

WSU Sunrise Orchard Irrigation Line and Pond

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

SECTION 02 22 00 - EARTHWORK

PART 1 –GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract, and Special Conditions apply to this Section.

1.2 DESCRIPTION

A. Provide all earthwork, including excavating, filling, grading, backfilling, erosion control measures, etc., required for this Work as indicated on the Drawings, specified herein and as required to provide a complete and finished Project.

B. Unit Prices, which are included in the Agreement Form, apply only to changes in the Work which may require importing of additional material, additional off-site disposal of material, removal of 'rock', and other additional work, and have no bearing on the basic work of the Contract including Alternates, as indicated on the Drawings and specified herein.

1.3 QUALITY ASSURANCE

A. Safety Codes and Standards: Perform all earthwork in compliance with applicable requirements of governing authorities having jurisdiction, including the applicable Rules and Regulations of OSHA 1518, Safety and Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations and of OSHA Part 1910, Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations, and the Regulations of Washington Industrial Safety and Health Act.

B. Pre-Contract Soils Investigation:

1. Pre-Contract soils sampling and analysis has not been performed at the Project site. Engineer cannot, and do not, guarantee that soils composition will be uniform throughout the site.
2. Contractor shall anticipate and make allowance for an average and reasonable amount of variation from the typical soils types in the area of the work. Contractor (bidders) shall familiarize himself with the site as fully as practicable. Claims for unforeseeable additional cost of earthwork will only be considered if Contractor encounters rock or soils substantially and extensively different and more difficult than those reasonably anticipated in the area.

C. Tests and Inspections: An Independent Special Inspector will perform tests and inspections of work under this Section. Costs associated with tests shall be included in project costs. Relative compactions will be determined as specified under ASTM-D1557, or similar approved standard. Contractor shall cooperate in all respects to allow and assist in testing.

D. Layout:

1. The contractor shall provide all field layout for the proposed work in accordance with the following:

    a) The Contractor shall be responsible for the setting of all construction staking and installation and or resetting of monuments as required by Washington state laws.

2. If any discrepancies are found between the Drawings and actual conditions at the site, Engineer reserves the right to make minor adjustments in the work as necessary to accomplish the intent of the Contract Documents without increased cost to WSU.

E. Contamination: No work of this Section shall allow excavated material to flow into existing creeks, rivers, lakes, ground waters, storm systems and cause contamination of same. Contractor shall develop a containment plan, acceptable to the Code Enforcement Authority having jurisdiction, for use in performing this work.

1.4 SUBMITTALS

Safety Codes and Standards: Perform all earthwork in compliance with applicable requirements of governing authorities having jurisdiction.

A. Imported Soil Samples: Submit samples of all imported materials (including coarse drainage rock, imported structural fill, top soil) to Engineer for approval at least seven days prior to scheduled start of use. The Contractor shall provide material test results from a certified testing laboratory as part of the submittal. Certify to Engineer that all materials of each type used in the Work is true to approved type sample.

1.5 JOB CONDITIONS

A. Existing Utilities: Although the Drawings endeavor to show all known existing underground or concealed utilities in the area of work, they do not purport to show all utilities. If existing utilities not shown on Drawings are encountered, support, shore up, protect same and immediately notify the Engineer. Allow access opportunity and ample time for measures necessary, for continuance and/or relocation of such services, if required.

B. Inspection: Examine the areas and conditions under which excavating, filling and grading are to be performed. Should any discrepancies between Drawings and Specifications and actual site conditions be encountered, consult Engineer before commencement of work.

C. Erosion and Water Quality Control:

1. Precautions shall be taken during the entire construction period to minimize wind and water erosion. Bare earth shall be kept moist to prevent wind erosion. Contractor is warned that wind is a problem in the area of construction and he must have means and methods covered in his bid to perform sprinkling to control dust. Bare earth shall be seeded or mulched well in advance of winter rainy season and/or freezing weather. Means and methods (Best Management Practices as defined by DOE) shall be provided by the Contractor to prevent sediment laden runoff from entering the adjacent properties, roads, or waterways.
2. Accidental spills of petroleum products, solvents, toxic chemicals fertilizers and construction materials shall be cleaned up immediately. Wash water, chemical and petroleum wastes shall be contained and prevented from entering ground water or runoff into waterways and shall be properly disposed of offsite.

D. Protection of Persons and Property

1. Refer to General Conditions.
2. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
3. Refer to various other sections of this specification for additional specific requirements for capping, temporary re-routing, etc., of existing on-site utilities, irrigation lines, etc.
4. Protect structures (new and existing), utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout and any other hazards created by earthwork operations.
5. All excavation or trenches near or under in-place footings or other improvements shall be cut

in such manner so as not to undermine or reduce bearing for such improvements. All backfilling of such trenches shall be compacted to 95% maximum density, as specified, without disturbing bearing for, or integrity of, adjacent footings or improvements.

6. Provide traffic control by a licensed flagger for all work adjacent to roadways unless traffic control plan is submitted and approved by Engineer.

E. Cutting Pavement: Existing pavement surfaces shall be sawcut only to minimum width which will permit proper excavation and bracing of trench. Exact locations of cuts shall be approved by the Engineer in the field.

F. Replacing Pavements, Sidewalks and Curbs

1. All existing roads, curbs or other paved or surfaced areas which are to remain shall be restored to their original condition, as nearly as practical.
2. All replacement of surfaced areas shall be to the approval of the Engineer.
3. If any pavement or surface area not immediately over or adjacent to a trench is disturbed or damaged as a result of operation of the Contractor, adequate repairs, as approved, shall be made by Contractor at his own expense.

G. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place against unnecessary cutting, creaking or skinning of roots, skinning and bruising of bark, etc. Refer to Special Conditions for specific requirements for protection, replacements.

H. Pumping and Drainage

1. Keep all excavations, pits, trenches, footings, etc., entirely free from water from any source during construction. Use suitable pumping equipment or other means as required by conditions. Continue pumping as necessary until completion of Project or until released by Engineer.
2. When operations are interrupted by unfavorable weather conditions, prepare areas by grading and compacting to avoid ponding and erosion.

I. Cleaning and Surplus Material Cleaning and Surplus Material

1. Conduct work in an orderly manner and so as not to create nuisance. Dirt shall not be permitted to accumulate on streets or sidewalks or to be washed into sewers or drainage systems.
2. Remove from the site and legally dispose of all debris and excavated material not approved for fills, including oversize rock. No rubbish or debris shall be buried on the site.

J. Unique Requirements of Operation: All pond berms and retaining walls must rest on existing undisturbed dense lower soils, level and true, or if over-excavation occurs, on approved concrete fill of over-excavated area.

K. Explosives: Do not bring explosives on site or use in work without prior written permission from authorities having jurisdiction. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.

PART 2 – PRODUCTS

2.1 On-Site Backfill and Fill Materials: Approved on-site soil materials which are free of debris, waste, frozen materials, vegetable, plant life and deleterious matter.

2.2 Imported Fill: Clean, well-draining sand and gravel meeting the following requirements:

1. Granular mineral soil containing not more than 2% organic matter with granular content of 100% passing 3-1/2" mesh and not more than 10% passing #200 sieve.

2.3 Subbase: a granular sand or gravel with less than 5% fines such as per WSDOT Section 9-03.12(2). WSDOT 9-03.9(3) base course is also acceptable.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavation consists of removal and disposal of material encountered when establishing required grade elevations and trench pipe cover and bedding requirements , and includes removal and disposal of material of any classification.

B. Unauthorized excavation consists of removal of materials beyond indicated sub-grade elevations or dimensions without specific direction of the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at the Contractor's expense.

C. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by the Engineer.

D. Rock Excavation:

1. Material to be excavated on this Project is assumed to be earth, dense earth, weathered rock, and other materials that can be removed by bulldozer with ripper, pneumatic hammer, power shovel, or other normal equipment to excavation work (but not requiring the use of explosives or drills), except for concrete items as may be encountered in demolition. If rock, as herein defined, is encountered within the limits of excavation, the Contract amount will be adjusted by Change Order. When the rock is encountered, the Contractor shall immediately notify the Engineer and shall not proceed further until instructions are given and measurements made for the purpose of establishing volume of rock excavation. The District may adjust the grades should excessive rock be encountered in lieu of removing the rock.
2. Rock is defined as stone or hard shale in original ledge, or boulders, concrete or masonry masses over 2 cubic yards in volume, and (all of) which cannot be broken and removed by normal job equipment as described above without the use of explosives or drills. This classification does not include materials such as soft rock, concrete or other materials that can be removed by means other than drilling and blasting or drilling and wedging, but which for reasons of economy in excavating, the Contractor prefers to remove by drilling and blasting.
3. Payment for rock excavation, as defined above, shall be at a negotiated unit price per cubic yard.

E. Additional Excavation

1. When excavation has reached required sub-grade elevations, notify the Engineer and Special Inspector who will make inspections of conditions.
2. If localized areas of unsuitable bearing materials other than those identified on the Drawings, or other unsuitable conditions not reasonably anticipated from the soils reports and other information contained in the Contract Documents are encountered at the specified sub-grade elevations, the Engineer will authorize the Contractor to carry excavations deeper and replace the excavated material as directed.
3. Removal of such additional unsuitable material, and its replacement as directed, will be paid for on the basis of unit bid prices and/or Contract Conditions pertaining to changes in the

Work.

F. Topsoil Stripping: At areas containing existing topsoil approved for reuse in the Work, where excavations and/or grading is scheduled, strip topsoil to an average depth of 8" after removal of brush, weeds, sod, etc., and stockpile on site at locations not to interfere with Project construction.

G. Stability of Excavations:

1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
3. All excavation which will in any manner affect the bearing capacity of the soil foundation presently supporting retaining walls, pavements, pipe beds, etc. shall be performed so as not to disturb existing soils to remain. Do not undermine or weaken bearing of existing structures foundations, or pavements to remain, except where temporary removal of such bearing is an indicated part of the Work, and then only with adequate provision of temporary support and permanent restoration of bearing.

H. Shoring and Bracing

1. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.
2. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.
3. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

I. Dewatering:

1. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.
2. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms and soil changes detrimental to stability of sub-grades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
3. Convey water removed from excavations and rain water to collecting or run-off areas. Establish and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use trench excavations as temporary ditches.

J. Excavated Materials

1. Excavated material suitable for filling shall be transported to the proper location for placing or materials shall be stockpiled on the property at separate location from approved topsoil stockpiles until required for backfill and/or fill. Place, grade and shape stockpiles for proper drainage.
2. Excavated material, such as boulders, not suitable for filling, shall be removed and disposed of off the property. Generally, cobbles and boulders larger than 8" in diameter shall not be included in compacted fills.
3. Locate and retain excavated materials away from edge of excavations while performing work in and around excavations.

K. Excavation for Pavements: Excavation sub-grade under pavements to comply with cross-sections, elevations and grades as shown.

L. Excavation for Trenches: Dig trenches to the uniform width required for the particular item to be installed, sufficiently wide to provide ample working room, and minimum 12" each side of items to be buried.

M. Cold Weather Protection: Protect excavations against freezing when atmospheric temperature is less than 35 degrees F. Remove or recompact frozen and/or thawed portions as required before backfilling or installation of materials.

3.2 FILLING

A. Ground Surface Preparation

1. Remove vegetation, brush, debris, unsatisfactory soil materials, obstructions and deleterious materials from ground surface prior to placement of fills.
2. When existing ground surface to receive fill has a density less than that specified under "Compaction" for the particular area classification, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to specified percentage of maximum density to a minimum depth of 6".
3. Do not bury construction debris. Remove such from site.

B. Placement and Compaction

1. Place backfill and fill materials in layers not more than 6" loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers.
2. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to required percentage of maximum density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen or contain frost or ice.
3. Place backfill and fill materials evenly adjacent to structures, to required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately the same elevation in each lift.
4. Compact with extreme care against retaining walls so as not to damage or weaken walls due to excessive pressure or vibration.

D. Compaction: Control compaction during construction so that material is compacted to not less than the following percentage densities and according to the following standards, as applicable to the scheduled soil types:

1. ON-SITE NATURAL SOILS – in accordance with ASTM D-1557 modified proctor, unless otherwise directed by Engineer.
   a. Under Exterior Slabs and Walkways: Compact top 6" of sub-grade and each layer of backfill or fill material to 95% maximum density.
2. IMPORTED (GRADED) GRANULAR MATERIAL – in accordance with ASTM D-1557, unless otherwise directed by Engineer.
   a. Under Exterior Slabs and Walkways: Compact top 6" of sub-grade and each layer of backfill or fill material to 95% maximum density.
3. IMPORTED COARSE GRANULAR MATERIAL – in accordance with ASTM D4253-54 not conforming to the above standards for proctor test methods:
   a. Under Exterior Walkways: Compact top 6" of sub-grade and each layer of backfill or fill material to 70% relative density.
4. Cobbles and boulders larger than 8" in diameter and broken inorganic rubble shall not be placed in compacted fills.

F Topsoil fill shall be placed as shown on Drawings.

1. Prior to placement/spreading of topsoil, any sub-grade surface that has become compacted or densified in the course of construction, shall be thoroughly tilled and scarified as may be necessary to avoid stratification of soils and ensure consistent sub-surface drainage.

G. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Inspection, testing, approval, and recording locations of underground utilities.
2. Removal of shoring and bracing, and backfilling of voids with satisfactory materials.
3. Removal of trash and debris.
4. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

H. Trench Backfilling: Shall conform to all applicable requirements of this Section and WSDOT Standard Specifications, as well as any additional requirements stipulated in sections covering work of trade for which trenching is required.

I. Construct berms and backfill in accordance with the liner manufacturer's requirements and recommendations.

3.3 GRADING

A. Grading

1. Uniformly grade areas within limits of Project, including perimeter transition areas, to achieve finish grade shown on Drawings and merge properly with existing grades to remain.
2. Smooth finished surface within specified tolerances, with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
3. Grade areas to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:
    a. Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10' above or below the required sub-grade elevations. Bring sub-grades in planting areas to elevations required to allow placement of 2" organic amendment in addition to topsoil.
    b. Pond: Shape surface grades and cross-section, with finish surface not more than 0.10' above or below the required sub-grade elevation. pond shall slope to drain as approved by Engineer.
    c. Roads: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 1/2" above or below the required sub-grade elevation.
    d. Compact sub-grade surfaces to the depth and percentage of maximum density for each area as specified herein before.

B. Proofing/Preparation at Non-Fill Areas: Non-fill areas to receive improvements shall be cleaned up, improved and maintained as required to achieve uniform sub-grade conditions essentially equivalent to those specified above under 'Compacted Filling', prior to placements of any improvements. Compact and proof roll all sub-grade surfaces; excavate and fill (or dry out) any soft, spongy areas; remove all organic or extraneous matter on or near the surface; all as required and approved by the Engineer or Special Inspector. Maintain surface and sub-grade in proper condition until improvements are in place.

C. Finish Grading:

1. Grade and rake all Trench and site finished surfaces smooth and free of debris and weeds to uniform slope and surfaces. Remove all surface rock over 1-1/2" largest dimension.
2. Machine dressing shall be supplemented by hand work to meet requirements outlined hereto

the satisfaction of the Engineer.

3. Upon completion of the cleaning and dressing, the Project shall appear uniform in all respects. All graded areas shall drain properly, be true to line and grade as indicated on the Drawings.

D. Maintenance:

1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Sprinkling of the finish surface with water may be required to control wind erosion of the graded area.
2. Repair and re-establish grades in settled, eroded and rutted areas to specified tolerances.
3. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

3.4 EROSION CONTROL

A. Installation

1. Install wattles and silt fence as per manufactures instructions to lines and grades as shown in the plans.

END OF SECTION 02 22 00

SECTION 02 41 00 – DEMOLITION

PART 1 –GENERAL

1.1 SUMMARY

A. Section includes: Requirements for demolition and/or removal work but does not include abatement of asbestos, PCBs, and other hazardous materials.

B. Related Sections:
1. Section 31 20 00 “Earthwork”

1.2 REFERENCE

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

B. Code of Federal Regulations (CFR):
1. 29 CFR 1910: Occupational Safety and Health Standards
2. 29 CFR 1926: Occupational Safety and Health Regulations for Construction

C. Washington State Department of Labor and Industries:
1. WAC 296-24: General Safety and Health Standards Construction.

1.3 GENERAL REQUIREMENTS

A. Do not begin demolition until authorization is received from the Engineer. Remove rubbish and debris from the project site daily. Store materials than cannot be removed daily in areas specified by owner.

B. All demolition materials are the responsibility of the Contractor unless noted on the approved plans. Demolition materials shall be disposed of at an approved facility.

C. All items and utilities that are not scheduled for removal shall be protected.

1.4 REGULATORY REQUIREMENTS

A. Comply with federal, state, and local hauling and disposal regulations.

B. Perform all excavation work in accordance with all applicable requirements of governing authorities and applicable rules and regulations of 29 CFR 1926, 29 CFR 1929 and WAC 296-24.

1.5 DELIVERY AND STORAGE

A. The Owner reserves the right to salvage certain construction materials, fixtures, or other existing items of value (as may be encountered). Items selected by the Owner for salvage under the Contract shall be removed with particular care and delivered to storage location as designated by Owner. Materials not claimed by the Owner for salvage, scheduled to be reused or to remain as part of the Work, shall become the property of the Contractor, and shall be removed promptly from the site.

1.6 DUST AND DEBRIS CONTROL

A. Prevent the spread of dust and debris to occupied portions of the building, on pavements, and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Sweep pavements as often as necessary to control the spread of debris.

1.7 PROTECTION

A. Traffic Control Signs: Where pedestrian, and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Anchor barricades in a manner to prevent displacement. Notify the Owner prior to beginning such work.

B. Existing Work: Protect existing work, which is to remain in place, be reused, or remain the property of the Owner. Repair items, which are to remain and which are damaged during performance of the work to their original condition, or replace with new. Do not overload structural elements or pavements to remain. Provide new supports and reinforcement for existing construction weakened by demolition or removal work. Repairs, reinforcement, or structural replacement must have Owner approval.

C. Facilities: Protect utility services. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections to utilities.

D. Pre-demolition Photographs: Before commencement of demolition, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by the Engineer or designee.
   1. Flag construction limits before taking construction photographs.
   2. Take no fewer than 20 photographs to show existing conditions adjacent to property before starting the Work.
   3. Take no fewer than 20 photographs of existing utilities and buildings either on or adjoining property to accurately record physical conditions at start of construction.
   4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

1.8 RELOCATIONS

A. Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair items to be relocated, which are damaged or replace damaged items with new undamaged items as approved by the Owner.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

A. Contact the Utility Notification Center at 811 or 800-424-5555 for utility location at or near public right-of-ways. The contractor shall pay for fees and cost associated with utility discounts, capping of line and meter removal within the Public Right-of-Way. Do not shut off or cap utilities without 48 hours notice.

B. Structures: Remove indicated existing structures and foundations.

C. Utilities and Related Equipment: Remove existing utilities as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Owner. If utility lines are encountered that are not shown on drawings, contact the Owner for further instructions.

D. Paving and Slabs: Provide neat sawcuts at limits of pavement removal as indicated. Remove sawcut concrete and asphaltic concrete paving and slabs as indicated.

E. Existing site and offsite storm drains and catch basins as shown on the approved plans or otherwise noted in the field, shall be kept operational at all times. Protect as shown on the Approved Plans or as needed to prevent clogging and sedimentation.

3.2 FILLING

A. Fill holes and other hazardous openings in accordance with Section 31 20 00, “Earthwork.”

B. Irrigation System: Locate all existing heads and irrigation lines within the limits of the Work. Protect or repair damaged portions of the irrigation system.

3.3 DISPOSITION OF MATERIALS

A. Title to Materials: Except where specified in other sections, all materials and equipment removed, and not reused, shall become the property of the Contractor and shall be legally removed from property. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon approval by the Owner of the Contractor’s demolition and removal procedures, and authorization by the Owner to begin demolition. The Owner will not be responsible for the condition or loss of, or damage to, such property after contract award. Materials and equipment shall not be viewed by prospective purchasers or sold on the site.

3.4 CLEANUP

A. Debris and Rubbish: Remove and transport debris and rubbish in a manner that will prevent spillage on pavements, streets, or adjacent areas. Clean up spillage from pavements, streets, and adjacent areas.

END OF SECTION 02 41 00

SECTION 02 80 00 - LANDSCAPE RESTORATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work included in this section consists of replacing and restoring all existing easement and other lands damaged directly, or indirectly, by the Contractor's operations and includes seeding, topsoil, sod, shrubs, trees and other items as required by these Specifications or indicated on the Drawings. It also includes the installation of new materials, as indicated on the Drawings.

B. Special provisions, requirements, and/or revisions to this Specification may be included in the DNR easement document, and/or on the Drawings or Details.

1.2 QUALITY ASSURANCE

A. For actual installation of seeding, sod and other landscape work, utilize personnel who are thoroughly experienced with materials and methods required. All material shall conform to federal, state and local laws.

1.3 SUBMITTALS

A. Submittals shall conform to Section 01 of the Specifications and shall include:

1. Seeding: Copies of certificates of inspection which include variety, purity and germination. Test shall have been performed within six months.

1.4 JOB CONDITIONS

A. Proceed with and complete restoration work as rapidly as portions of site become available, working within seasonal limitations for each kind of work required.

1.5 SPECIAL WARRANTY

A. Warranty any seeding, hydroseed, sod, trees, and shrubs for a period of one year after date of Substantial Completion against defects, including death and unsatisfactory growth, except for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents that are beyond Contractor's control. Remove and replace items found to be dead or in unhealthy condition during warranty period. Make replacements during growth season following end of warranty period. Replace items that are in doubtful condition at end of warranty period, unless, in opinion of Engineer, it is advisable to extend warrant period for a full growing season.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. Topsoil for restoration work shall be friable, free-draining sandy loam, or loamy sand free of materials which are prohibitive to plant growth, such as excessive salinity, alkalinity, or concentration of lead or arsenic. Obtain topsoil from local sources or from areas having similar soil characteristics to that found at project site. Obtain topsoil only from naturally well-drained sites where topsoil occurs in depths of not less than 4"; do not obtain from bogs or marshes.

2.2 SEED

A. Purity, inert material and germination shall be in accordance with state and federal laws. Seed mix as follows:

1. DNR Easement Seed Mix
   Rate of 50 pounds per acre with a non-invasive,
   Pasture mix (35% Perennial Ryegrass, 52% Tall Fescue, 13% New Zealand White Clover) and covered with straw.

2.3 PFERTILIZER

A. Fertilizer shall be a standard commercial grade of the kind and quantity specified herein. All fertilizer shall be furnished in standard unopened containers with weight and manufacture's analysis clearly marked.

1. Cover Crop Fertilizer

Total Nitrogen	18%
Available Phosphoric Acid	10%
Water Soluble Potash	10%
Sulphur	7%

PART 3 - EXECUTION

3.1 GENERAL

A. All plant materials shall be installed in accordance with the grower's recommendations and/or in accordance with locally acceptable best landscape practice, and as approved by the Engineer.

B. All tools and equipment shall be the type specially designed for the work and be satisfactory to the Engineer. In no case shall sod be removed by the use of a mattock or other tool which will not meet requirements specified herein.

3.2 SOIL PREPARATION

A. Contractor is responsible for any adverse drainage conditions that may affect plant growth, unless he contacts the Engineer immediately, indicating any possible problems. Prior to placing topsoil, review existing soil conditions for any contaminants that may have been discarded by other trades and notify Engineer immediately if any contaminants are present.

B. Cover Crop Seeding Preparation:

1. Scarify soil surface to promote proper drainage. Remove debris from area. Flat soil surface to produce a smooth surface.

3.3 TOPSOIL PLACEMENT

A. For lawn areas to be sodded or seeded, place 4" of topsoil and rake surface to a smooth uniform finish and compact to 80% dry maximum density. Set finished grade of topsoil 1-1/4" below top of adjacent pavement or sidewalk for sod installation, level of adjacent pavement or sidewalk for areas to be seeded.

3.4 SEEDING

A. Seeding shall not be done during windy weather or when the ground is frozen, saturated or otherwise untellable. All disturbed areas shall be hydro-seeded.

B. The exact time for seeding will be determined by actual weather conditions. The normal satisfactory period shall be considered as being between May 1 and September 1.

1. Cover Crop Seeding:

a) Seeding may be performed by hydro-seeding or blowing. Equipment must be capable of obtaining an even distribution of materials at the proper rates.
b) Fertilizer shall be applied at a rate of two hundred fifty (250) pounds per acre.
c) Grass seed shall be applied at a rate of sixty (50) pounds per acre.
d) Tackifier shall be applied at a rate of forty (40) pounds per acre.

3.5 MAINTENANCE

A. Maintenance shall begin following installation of material and shall continue until final acceptance of project or approved conditional acceptance. Work includes protection, watering, weeding cultivating, mowing, tightening and repairing of guys, removal of dead materials, resetting plants to proper grades or upright position, and other operations necessary to proper growth and survival of all plant materials. All erosion shall be corrected at Contractor's expense.

3.6 FINAL INSPECTION

A. Final inspection for seeded areas will not be made until thirty (30) days following completion of all seeding, fertilizer, and mulching as specified. Damage caused by the Contractor to areas which have been seeded or sodded shall be repaired and/or replaced by the Contractor at his own expense.

END OF SECTION 02 80 00

SECTION 03 10 00
CONCRETE FORMWORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Provide, install and remove form surfaces for structural and architectural cast-in-place concrete components, including shoring, bracing and form supports.
B. Related Sections:

1. 01450 – Testing Laboratory Services:
2. 03200 – Concrete Reinforcement.
3. 03300 – Cast-in-Place Concrete.
4. Division 26 – Electrical: Inserts, sleeving and other like items.

C. Substitutions: Substitute products will be considered only under terms and conditions specified.

1.2 QUALITY ASSURANCE

A. Required Quality: Design and construction of concrete formwork is the responsibility of the Contractor. Design and construct formwork to furnish only those lines and shapes indicated on drawings, unless otherwise approved by Architect. Construct formwork for erection in satisfactory sequence and removal without damage to the resulting concrete surface.

1. Construct all formwork to the shapes, lines and dimensions of concrete members within specified tolerances. Formwork shall be designed and constructed in a manner to eliminate bulges, off-sets, or other unsightly features in the finish surface and to maintain the integrity of the surface texture or configuration.
2. Construct temporary openings in forms for cleaning and inspection; arrange such openings in sides of forms where concrete surfaces will be concealed by other materials or construction.
3. Special attention shall be given to closure techniques, concealment of joints in formwork material, and to the sealing of forms to make them watertight.

B. Allowable Tolerances: In accordance with requirements of ACI 347, Paragraph 3.3.

C. Special Inspections: Refer to article entitled “Field Quality Control” of this Section for special inspections.

D. Embedded Items: Where items, such as embedded plates, reglets, anchors, fastenings, conduit, piping and other items are supplied by other trades and specified elsewhere in these specifications, obtain approval of their placement in the forms by the Architect prior to placing any concrete.

1.3 PROJECT CONDITIONS

A. Protection: Where applicable, construct and erect forms for reuse; withdraw all projecting nails and other objects from contact surfaces before reusing; clean and completely recondition all forms prior to reuse. Obtain approval for form reuse; formwork with patches and repairs affecting the appearance of concrete surfaces will not be allowed.

1.4 DESIGN REQUIREMENTS

A. The structural design and construction of the concrete formwork, shoring and reshoring shall be the responsibility of the Contract, subject to the specified requirements. Design formwork to produce cast in-place concrete elements in the shapes indicated, unless otherwise approved by the Architect.

B. Proprietary forming systems may be used upon approval by the Architect.

C. Camber: Design formwork for anticipated deflections due to weight and pressure of fresh concrete, and for structural cambers as noted on the drawings, for cast in-place concrete to tolerances specified.

1.5 QUALIFICATIONS

A. Design formwork over 4 feet under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Washington.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable code for design, fabrication, erection and removal of formwork.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01
B. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.8 COORDINATION

A. Coordinate this Section with other Sections of work which require attachment of components to formwork.

B. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instruction before proceeding.

PART 2 - PRODUCTS

2.1 FORM MATERIALS (WOOD)

A. Plywood Forms for Exposed Concrete (“Conc-1”): APA High density Overlaid Plyform Class 1 and Class 2. (Burke “Neotex”, Georgia-Pacific “Fiber Ply”, or

approved equal.) Use non-staining oil guaranteed not to affect subsequent finish treatment.

B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.

2.2 PREFABRICATED STEEL FORMS

A. Preformed Steel Forms: Minimum 16 gauge, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces. Provide plastic liner to achieve desired profile if necessary.

B. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete.

2.3 FORMWORK ACCESSORIES

A. Release Coatings: Burke “Burke-Release”, Nox-Crete “Form Coating”, Industrial Synthetics Corporation “Synthex”, or approved equal. Release coating shall be a non-staining release agent guaranteed against interference with bonding of finish materials. Spray apply to all contact surfaces prior to placement of concrete.

B. Form Ties:

1. Snap Ties: Burke, Superior, or approved high-strength wire snap ties with flattened break-offs; break-backs and lengths as required for the conditions of the installation; non-corrosive and non-staining finish.

2. Ties for concrete walls below grade: Galvanized steel snap-ties with 1 inch diameter removable cones with break back; provide with water seals to inhibit the flow of water along the tie shaft and block against leakage. Burke “Penta-Tie” with water seal, or approved equal.

3. Ties for concrete walls above grade: Galvinized steel snap-ties with 1-inch diameter removable cones leaving no metal closer than 1 inch from finished concrete surface. Burke “Penta-Tie”, or approved equal.

4. Cones for exposed concrete: Plastic accessories standard with form tie manufacturer; Burke “BA Architectural, Standard” cone, or approved equal.

C. Corners: Chamfered, plastic or wood strip type; ¾ inch by ¾ inch size; maximum possible lengths.

D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorage’s: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

E. Waterstops: Polyvinyl chloride, minimum 1,750 psi tensile strength, minimum 50 degrees F to plus 175 degrees F working temperature range, 6 inches wide, maximum possible lengths, ribbed profile with center bulb, preformed corner

sections, heat welded jointing; manufactured by Burke, Greenstreak, or approved equal.

PART 3 - EXECUTION

3.1 ERECTION

A. General: Design of formwork for structural stability and efficiency is Contractor's responsibility, and shall satisfy requirements of ACI 347 with regards to design methodology for anticipated loads, fluid pressures, wind and lateral uplift pressures, etc. Forms shall be capable of withstanding pressures resulting from placement and vibration of concrete.

1. Fabricate all formwork to the sizes, shapes, lines, and dimensions of concrete members shown within specified tolerances. Formwork shall be designed to eliminate bulges, off-sets, or other unsightly features in the finish surface and to maintain the integrity of the surface texture or configuration.

2. Construct forms for architectural concrete to meet Class A surface with the additional requirement that a 10 foot template be used to measure irregularities.

3. Provide for openings, offsets, keyways, recesses, reglets, chamfers, blocking, screeds, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes.

4. Solidly butt joints and provide back-up at joints to prevent leakage of cement pasts.

B. Exposed Surfaces: Construct forms to release-coated overlaid plywood as specified. Provide means of shimming or adjusting contact faces to bring surfaces into perfect alignment.

1. Coat forms with form release coating before reinforcement is placed in final position. Apply coating as recommended by manufacturer. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

2. Chamfer exposed corners and edges using wood, metal, PVC or rubber chamfer strips fabricated to product uniform smooth lines and tight edge joints.

C. Openings: Construct temporary openings in forms for cleaning and inspection; arrange such openings in sides of forms where concrete surfaces will be concealed by other materials or construction. Securely brace temporary openings and set tightly to prevent loss of concrete.

1. Coordinate erection of formwork with requirements of all trades; form openings required for work of other trade in accurate sizes and locations.

2. Obtain approval of openings from trade requiring same before placement of concrete.

D. Camber: Erect formwork for anticipated deflections due to weight and pressure of fresh concrete and for structural cambers as noted on drawings. Provide positive means for adjustment of shores and struts to compensate for settlement during placement.

E. Joints: Special attention shall be given to closure techniques, concealment of joints in formwork material, and to the sealing of forms to make them watertight.

F. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.

G. Design formwork to be readily removable without impact, shock or damage to cast in-place concrete surfaces and adjacent materials.

H. Erection: Erect formwork with panel joints, ties, and embedded items in accurate location and securely fastened to prevent dislocation during placement of concrete. Inspect contact surfaces and remove all foreign matter affecting the strength and appearance.

I. Shoring: The adequacy, strength, and arrangement of shoring and reshoring is the Contractor's responsibility; at no time shall the safety of the structure or personnel be endangered by faulty formwork or support; modify and adjust shoring and reshoring as required to meet conditions of the Work and to ensure safety.

1. Erect shoring and bracing for formwork to transmit loads form successive parts of the structure directly through falsework to adequate support without creating bending or shearing stress in the concrete.

2. Erect shoring and reshoring so that forms may be removed without disturbing adjacent shoring and formwork.

3. Leave shoring in place until concrete being supported has reached 28-day strength.

J. Form Removal: In accordance with ACI 301, Paragraph 4.5, remove forms as follows:

1. When repair of surface defects of finishing is required at an early age, forms shall be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations.

2. Top forms on sloping surfaces of concrete shall be removed as soon as the concrete has attained sufficient stiffness to prevent sagging. Any needed repairs or treatment required on such sloping surfaces shall be performed at once and be followed by the specified curing.

3. Wood forms for wall openings shall be loosened as soon as this can be accomplished without damage to the concrete.

4. Formwork for columns, walls, sides of beams, and other parts not supporting the weight of the concrete may be removed in a minimum of three (3) days after placement of concrete and as soon as the concrete has hardened sufficiently to resist damage from removal operations.

5. Formwork supporting weight of concrete, such as beams soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength specified at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

6. When shores and other vertical supports are so arranged that the non-load-carrying form-facing material may be removed without loosening or disturbing the shores and supports, the facing material may be removed at an earlier age as specified or permitted.

3.2 FIELD QUALITY CONTROL

A. Inspection Requirements: Inspect forms for locations, configuration, camber, shoring, sealing of form joints, correct forming material, concrete accessories, form ties, etc.; inspections shall be conducted by Independent Testing Agency. Refer to Section 01 for requirements pertaining to services, reports, payments, Contractor's responsibilities, etc.

END OF SECTION

SECTION 03 20 00 CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Steel reinforcement, including fabrication and installation accessories, for cast-in-place concrete.

B. Related Sections:

1. 01400 – Testing Laboratory Services:
2. 03100 – Concrete Formwork.
3. 03300 – Cast-in-Place Concrete.

C. Substitutions: Substitute products will be considered only under terms and conditions specified in Section 01.

1.2 SUBMITTALS

A. General: Make submittals in accordance with Section 01

B. Shop Drawings: Submit shop drawings, including placing plans and elevation, in accordance with ACI 315. Indicate bending diagrams, splicing, laps, dimensions and details of bar reinforcing and accessories. Do not use scaled dimensions from structural drawings in determining the lengths of reinforcing bars.

1. Show embedded plates, bolts, etc., for purposes of checking for potential interferences.
2. Include support details, including types, sizes and spacing.
3. Indicate locations of construction joints in the concrete construction.

C. Certificates: Submit mill certificates for all bars.

D. Welding Procedures and Qualifications: Furnish qualified welders, as well as detailed written procedures as required.

E. Test Reports: Submit ICBO Reports for threaded or sleeve type couplers if used to splice reinforcing bars to verify compliance with specified requirements.

1.3 QUALITY ASSURANCE

A. Allowable Tolerances: Unless otherwise specified or noted, fabrication and placement tolerances in accordance with ACI 318.

B. Special Tests and Inspections: Refer to article entitled “Field Quality Control” of this Section for special inspection and testing.

C. Welders Qualifications: Welders shall be AWS/WABO qualified in accordance with AWS D1.4.

D. All Contractors and contractor's foremen involved in this work shall have a minimum of 5 years' experience in similar type projects.

1.4 DELIVERY, HANDLING AND STORAGE

A. General: Reinforcing steel shall be transported to the building site, stored, and covered in a manner which will ensure that no damage shall occur to it from moisture, dirt, grease or any other cause that might impair bond to concrete. Identification of steel shall be maintained after bundles are broken.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Reinforcing Bars: ASTM A615, Grade 60, deformed, unless otherwise indicated on drawings.

B. Weldable Reinforcing Bars: ASTM A706, Grade 60, deformed per ANSI/AWS D1.4-97.

C. Welded Wire Fabric: ASTM A185; wire in accordance with ASTM A496; mesh and wire sizes as noted on Structural drawings.

D. Supports: CRSI Class A and D; types and sizes as required for the conditions of the installation.

1. For exposed to view concrete surfaces where legs of supports are in contact with forms, provide supports with legs which are hot-dipped galvanized, plastic protected, or stainless steel.

2. Provide precast concrete blocks, not less than 4 inches square, when supporting reinforcing steel on ground. Precast concrete blocks shall have a compressive strength equal to that of surrounding concrete.

E. Tie Wire: ASTM A82, No. 16-gage double annealed wire.

F. Mechanical Splices: See General Notes on Structural drawings.

2.2 FABRICATION

A. Steel Bar Reinforcement: Fabricate and detail to shapes and dimensions shown on drawings in accordance with ACI 315.

B. Bending and Straightening: In accordance with ACI 318, Chapter 7, unless otherwise noted on drawings; no bending or straightening of reinforcement will be permitted after partial embedment in concrete; heating of reinforcement will be permitted only if entire operation is approved.

C. Welding: Welding or tacking of reinforcing bars is not permitted unless specifically shown on Structural drawings. When welding of reinforcement is indicated and required, provide wilds in accordance with AWS D1.4.

D. Splicing:

1. Reinforcing bars shall be lap spliced for tension unless otherwise noted on the Structural drawings.

2. At the Contractor's option, mechanical butt splicing using an exothermic welding process and high-strength sleeves or threaded splicing may be used, provided that the mechanical splices develop the same values of strength provided by the full-penetration butt welds. Threaded splices shall be capable of developing in tension at least 125 percent of the specified yield strength (Fy) of the bar.

3. Welding or tack welding of reinforcing bars to other bars or to plates, angles, etc., is prohibited, except where specifically detailed on the approved shop drawings. Where welding is approved, it shall be done by AWS/WABO Certified Welders using E9018 or approved electrodes. Welding procedures shall conform to the requirements of AWS D1.4.

E. Welded Wire Fabric: In accordance with CRSI, Chapter 2, unless otherwise noted or indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Clean reinforcing steel free from loose rust, mud, oil and other foreign matter affecting bond. Install supports in accordance with CRSI, Chapter 3 unless otherwise indicated.

B. Placement of Bars: In accordance with ACI 318 and approved placement drawings. If bars are displaced, or if necessary to shift bars to avoid interference with other reinforcing or embedded items, and if bars are moved to locations exceeding allowable tolerances, obtain approval by Architect of the resulting arrangement prior to placing concrete. Reinforcement shall not be continuous through expansion joints and shall be as indicated through construction or contraction joints.

C. Cover: Allowable cover for reinforcement is indicated or noted on drawings; where no cover is indicated or noted allow minimum of 3 inches of cover.

D. Tie Wires: After cutting tie wires, turn wires to the inside of section and bend so that concrete placement will not force ends to exposed concrete surfaces.

E. Welded Wire Fabric: Place welded wire fabric reinforcing in accordance with requirements of ACI 315, unless otherwise noted or indicated. Place continuous between control and expansion joints; stop at expansion joints and cut ½ through at control joints unless noted otherwise. Extend fabric across beams and walls. Lap fabric a minimum of 8 inches on sides and ends.

F. Dowels: Install at locations indicated and at right angles to joint being doweled. Accurately align dowels parallel to the finished concrete surface and rigidly

support during concrete placement using dowel baskets. One end of dowels shall be coated with a bond breaker.

G. Splicing: Splices of reinforcement shall conform to ACI 318 and shall be made only as required or indicated. Splicing shall be y lapping or by mechanical connection; except that lap splices shall not be used for bars larger than No. 11's, unless otherwise indicated.

1. Lapped bars shall be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete. Lapped bars shall not be spaced farther apart than one fifth the required length of lap or 6 inches.

2. Mechanical butt splices shall be in accordance with the recommendations of the manufacturer of the mechanical splicing device. Butt splices shall develop 125 percent of the specified minimum yield tensile strength of the splices bars or of the smaller bar in transition splices.

3.2 DEFECTIVE WORK

A. General: The following reinforcing steel work will be considered defective and shall be removed and replaced by the Contractor at no additional cost to the Owner:

1. Bars with kinks or bends not shown on drawings.

2. Bars injured due to bending or straightening.

3. Bars heated for bending.

4. Reinforcement not placed in accordance with the drawings and/or specifications.

3.3 FIELD QUALITY CONTROL

A. General: Special testing and inspection shall be conducted by Independent Testing Agency. Refer to Section 01400 for requirements pertaining to services, reports, payment, Contractor's responsibilities, etc.

B. Special Inspection: Independent Testing Agency will perform the following:

1. All steel bars that can be positively identified as to heat number and mill analysis shall have one tensile test and bending test for each 10 tones, or fraction thereof, for all #5 bars and larger.

2. All steel bars that cannot be identified shall have one tensile and one bend test made for each 2½ tons or fraction thereof, of each size and kind of reinforcing steel.

3. Testing procedure shall conform to ASTM A615.

4. Testing Agency need not be present during entire reinforcing steel placing operations, provided he has inspected for conformance with the approved shop drawings prior to closing of forms or the delivery of concrete to the job site.

C. Refinement Welding: All shop and field welds of reinforcing steel will be inspected. The special welding Inspector will check the materials, equipment, the qualifications and ability of the welder, details of construction and procedure as well as the welds themselves. The Inspector may use gamma ray, magneflux, trepanning, sonics or any other aid to visual inspection which the Inspector may deem necessary to determine the adequacy of the welding.

END OF SECTION

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This Technical Specification covers supply, placement, and testing for all cast-in-place concrete, including formwork and reinforcement for construction of concrete slabs as shown in the Contract Drawings. Work included under this Technical Specification is to include all equipment, labor, and materials, including reinforcement, formwork, placement, curing, testing, and any other associated work required for the installation of cast-in-place concrete.

1. Concrete slabs and walls

1.2 RELATED SECTIONS

A. Section 01 – Submittals

1.3 APPLICABLE PUBLICATIONS

A. Codes and Standards: Comply with the provisions of the following codes, specifications and standards, except as otherwise shown or specified:

ACI

117 Specifications for Tolerances for Concrete Construction Materials
301 Specification for Structural Concrete, Sections 1 through 5
304 Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete
305 Recommended Practice for Hot Weather Concrete
306 Recommended Practice for Cold Weather Concrete
315 Manual of Standard Practice for Detailing Reinforced Concrete Structures
318 Building Code Requirements for Structural Concrete

ASTM

C 94 Ready-Mixed Concrete
C 143 Test Method for Slump of Hydraulic-Cement Concrete
C 172 Sampling Freshly Mixed Concrete
C 31 Making and Curing Concrete Test Specimens in the Field
C 39 Test Method for Compressive Strength of Cylindrical Concrete Specimens
C 42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
C 1064 Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
C 131 Test Method for Abrasion Resistance (aka LA Abrasion)
C 618 Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
C 989 Slag Cement for Use in Concrete and Mortars
C 1240 Silica Fume Used in Cementitious Mixtures
C 150 Portland Cement

C 1602 Mixing Water Used in the Production of Hydraulic Cement Concrete
C 33 Concrete Aggregates
D 4791 Test Method for Flat Particles, Elongated Particles… in Coarse Aggregate
C 260 Air-Entraining Admixtures
C 494 Chemical Admixtures for Concrete
A 615 Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
A 775 Epoxy Coated Steel Reinforcing Bars
A 82 Steel Wire, Plain, for Concrete Reinforcement
D 1752 Joint Fillers for Concrete Paving and Structural Construction
C 309 Liquid Membrane-Forming Compounds for Curing Concrete
C 1059 Latex Agents for Bonding Fresh To Hardened Concrete
C 219 Terminology Relating to Hydraulic Cement
C 109 Test Method for Compressive Strength of Hydraulic Cement Mortars

1.4 QUALITY ASSURANCE

A. General:

1. All concrete work shall meet the local building code requirements. All concrete shall be reinforced unless otherwise stated.

2. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

   a. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

3. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

   a. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

   b. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician – Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician – Grade II.

4. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

5. Workmanship: The workmanship must be equal to the best practice in modern construction. Contractor shall exercise the greatest possible care to make a uniform dense concrete of required strength, true to the elevations and lines shown on the Contract Drawings.

6. All concrete work which does not conform to the specified requirements, including those for strength, tolerances, and finishes shall be corrected or

removed and recast as directed by the Owner at the Contractor's expense with no modification of project schedule requirements. The Contractor shall also be responsible for the cost of corrections to any other work affected by, or resulting from, corrections to the concrete work.

B. Qualifications of Personnel:

1. Provide at least one person who shall be present at all times during execution of this work and who shall be thoroughly trained and experienced in placing the types of concrete specified and who shall direct all work performed under this Technical Specification.

2. Thoroughly trained and experienced journeyman concrete finishers shall be responsible for finishing of exposed surfaces.

1.5 SUBMITTALS

A. Action Submittals

1. Concrete mixes: Contractor shall submit concrete mixture proportions and supporting data for review by the Owner to prequalify their mix design. The mix design shall be approved prior to any concrete placement. The proportions of each ingredient used in all mixes, the compressive strengths at 7 and 28 days, and slump, air content, chloride-ion content, Los Angeles (LA) Abrasion test results, and other characteristics of all mixes shall be submitted for approval. Note that all testing for this project is at the point of placement not the point of discharge, and it is the Contractor's responsibility to ensure the mix design will provide the required properties at the point of placement. This submittal shall be accompanied by the test data showing the properties of each ingredient used in the mixes including cement and aggregates. The materials used in the work shall be the same as those in the submittal.

    a. Indicate amounts of mixing water to be withheld for later addition at Project site.

2. Thermal control plan: If hot or cold weather concrete placement is anticipated as defined by ACI 301, the Contractor shall submit a thermal control plan.

3. Reinforcing steel shop drawings: Contractor shall submit shop drawings for all reinforcing steel. Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connection, tie spacing, hoop spacing, and supports for concrete reinforcement. Shop drawings shall conform to ACI and CRSI standards.

4. Mill certifications: Contractor shall submit certified mill test reports for reinforcing steel.

5. Curing compounds: Contractor shall submit the manufacturer's literature for curing compounds to be used in the work if applicable.

6. Batch tickets: Contractor shall submit one original copy in accordance with ASTM C94, Section 15, except that items 15.1.5, 15.1.10, 15.2, 15.2.2, 15.2.3 and 15.2.7 need not be provided for ready-mixed concrete and items 15.1.1, 15.1.5, 15.1.6, 15.2.2, 15.2.3, 15.2.5 and 15.2.6 need not be provided for job-mixed concrete.

7. Test results: Concrete cylinders taken during concrete construction shall be tested in accordance with these Technical Specifications and the results submitted to the Owner for review.

8. Concrete pour sequence and joint plan.

9. Prior to commencement of any concrete work, the Contractor is to submit a repair plan for both structural and non-structural repairs addressing materials and methods.

10. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
    a. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali reactivity.
11. Field quality-control test and inspection reports.

PART 2 - PRODUCTS

2.1 GENERAL

A. Unless otherwise specified, use materials, measure, batch, and mix concrete materials and concrete and deliver concrete in approved equipment, all in conformance with ASTM C 94.

B. All cast-in-place concrete shall be normal-weight concrete made with normal-weight aggregate. Lightweight aggregates shall not be used.

C. Manufacturers
1. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
    a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
    b. Products: Subject to compliance with requirements, provide one of the products specified.
    c. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
    d. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 MIX COMPONENTS

A. Concrete mix: Concrete mixtures shall be proportioned by the Contractor in accordance with ACI 211.1. Concrete mixtures shall conform to ACI 318, Chapter 4, and shall meet both the strength and durability criteria specified herein.

B. Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
2. Project-Site Mixing: Not permitted without prior approval from the Owner.

C. Consistency of mix shall be obtained with the minimum amount of water required to produce a concrete that will work properly into the corners, angles, and reinforcement without excessive puddling, or the need for spading or excessive vibrating and without permitting the materials to segregate or free water to collect on the surface.

D. Mix proportions: The mixture proportions for concrete shall be developed by the Contractor to produce the design strength and to provide durability, workability, and mixture consistency to facilitate placement, compaction into the forms and around reinforcement without segregation or bleeding. The Contractor shall submit this mix design to the Owner for approval. The following durability requirement considerations shall be incorporated in the mixture proportions for concrete subjected to water immersion and splash:

1. Maximum water/cement ratio: 0.40 by weight
2. Min. quantity cementitious materials: 675 lb/cy.

E. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement (fly ash or other pozzolans, slag, or silica) in concrete as follows. The Contractor is to select quantities of pozzolan, fly ash, slag, and/or silica fume not less than the amount that has been determined by service records to improve sulfate resistance and provide decreased permeability.

1. Combined fly ash and pozzolan conforming to ASTM C 618: 25%
2. Ground granulated blast-furnace slag conforming to ASTM C 989 Grade 100 or 120: 50%
3. Combined fly ash or pozzolans and ground granulated blast-furnace slag: 50%
4. Silica fume conforming to ASTM C 1240: 10%
5. Combined fly ash, pozzolans, and silica fume: 35%
6. Combined fly ash or pozzolans, ground granulated blast-furnace slag, and silica fume: 50%

F. Portland cement: Portland cement shall conform to ASTM C 150, Type II for all cast-in-place elements. Only cement of low alkali (less than 0.60 percent as Na2O) content shall be used with aggregates identified as potentially reactive. All cement used shall be from the same mill and manufacturer and shall have uniform color and shade.

G. Water used in the mixing of concrete shall be potable in accordance with ASTM C1602 and shall be clean and free from oil, acid and injurious amounts of organic material, or alkalies and other salts.

H. Aggregates:

1. Coarse aggregate shall be hard, durable, clean, uncoated particles conforming to the requirements for deleterious substances contained in ASTM C 33, Class Designation 4S. Course aggregate shall conform to ASTM C 33 No. 67 gradation requirements unless otherwise approved by the Owner. The aggregate shall

contain no more than 8 percent by weight of flat or elongated pieces (ratio between maximum and minimum dimensions of a circumscribing rectangular prism exceeding 5:1) when tested in accordance with ASTM D 4791.

2. Maximum size of aggregate shall be 1-1/2 inch to 2 inch minus for 6-inch thick slabs, 1 inch to 1-3/8 inch minus for 4-inch thick slabs, pea gravel for drilled concrete piers and 1-1/2 inch for all other structural concrete, unless noted otherwise. Aggregate shall not be larger than 1/3 of the depth of slabs or 3/4 of the minimum clear distance between reinforcing bars and forms. The Contractor shall propose an alternate aggregate gradation if required.

3. Fine aggregate shall be clean, hard, durable, uncoated grains of natural medium sand, free from silt, loam and clay, as available from established, approved local sources conforming to ASTM C 33, including grading requirements.

I. Admixtures:

1. No admixtures containing calcium chloride shall be used.

2. All admixtures shall be provided by the same supplier and shall be stated by the manufacturer as being compatible.

3. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
   a. Water-Reducing Admixture: ASTM C494/C 494M, Type A.
   b. Retarding Admixture: ASTM C 494/C 494M, Type B.
   c. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D
   d. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
   e. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
   f. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

4. Air-Entraining Admixture: Air-entraining admixture shall be in strict accordance with agent manufacturer's printed instructions and shall conform to ASTM C 260.

5. Set-Retarding Admixture: All concrete shall contain Master Builders Pozzolith 100-XR, or approved equal, set retarding admixture, which shall be used at the rate, recommended by the manufacturer if the concrete cannot be placed within 1 hour of batching.

6. Water Reducing Agent(s) (Plasticizers): Sika 'Plastiment' or Master Builders' 'Pozzolith' or approved equal.

7. Concrete Accelerator Admixtures may be used, if approved by the Owner. Calcium chloride shall not be used.

8. Other Admixtures: Anti-freeze liquids, salts, or other similar materials shall not be used in concrete unless specifically authorized in writing by the Owner prior to construction.

9. Superplasticizer can be added to a concrete mix on-site to increase slump prior to placement, provided that the finished mix meets all specified requirements and the manufacturer's mix design parameters. Superplasticizer cannot be added to a partially-emptied concrete truck. Superplasticizer additions can only be made to a load of concrete of known volume. Superplasticizer can only be added by the concrete manufacturer's representative.

J. Vapor Retarders:

1. Plastic Vapor Retarder: ASTM E 1745, Class C, or polyethylene sheet, ASTM D 4397, not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure sensitive joint tape.

a. Products:

1) Fortifiber Corporation; Moistop Plus.

2) Stego Industries, LLC; Stego Wrap, 10 mils.

K. Water soluble, chloride-ion content in hardened concrete is not to exceed 0.15% by weight of cement. The Contractor shall include test results showing compliance with this requirement with the submittal of their proposed mix design.

2.3 REINFORCING STEEL AND MISC

A. Reinforcing steel (deformed bars & undeformed rod) shall be in accordance with ASTM A 615, Grade 60 unless reinforcement is to be welded, in which case it shall be in accordance with ASTM A 706. Reinforcing steel shall be uncoated unless otherwise noted.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Plain-Steel Wire: ASTM A 82, as drawn.

D. Smooth bar dowels shall be uncoated unless otherwise noted.

E. Tie Wire shall conform to ASTM A82, 16-gauge minimum.

F. Metal accessories: Metal accessories including spacers, chairs, ties and other devices necessary for proper placement, spacing, supporting and fastening reinforcement in place shall conform to the Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice.

G. Joint filler material: 'Ceramar' by W.R. Meadows, or other approved equal, 3/4-inch thickness by full depth, or as otherwise sized, detailed, or noted in the Contract Drawings. Joint filler strips shall meet ASTM D 1752 Type I requirements and shall be punched to admit dowels where called for on the Contract Drawings.

H. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.

I. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.4 FORMING AND CURING

A. Formwork: Materials for concrete formwork shall be suitable to achieve the finish requirements for formed surfaces specified and meet ACI 347 "Recommended Practice for Concrete Formwork." Unless specified or detailed otherwise, construct all formwork with new plywood or clean steel forms, to provide continuous straight, smooth, exposed surfaces. The Plaza Wall will require the use of form liners. Vertical surfaces not over 12 inches high may be formed with new dimension lumber or stock steel forms. Provide form material with sufficient strength and rigidity to withstand pressure of newly placed concrete without bow or deflection.

B. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class A, 1/8 inch for smooth-formed finished surfaces.
2. Class B, 1/4 inch for rough-formed finished surfaces.

C. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips: use strike-off templates or compacting-type screeds.

D. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

E. Form openings, chases, offsets, linkages, keyways, reglets, blocking, screeds, and bulkheads required in the work. Determine sizes and locations from trades provided such items.

F. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

G. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

H. Form coatings, sealers and release agents: Form coating, sealers and release agents shall not bond with, stain, not adversely affect concrete surfaces, and shall not impair subsequent treatments (painting, etc) of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
2. Form-release agent shall not be comprised of used motor oil or other toxic material.

I. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

J. Curing compounds: Curing compounds can be used at the Contractor's option and if used shall be an approved paraffin based substance conforming to ASTM C 309 Type 1 that shall not impair subsequent treatments (painting, etc.) of concrete surfaces. Liquid membrane-forming curing compounds shall not be used on surfaces to receive additional concrete or cementitious finishing materials, and shall be used only where approved by the Owner.

K. Curing Materials: Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

L. Concrete slab coating: Concrete sealer shall be Clear Sealer as manufactured by Cementone or approved equal. If used, the Contractor shall verify with the concrete sealer manufacturer that the concrete sealer shall be compatible with any applied curing compounds. The Contractor shall obtain a letter from the manufacturer stating sealer and curing compound compatibility and submit it to the Owner for review.

M. Floor Slab Treatments

1. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.
   a. Products:
      1) Burke by Edoco; Titan Hard.
      2) Euclid Chemical Company (The); Euco Diamond Hard.
      3) Meadows, W.R., Inc.; Liqui-Hard.

N. Bonding agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.5 CONCRETE REPAIR MATERIALS

A. Repair underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent surface elevations.

1. Cement binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C219.

2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer for site conditions and repair thickness.

4. Compressive strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement binder: ASTM C150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C219.

2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer for site conditions and repair thickness.

4. Compressive strength: Not less than 5,000 psi at 28 days when tested according to ASTM C109/C 109M.

C. All repair materials and methods shall be submitted by the Contractor to the Owner for review and approval. The contractor shall allow for any and all submittals sufficient time for review and approval taking into consideration that repair materials and/or methods may be rejected and may need to be resubmitted.

D. Materials defined for repair in this Technical Specification are not all inclusive and may not be applicable to the type of repair that is to be performed in the field. It is at the Owner's discretion to define the applicability of specific repair materials and whether or not the damaged item is repairable or not. If an item is deemed non-repairable the Contractor shall replace such item(s) at no additional cost to the Owner.

PART 3 - EXECUTION

3.1 GENERAL

A. Trucks used for transportation of concrete shall have a water-gage for monitoring the water added to the concrete batch. The water-tank shall always arrive on-site full, and no other uses of this water shall be permitted until any on-site water additions have been

made. On-site water additions shall be recorded on the batch receipt that becomes part of the project records.

B. Measuring, mixing, transporting and placing concrete shall adhere to the requirements and recommendations of ACI 304. Aggregate shall be handled in such a way as to avoid segregation prior to incorporation.

C. Place concrete on damp (not wet) firm earth, or base course fill where so indicated on the Contract Drawings. Finished surface is to be true to plane within 3/8 inch in 10 feet of design elevation in any direction.

D. The work shall be protected from the elements, rain, flowing water, and defacement of any nature during construction.

E. In the case of concrete inadvertently placed such that it will be below the water level within 7 days of placement, the Contractor shall prevent the cast-in-place concrete from being submerged by the pool waters during the curing by providing adequate protection systems designed for project-specific field conditions. Concrete and formwork damage caused by contact with pool waters shall be repaired or replaced by the Contractor to the Owner's satisfaction at no additional cost to the Owner. Temporary, low-impact protection systems such as sandbags may be used – cofferdams shall not be allowed.

F. Ends of reinforcement ties shall be bent inwards, away from the outside edges of the concrete pour.

3.2 INSPECTIONS

A. The Owner shall be notified upon completion of installation of concrete reinforcement and formwork. The Owner will review the work for conformance with the contract documents prior to placement of concrete.

B. All concrete testing is the responsibility of an independent testing firm hired by the Contractor.

C. Concrete testing – general

1. All concrete test samples are to be procured at the point of placement prior to consolidation to ensure the in-place product provides the required level of performance.

2. Materials and installed work will require testing by the Contractor's inspection laboratory and services in accordance with ASTM C172.

3. Contractor shall employ a qualified independent commercial testing laboratory to perform concrete quality control sampling and testing at no additional expense to the Owner.

4. The Owner may independently sample concrete and perform slump, temperature and air tests in accordance with ASTM C 143. Concrete exceeding the maximum

slump may be rejected by the Owner. Concrete rejected for excessive slump shall be immediately removed from the Project Site.

D. Concrete Strength Testing

1. Unless otherwise shown on the Contract Drawings or otherwise approved the 28-day concrete compressive strength shall be 4,000 psi for cast-in-place portion of the concrete plaza.

2. Concrete test specimens shall be collected in accordance with ASTM C 172 at the point of placement, created in accordance with ASTM C 31, and be tested in accordance with ASTM C 39. Sample acquisition and testing shall proceed promptly so as not to impede progress of the work. Strengths of concrete shall be considered satisfactory if the average of any three consecutive strength tests of the laboratory cured specimens representing each specified strength of concrete is 15 percent greater than the specified strength, and if not more than 10 percent of the strength tests have values not more than 10 percent less than the specified strength.

   a. A minimum of four 6-by-12-inch test specimens shall be taken by the testing laboratory for each sample set as follows:

      1) Cast-In-Place Slab: A minimum of 1 set each day of placement.

      2) One test specimen of each set shall be tested at seven (7) days or prior to stripping of the forms and three test specimens shall be tested at 28 days. The 28-day compressive strength shall be evaluated in accordance with ASTM C 39.

3. Specimens will be collected by a testing laboratory/special inspector. Contractor shall provide labor, and material as required, to assist testing laboratory in preparing specimens for testing, and job storage facilities for making and storage of specimens. The Contractor is responsible for protecting the specimens from damage while they are on the project site. Assist in packing specimens for shipping. Delivery and responsibility of the test specimens will be that of the testing laboratory/special inspector.

4. The Contractor is to keep an identification record of cylinders taken and concrete poured. Mark all cylinders from each set with the same number on one end and enter this number in the concrete testing records and include the date, time and location.

5. If compressive strength test samples fail to meet the minimum strength requirements, the concrete represented by the failed tests shall be considered questionable and shall be subjected to further testing. In this case, the Owner may require test cores of cured concrete to be taken by the testing laboratory in accordance with ASTM C 42 and ASTM C 39. If core specimen compressive strength test results do not meet the minimum strength requirements, the Contractor is to remove and replace the concrete in question at the Contractor's expense.

6. Compressive strength test results shall be submitted in writing to the Owner, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in work, design compressive strength, concrete mix proportions and materials, compressive breaking strength, and type of break for all tests and shall be correlated to the corresponding on-site test results.

E. Concrete Slump Testing

1. Make slump tests in accordance with ASTM C 143 at the point of placement. Concrete failing the slump test cannot be placed as-is. Perform one test for each batch of each strength of concrete and at least one test per truck. Maximum slump of all concrete measured in accordance with ASTM C 143 shall be as follows: 2" for concrete slabs on-grade which have plasticizer additive added (prior to addition of plasticizer); 3" for other slabs where no plasticizer is added. 4-inch maximum and 1-inch minimum slump for all other concrete structures. The maximum slump may be increased when approved chemical admixtures are used, provided that admixture concrete has the same or lower water-cement ratio and does not exhibit segregation potential or excessive bleeding.

F. Concrete Air Entrainment Testing

1. Perform air entrainment tests in accordance with ASTM C 173 for each truck-load of concrete at the point of placement. Add air-entraining admixture in accordance with the proven, approved mix design as required to achieve required percent air content at the point of placement in accordance with the table below, unless otherwise noted. The air content shall be with the range of shown below – additional tolerances shall not be applied.

Maximum Aggregate Size [in.]	3/8	1/2	3/4	1	1 1/2
Corresponding Air Entrainment [%]	6.0% - 9.0%	5.5% - 8.5%	4.5% - 7.5%	4.5% - 7.5%	4.0% - 7.0%

G. Concrete Temperature Testing

1. Concrete temperature: ASTM C 1064; test hourly when the ambient air temperature is 40 degrees F (4.4 degrees C) or below and when the ambient air temperature is 80 degrees F (27 degrees C) or above, and whenever cylinders are taken. Concrete temperatures shall be in conformance with ACI 301.

H. Testing of concrete mix components

1. Limit water soluble, chloride-ion content in cured concrete to 0.15% by weight of cement. The Contractor shall submit test records indicating that their proposed

mix design meets this requirement. The Contractor shall ensure that the test records represent samples made with materials from the same material suppliers as will be used for the work.

2. Aggregate shall have an L.A. abrasion loss of no more than 40%, tested in accordance with ASTM C 131.

3. Aggregate from sources determined on the basis of petrographic analysis or tests to be susceptible to the alkali-carbonate form of alkali-aggregate reaction shall not be used.

3.3 CONCRETE FORMWORK

A. Design, erect, support, brace and maintain formwork according to ACI 301 to support vertical and lateral loads that might be applied until such loads can be supported by the concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position, within tolerance limits of ACI 117.

B. Formwork shall be designed to be readily removable without impact, shock or damage to concrete surfaces and adjacent materials and surfaces.

C. Forms shall be in compliance with ACI 347. Construct to sizes, shapes, lines and dimensions as necessary to produce the finished shapes shown in the Contract Drawings. Obtain accurate alignment, location, grades, level and plumb work in the finished structures. Solidly butt joints of forms and provide back-up at joints to prevent leakage of water and/or cement paste. Leakage of concrete from improperly sealed formwork is prohibited from entering the water. The Contractor shall immediately notify the Owner if any wet concrete enters the water. Voids, honeycombing, sand pockets, fins, etc., may be cause for rejection.

1. Class A, 1/8 inch for smooth-formed finished surfaces.

2. Class B, 1/4 inch for rough-formed finished surfaces.

D. Forms shall be of wood or steel, straight, of sufficient strength to resist springing during depositing and consolidation concrete. Wood forms shall be of adequate thickness, straight and free from warp, twist, loose knots, splits or other defects. Steel forms shall be channel formed sections with a flat top surface and with welded braces at each end and not less than two intermediate points. Ends of steel forms shall be interlocking and self-aligning.

E. Removing and reuse of forms

1. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 degress F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

2. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

3. When forms are reused, clean surfaces, remove fins and laitance, tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by the Owner.

F. Fabricate forms for easy removal without hammering or prying against the concrete surfaces.

G. Form coatings, sealers and release agents shall be applied immediately before erecting forms where necessary to achieve the specified curing and finishes. Forms shall be protected from dust and dirt.

H. Cleaning and tightening: Before inspection of forms and reinforcing steel, thoroughly clean forms and adjacent surfaces to receive concrete. Remove wood chips, sawdust or other debris just before concrete is placed. Retighten forms after placement of concrete, and as required, eliminating any concrete or water leakage.

I. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcement bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable length on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete so that strength and appearance of concrete are not impaired. Joints shall be in compliance with the approved concrete pour sequence and joint plan submittal. All necessary joint locations, spacing and offsets from adjacent structures shall be considered. A layout in plan view of all required joint locations (construction, control, expansion) shall be included for approval, and shall be laid out in accordance with the Contract Drawings, and as indicated for interfacing with upland concrete components.

B. Construction joints: Install joints so that strength and appearance of concrete is not compromised, at locations indicated in the Contract Drawings or alternate locations approved by the Owner.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finished. Eliminate groover tool marks on concrete surfaces.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8 inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 07 Section “Joint Sealants” are indicated.

3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lave or clip sections together.

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

F. Crack control joints (grooved “V” tooled joints) for concrete slabs: Form crack control joints after initial floating by grooving and finishing each joint to the dimensions with a finishing tool capable of producing a single v-shaped groove in accordance with

industry standard practice at the locations and extents as indicated on the Contract Drawings. Eliminate groover tool marks from concrete surfaces.

G. Expansion joint for concrete plaza: Construct expansion joint as indicated on the Contract Drawings with pre-molded joint filler.

H. Joint filler shall be installed as shown in the Contract Drawings and in accordance with manufacturer's written recommendations.

I. Joint sealant shall be installed as shown in the Contract Drawings and in accordance with manufacturer's written recommendations.

3.5 PRIOR TO PLACEMENT

A. Notify the Owner and Special Inspector not less than twenty-four (24) hours before placing concrete.

B. Clean formwork thoroughly, removing all loose dirt, scrap lumber and other debris from forms prior to concrete placement.

C. Do not place concrete until the forms and reinforcement have been completed and all preparations for the pour have been made, and have been inspected and approved by the Owner.

3.6 PLACEMENT

A. Discharge and place concrete not later than one hour after the original addition of water to the mix. Mix concrete for a minimum of 10 minutes prior to placing, at least 3 minutes of which must be immediately prior to discharge at the site.

B. No additional water to be added on-site, unless on-site water additions are pre-authorized by the Owner. On-site water additions shall be recorded on the batch receipt that becomes part of the project records.

C. In no case shall concrete be placed on standing water, muddy, soft or spongy areas.

D. Pours of concrete, once started, shall be carried on as a continuous operation until the section of approved size and shape is completed. The contractor shall determine pour sizes based on ability to provide finishes as specified in this Technical Specification. If the Contractor elects to pour more than agreed upon by the Owner, any defects in finishing work shall be repaired, using a method approved by the Owner, at no additional cost to the Owner.

E. Depositing of concrete shall be continuous, or in layers, or bands, of such thickness that no concrete will be deposited on, or against, concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section.

F. Concrete shall be consolidated by use of approved immersion-type mechanical vibrators immediately upon placement. Concrete shall be vibrated sufficiently to remove entrapped air such that the concrete closes snugly against all surfaces to the maximum practicable density but not so much as to cause the coarse aggregate to settle or excessive accumulation of mortar at the surface. Vibrators shall not be held against embedded materials.

G. Concrete shall be deposited in or near its final position; segregation due to rehandling or flowing shall be avoided.

H. Depositing a large quantity at any point, or running or working the concrete along the forms will not be permitted.

I. Concrete shall be conveyed from mixer to place of final deposit by methods which will not cause separation or loss of material.

J. Concrete shall be placed in a manner that prevents it from dropping from a height greater than 4 feet.

K. Concrete which has developed initial set shall not be used. Concrete which has developed initial set shall not be re-tempered or remixed.

L. Concrete shall be deposited in layers, not to exceed 18 inches, in a continuous operation until each section or panel is complete. Each layer shall be thoroughly vibrated before placing the succeeding layer. Concrete shall be thoroughly worked around reinforcement and embedded items, and into corners of forms by effective vibration. Vibrators shall penetrate each layer and into the top of the underlying layer. Top surfaces shall be generally level during placement.

M. Placing of concrete shall be regulated so that the pressure caused by the wet concrete shall not exceed that used in the design of the forms.

N. Concrete shall not be cast underwater or used to displace water in the forms without written approval of the Owner.

O. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high temperature is expected to fall below 40 degrees F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

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

P. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 degrees F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated into total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's opinion.

2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.7 FINISHES - GENERAL

A. Prepare slabs for finishing by tamping concrete with special tools to force the coarse aggregate away from the surface and then screed to the required level.

B. All finishes are to be clearly designated on the Contractor's shop drawings.

C. All finishes shall be in accordance with ACI 301 unless otherwise noted.

D. Non-formed surfaces (flatwork):

1. At exterior slabs and walks, not otherwise noted, lightly brush wet troweled surface with soft hair broom, all strokes perpendicular to walks or flow lines, or in direction as indicated on the Contract Drawings, to create moderately abrasive, uniform, non-skid surface.

2. Mark off slabs as indicated or directed; round edges to ½ inch radius with 1-1/2 inch wide smooth edging tool. Unless otherwise indicated or detailed, edge all sections of brushed slabs with 1-1/2 inch wide smooth edging along all edges and both sides of all joints.

3. The final broomed surface shall be ADA compliant, with a maximum ¼ inch change in level. Surfaces failing this criteria shall be carefully corrected using a masonry rubbing stone without compromising the non-skid finish.

3.8 CURING AND PROTECTION

A. Curing: Concrete is to be wet-cured not less than seven days after placement for Type I and II cement concrete, and three days for Type III cement concrete in accordance with ACI 308. During wet-curing the concrete is to remain wet by covering with burlap or cotton mats or rugs which are to be kept moist with a soaker hose or sprinkler. Plastic sheets or other moisture barrier shall not be an acceptable substitute for a soaker hose or sprinkler unless approved by the Owner. To simplify the wet curing process, concrete curing compounds can be used in accordance with the manufacturer's recommendations and in conformance with ASTM C 309.

B. Concrete shall be protected from damage during removal of formwork and from injury resulting from the storage or movement of materials during construction. Careful attention shall be given to the proper curing and protection of all concrete.

C. Curing shall start as soon as concrete has hardened sufficiently to prevent surface damage.

D. Changes in temperature. Curing temperature of all concrete shall be as uniform as possible. Changes shall not exceed 5 degrees F. in any one hour or 50 degrees F. in any 24-hour period. The Contractor is to monitor the concrete temperature intermittently as required to ensure the change in temperature requirements are met.

E. Formwork shall not be distributed until the concrete has hardened adequately. All forms shall be loosened and removed as soon as practicable, but in no case shall they be removed earlier than seven days after placement for Type I and II cement concrete and three days for Type III cement concrete unless otherwise approved by the Owner. Concrete exposed by form removal prior to seven days after placement shall be moist-cured in accordance with this Technical Specification. Forms shall be removed carefully so as to prevent damage to the concrete. Any repairs needed or finish treatment required on surfaces shall be performed at once and shall be followed immediately by the specified curing.

F. If forms are removed prior to end of prescribed curing time, continue curing for the prescribed time as specified herein.

G. If voids and/or rock pockets are present when forms are removed, the contractor shall modify his placement procedure on future pours. Do not proceed until placement procedure has been corrected.

3.9 CONCRETE REPAIRS

A. All repairs are to be performed at the Contractor’s expense. The Contractor shall not be granted schedule extensions due to time spent performing concrete repairs. All concrete repairs are to be performed at the Contractor’s expense.

B. Curing shall be interrupted for the shortest time and in the smallest area practicable to perform repair.

C. All tie holes shall be patched.

D. Every defect shall be reported to the Owner by a means adequate to convey the size and extent of the defects. The Owner shall reply to the Contractor and direct them to consider the repair as either structural or non-structural. The Contractor can then proceed to make the repair in accordance with their approved repair plan. The Contractor is not permitted to repair a defect that the Owner has not been made aware of.

E. Repair materials and installation not specified herein may be used, subject to Owner's approval.

F. Defective concrete: Repair and patch defective areas when repair designation (structural or non-structural) has been made the Owner. Remove and replace concrete that cannot be repaired and patched as directed by the Owner.

G. Non-structural patching mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.2-mm) sieve, using only enough water for handling and placing.

H. Repairing formed surfaces (non-structural): Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Take all measures required to prevent reinforcement from being cut. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by the Owner.

I. Repairing unformed surfaces (non-structural): Test unformed surfaces, such as slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct low areas with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent surface elevations. Prepare, mix, and apply repair topping and primer according to manufacturers written instructions to produce a smooth, uniform, plane, and level surface.

4. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4-inch (19 mm) clearance all around. Dampen concrete surfaces in contact

with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

5. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

J. Structural repairs: Perform structural repairs of concrete, subject to the Owner's approval, using epoxy adhesive and patching mortar in accordance with the manufacturer's recommendations and the Owner comments on the Contractor's submitted structural repair procedure.

3.10 LEVELNESS CORRECTIONS

A. Correct high areas in surfaces by grinding, if approved by Owner, after concrete has cured at least 14 days. Grinding shall be performed with a masonry rubbing stone with sand and cement to match adjacent surfaces. Alternate refinishing methods can be used if approved by Owner.

B. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas to the nearest joint or edge on all sides and replacing with fresh concrete. Finish repaired areas to match adjacent concrete.

3.11 CLEAN-UP

A. Areas to be kept clean during progress of work and until completion. Dispose of all surplus, waste materials, and rubbish according to laws, regulations, and ordinances.

B. Provide certification from disposal site operator stating that disposal site complies with governmental regulations.

3.12 ENVIRONMENTAL REQUIREMENTS

A. Cold weather: Unless otherwise approved in writing by the Owner, concrete shall not be placed when the ambient temperature is below 40°F, or when the concrete is likely to be subject to freezing temperatures before expiration of the curing period. Where cold weather placement is approved, special procedures shall be adopted to heat the material and to protect the concrete from damage by freezing during mixing, placing and curing. All such special procedures shall be subject to prior approval of the Owner. Cold weather concreting procedures contained in ACI 306 Cold Weather Concreting shall be utilized.

B. Hot weather: Unless otherwise approved in writing by the Owner, the maximum allowable temperature of the concrete as it is placed, shall be 90°F. When the ambient air temperature approaches or exceeds this maximum, special procedures shall be adopted to control the temperature of the materials and to protect the concrete from damage due to hot weather during mixing, placing and curing. All such special procedures shall be subject to the prior approval of the Owner. Hot weather concreting procedures contained in ACI 305 Hot Weather Concreting shall be utilized.

C. Concrete shall not be placed during rain, sleet or snow unless Owner approved protection is provided.

END OF SECTION 03 30 00

SECTION 05 50 00 METAL FABRICATIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

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

B. Metal fabrication includes items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere. Provide all miscellaneous metals as required and indicated for a complete building, including, but not limited to the following:

1. Steel Lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry,
3. Other miscellaneous framing and bracing members for panels.

C. Contractor's Coordination of Metal Fabrications: Contractor shall coordinate with respective trades all required metal fabrications which are necessary to complete the Work.

D. Related Sections:

1. 03 30 00 – Cast-In-Place Concrete for installing anchor bolts, wedge-type inserts, and other items cast into concrete.
2.

D. Substitutions: Substitute products will be considered only under terms and conditions specified in Section 01.

1.2 SUBMITTALS

A. General: Make submittals in accordance with Section 01.

B. Product Data: Submit producer or manufacturer's specifications for the following products.

1. Galvanizing repair paint.

C. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections and any other pertinent information. Show anchorage and accessory items.

1. Drawings shall show type and grade or strength of steel for each fabrication item.

2. Where materials or fabrications are indicated to comply with certain requirements for design loading, include structural computations, material properties and other information needed for structural analysis.
3. Indicate welds by standard AWS symbols, and show size, length, and type of each weld.
4. Indicate all bolted and mechanically fastened connections showing type, alloy and size of fasteners.
5. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed by others.
6. For steel members which are to be galvanized, indicate weight of galvanized coating in ounces.

D. Certification:

1. Submit written certification that the welders to be employed in work meet the requirements as specified under Quality Assurance.
2. Submit written Certifications of Compliance from the galvanizer stating that the weight of galvanize coating being applied meets the minimum weights as established in referenced ASTM, Tables 1 and 2.

E. Mill Test Reports: Submit mill test reports certifying that the steel used in fabrication meets the requirements of the referenced ASTM.

1.3 QUALTIY ASSURANCE

A. Fabricator Qualifications: Firm experience in successfully producing metal fabrications similar to that indicated for this project, with sufficient production capacity to produce required units without causing delay in the Work.

B. Installer Qualifications: Arrange for installation of metal fabrications specified in this Section by the same firm that fabricated them or under their supervision.

C. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS “Standard Qualification Procedure”. Welders to be employed in work shall be certified by Washington Association of Building Officials (WABO) and AWS within the previous 12 months.

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

E. Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

F. Galvanizing: It is the intent of this specification that all welding shall be done prior to galvanizing; all field welds shall be ground smooth and touched-up as hereinafter specified.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel:

1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade manes and roughness.
2. Steel Plates, Shapes and Bars: ASTM A36.
3. Steel Tubing: Cold-formed, ASTM A500, Grade B.
4. Steel Pipe: ASTM A53; type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated is indicated or specified; standard weight (Schedule 40), unless otherwise required.
5. Steel Bar Gratings: ASTM A569 or ASTM A36 (where required).
6. Checker Plate: FS QQ-F-461, Class 1, diamond pattern, 7/16 inch thick (where required).

B. Fasteners:

1. General: fasteners, bolts and anchors required at all structural connections. Provide zinc-coated fasteners for exterior use or where built into exterior walls, except as otherwise specified. Select fasteners for the type, grade and class required.
2. Bolts and Nuts: Regular hexagon head type, ASTM A307, Grade A with hex nuts, ASTM A 563, and where indicated, flat washers.
3. Plain Washers: Round, carbon steel, FS FF-W-92.
4. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated, with nuts, ASTM A 563/ASTM A 563M, and where indicated, flat washers.
5. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.

C. Galvanizing Repair Paint: Re-galvanizing field welds, bolted connections, and abraded areas shall be done with zinc rich paints containing a minimum of 94 percent zinc dust by weight.

D. Miscellaneous: Provide other materials shown or required for complete fabrication and installation of metal fabrications.

2.2 FABRICATIONS, GENERAL

A. Workmanship: Use materials of size and thickness indicated or, if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of work.

B. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

1. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
2. Weld corners and seams continuously, complying with AWS recommendations. Use materials and methods that minimize distortions and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
3. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts.
4. Provide for anchorage of type indicated, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
5. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
6. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8” x 1 1/2”, with a minimum 6” embedment and 2” hook, not less than 8” from ends and corners of units and 24” O.C., unless otherwise indicated.

2.3 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide miscellaneous steel framing and supports which are not a part of drawing set as required to complete the Work. Fabricate miscellaneous framing and supports to sizes and shapes indicated or, if not indicated, of required dimension to receive adjacent other work to be retained by framing. Except as otherwise indicated, fabricate from structural steel shapes, plates and steel bars.

1. Furnish inserts for units installed after concrete is placed.
2. Provide all miscellaneous steel supports and brackets required for complete and satisfactory installation other material and equipment; coordinate requirements for anchors and brackets with elevator supplier.
3. Galvanize miscellaneous framing and supports where indicated.

2.4 BEARING AND LEVELING PLATES

A. Provide bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
B. Galvanize plates.

2.5 STEEL LINTELS

A. Fabricate steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size lintels to provide bearing length at each side of openings in accordance with the structural drawings.

C. Galvanize and prime steel lintels located in exterior walls.

D. Prime steel lintels located in exterior walls with zinc-rich primer.

2.6 GALVANIZING

A. General: Provide a zinc coating for those items installed at exterior of buildings or in exterior walls, and elsewhere as indicated on drawings and specified herein. Except for bolts, nuts and washers, all items specified in this Section shall be galvanized after fabrication, with fabrication to include forming, cutting, shearing, punching, drilling, bending, and welding. Galvanized items in accordance with the following:

1. ASTM A153 for galvanizing iron and steel hardware and anchor bolts. Weight of coating shall be per Table 1 for class of material.
2. ASTM A123 for galvanizing iron and steel products made from rolled pressed and forged shapes, pipes, tubes, plates, bars, wires, and strips. Weights of coating shall be per Tables 1 and 2 for steel category.

B. Galvanizing:

1. After fabrication, grind welds smooth. Remove heavy deposits of oil, grease, and other foreign matter prior to pickling by caustic cleaning.
2. After solvent cleaning, steel surfaces shall have mill scale and rust removed by pickling in solutions of either hot sulfuric or at ambient temperature hydrochloric (muriatic) acid (galvanizer option) followed by rising in hot water in accordance with SSPC SP-8 “Pickling”. Heavy deposits of rust, scale, and paint shall be removed by any one of methods specified in SP-2, SP-3, SP-6 or SP-7.
3. After cleaning, steel shall be hot-dipped galvanized in accordance with ASTM A123 or A153. Pipes and tubes shall be galvanized inside and outside. Zinc used for coating shall conform to STM B6, Grade “Prime Western”. The aluminum content of the zinc bath during actual galvanizing operations shall not exceed 0.001 percent.

C. Galvanize coating shall be continuous, and as reasonably smooth and uniform in thickness as the weight, size and shape of the item will permit. Galvanize members shall be free form uncoated areas, blisters, fluz deposits, acid and black spots and dross inclusions. Lumps, projections, globules, or heavy deposits of zinc which will interfere with the intended use of the material will not be permitted. Material upon which serious abrasions of galvanized occurs will not be acceptable. All holes shall be clean and reasonably free from excess zinc.

PART 3 - EXECUTION

3.1 PREPARATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete construction. Coordinate delivery of such items to project site.

3.2 INSTALLATION

A. General:

1. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including threaded fasteners for concrete inserts, and other connectors as required.
2. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plus, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete.
3. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted field connections.
4. Filed Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

3.3 ADJUST AND CLEAN

A. For Galvanized Surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

END OF SECTION

SECTION 26 05 00 – ELECTRICAL GENERAL REQUIREMENTS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope

1. This section specifies general requirements for electrical work. Detailed requirements for specific electrical items are specified in other sections, but are subject to the general requirements of this section. The electrical call-outs included in this project are functional in nature and do not specify exact locations of equipment or equipment terminations.

2. The Contractor shall examine all shop and PUD drawings and Specifications to determine actual locations, sizes, materials, and ratings of all equipment provided by others.

3. Items of Work shown on drawings and not specified, or mentioned in the specifications and not shown on the drawings, shall be considered required as if they had been both specified and show on the Drawings. In the event of conflicting specified or drafted requirements the more stringent requirement shall govern. Any work or material omitted from the description of the work but which is clearly implied shall be provided by the Contractor as though specifically stated. The Drawings and Specifications contemplate a finished piece of Work of such character and quality as described in and reasonably inferred from them, and fitting with the Work of other Contractors and the Owner. The Contractor agrees that the failure to show details or repeat on any drawings the figures or notes given on another shall not be cause for additional charges or claims.

4. When record drawings are provided with the contract drawing set, they constitute the best available information pertaining to the relevant systems at the time of design. Their accuracy is specifically not guaranteed and they are provided only for the Contractor's convenience. It is the Contractor responsibilities to field verify these record drawings prior to use. Actual field conditions are specifically and entirely the responsibility of the Contractor. Deviation of the record drawings provided from actual field conditions shall not constitute a basis for any increase in time allowed for completion or compensation for the Contractor.

5. The Contractor shall notify the Engineer in writing of perceived discrepancies, errors, or omissions in the Contract Documents prior to bid. The Engineer shall provide clarification to resolve these issues prior to bid. The Contractor shall resolve his questions regarding the perceived inconsistency, errors, or omissions in the Contract Documents prior to bid. Failure of the contractor to resolve his questions prior to bid shall result in the residual issues of the aforementioned kind providing no basis of claim for an increase in compensation for the Work or the time allowed for the completion of the contract and the Engineer's interpretation shall govern.

B. Definitions

1. Provide: Furnish and install.

2. Contractor: The party who furnishes and installs all tools, materials, and equipment to complete the work shown and implied in the drawings and these Specifications. This includes the Prime Contractor, the Electrical Contractor, Control System Integrator, and all other Contractors and Subcontractors.

3. Arrangement, Layout, or Outline Drawings: Shows the physical space and mounting requirements of a piece of equipment. Diagrams may also indicate ventilation requirements and space provided for connections or the location to which connections are to be made.

1.02 GENERAL DESCRIPTION OF WORK

A. The Contractor shall provide all labor, material, tools, equipment and services required to complete the furnishing, installation, wiring, connection, calibration, adjustment, testing and operation of all electrical equipment, devices and components as indicated and implied by the plans and these Specifications. General descriptions include:

1. Complete the procurement, installation, wiring, connection, calibration, adjustment, testing and operation of all electrical devices, components, accessories and equipment that is not shown or specified but which is nonetheless required to make the systems shown and specified function properly.

2. Complete the wiring to, connection to, adjustment and calibration of, and testing of furnished electrical components.

3. Install all equipment so it shall be readily accessible for maintenance. Installations shall have electrical clearances in accordance with NEC and shall be installed in locations that will provide adequate cooling.

4. Check electrical equipment prior to installation so that defective equipment is not installed.

5. Provide field services of qualified technicians to supervise and check out the installation of the equipment, to supervise and check out interconnecting wiring, to conduct start-up of operation of the equipment, and to correct any problems that occur during start-up.

6. Provide circuit breakers, conduit, wire and installation for all items that require electrical power.

1.03 PROJECT DESCRIPTION

A. General

In general, the project shall consist of all electrical construction required to make a complete and fully operational system. The following is a general description of the work anticipated to be provided by the Electrical Contractor:

1. Provide new electrical service equipment per Specification 26 27 00.

2. Provide new power distribution including feeders, branch circuits, panels, disconnects, and other equipment.

3. Provide new exterior lighting systems.

4. Provide power and control connections for all pump equipment required for the project.

5. Mitchell Lewis Staver 125 HP x 125 HP x 25 HP 3 phase tri-plex VFD pump control panel free standing on legs or similar. Features listed on plans

6. Additional electrical work not shown on the drawings and specifications yet required by Washington state electrical code, Douglas County PUD, or manufacuture requirements.

1.04 TEMPORARY OPERATION AND CONSTRUCTION POWER

A. The Contractor shall provide a separately metered temporary power service for construction power as needed. The temporary service shall provide:

1. Power for operation of all equipment during testing.
2. Power for operation of all equipment including lighting and equipment

B. All coordination with the utility and associated construction costs for temporary construction power shall be paid for by the Contractor. The Contractor shall pay the for the energy costs as billed by the utility on the construction power meter.

C. The Contractor may use existing power feeder if coordinated and agreed to by the District.

1.05 TEMPERATURE RATINGS OF EQUIPMENT TERMINATIONS

A. All materials shall conform to the National Electrical Code Article 110-14C. Wiring and circuit breakers on this project are designed for 75 deg C operation above 100 amperes; 60 deg C for 100 amperes and below. All products furnished on this project shall have electrical terminations rated for 60 deg C for ampacities of 100 amperes and below, and rated for 75 deg C for ampacities above 100 amperes.

B. These requirements cover all electrical equipment provided under this Contract.

1.06 STANDARDS AND CODES

The Contractor shall provide all permits, licenses, approvals and other arrangements for work on this project and all fees shall be paid for by the Contractor. The Contractor shall include these fees in the bid price.

A. References

This section contains references to the following documents. They are part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

1. National Electrical Code (NEC)
2. Underwriters' Laboratories, Inc. (UL)
3. National Electrical Manufacturers Association (NEMA)
4. Canadian Standards Association (CSA)
5. Electrical Testing Laboratories (ETL)
6. Factory Mutual (FM)

B. Identification of Listed Products

1. All materials and equipment specified herein shall be within the scope of Nationally Recognized Testing Laboratory (NRTL) examination services, be approved by the NRTL for the purpose for which they are used, and shall bear the appropriate listing label.
2. Equipment listed/labeled by an NRTL shall be as dictated by the latest printing of the *Electrical Testing Laboratories Accreditation Report* available from the State of Washington Department of Labor and Industries, Electrical Inspection Division. Any NRTL listing/labeling shall be as accepted by the local authority having jurisdiction.

3. When a product is not available with a testing laboratory listing for the purpose for which it is to serve, the product may be required by the inspection authority to undergo a special inspection at the manufacturer's place of assembly. All costs and expenses incurred for such inspections shall be included in the original contract price.

1.07 SITE FAMILIARIZATION

The Contractor shall become familiar with all features of the site which may affect the execution of the work prior to submitting a bid. The Contractor shall take all field measurements necessary for the work and shall assume full responsibility for their accuracy. The Contractor shall take full responsibility for locating and avoiding all substructures and utilities. Any damage to existing equipment or utilities shall be repaired or replaced by the Contractor at the Contractors expense.

1.08 AREA CLASSIFICATIONS

The following classification of areas shall be used as a reference in determining application of material covered by this Section unless specifically shown otherwise on the drawings. Areas that fall under two or more of the following classifications shall conform to the minimum requirements of all of the area classifications listed for that area.

A. General Purpose Areas:

Exposed raceways shall be GRS. Raceways concealed for general purpose lighting and receptacle circuits shall be EMT. Exposed boxes shall be NEMA 12. Concealed boxes may be NEMA 1. Boxes poured in concrete shall be cast copper free aluminum.

1.09 ELECTRICAL SUBMITTALS

A. Electrical submittals shall be submitted in accordance with Section 01.

PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. General

Equipment and materials shall be new and free from defects. All material and equipment of the same or a similar type shall be of the same manufacturer throughout the work. Standard production materials shall be used wherever possible.

B. Equipment Finish

Unless otherwise specified, electrical equipment and materials shall be painted by the manufacturer.

C. Galvanizing

Where specified, galvanizing shall be in hot dipped.

2.02 NAMEPLATES

A. Nameplates shall be provided on all electrical devices. This includes, but is not limited to: motor control equipment, MCC cubicles, control stations, junction boxes, panels, motors, instruments, switches, indicating lights, meters, and all electrical equipment enclosures.

B. Nameplates shall also be provided on all electrical panel interior equipment. This includes but is not limited to: relays, circuit breakers, power supplies, terminals, contactors, and other devices.

C. Nameplates shall be made of 1/16" thick machine engraved laminated phenolic having engraved black filled letters not less than 3/16" high on white background or as shown on the drawings or other sections of the Specifications. Nameplates on the interior of panels shall be white polyester with printed thermal transfer lettering and permanent pressure sensitive acrylic; Tyton 822 or equal. All nameplates shall include the equipment name and number (and function, if applicable).

D. Warning nameplates shall be provided on all panels and equipment which contain multiple power sources or which may have energized circuits with the main disconnecting means in the off position. Lettering shall be white on red background.

E. All nameplates shall be secured to equipment with stainless steel screws/fasteners. Epoxy glue may be used where fasteners are not practical as determined by the Engineer.

PART 3 - EXECUTION

3.01 GENERAL

A. Storage and Installation Environment

1. The Contractor shall store all electrical equipment in a dry environment free from dust, moisture, sprays or vapors which may be detrimental to their new condition. After installation of equipment, the Contractor shall take care to protect all equipment from all dust, moisture, paint and other spray, harmful vapors.

2. Equipment shall not be installed in indoor areas until the area is covered, dry and finished to the point that other work will not create dust, vapors, or moisture. Equipment with integral heaters and fans shall not be installed until power is available at the location, and the heater and fan shall be energized within 6 hours of the equipment being installed.

B. Housekeeping

1. The premises shall be kept free of accumulated materials, rubbish and debris at all times. Surplus material, tools and equipment must not be stored at the job site. Upon completion of the project, all equipment and fixtures shall be cleaned and in proper condition for their intended use.

3.02 TESTS

A. The Contractor shall conduct testing for installed feeder cables and motors in accordance with Sections 26 05 19. Grounding shall be tested in accordance with Section 26 05 26.

B. Functional testing shall be performed for all new work. Prior to functional testing, all protective devices shall be adjusted and made operative. Prior to energization of equipment, the Contractor shall perform a functional checkout of the control circuit. Checkout shall consist of energizing each control circuit and operating each control, alarm or malfunction device and each interlock in turn to verify that the specified action occurs. The Contractor shall submit a description of the proposed functional test procedures prior to the performance of the functional checkout.

C. The Contractor shall verify motors are connected to rotate in the correct direction. Verification may be accomplished by momentarily energizing the motor, provided the Contractor confirms that neither the motor nor the driven equipment will be damaged by reverse operation.

3.03 FINAL ACCEPTANCE

A. Prior to final acceptance, the Engineer will perform one or more site observation trips to develop a "punch list" of items deemed incomplete. The Electrical Contractor shall be present while these inspections are taking place and shall be available for opening cabinets and operating and adjusting the system as is necessary for the Engineer to verify all equipment is installed and operates to the requirements of the contract documents.

B. The Contractor shall complete all items of work, including wire markers, nameplates, final tests and final test reports prior to requesting final acceptance inspections. All equipment shall be checked for proper operation and all signals verified for correct calibration and wiring. Fixtures shall have been cleaned, and burned out or defective lamps shall have been replaced.

3.04 TRAINING

A. The Contractor shall provide training in accordance with the specific requirements in other sections of these Specifications. In addition to training required in other Sections of the Specifications, the Contractor shall conduct specifically organized training sessions in the overall operation and maintenance of the electrical system for personnel employed by the Owner. The training sessions shall be conducted to educate and train the personnel in operation and maintenance of all components of the electrical system outside the training requirements in the other sections of these Specifications. Training shall include, but not be limited to, the following:

1. Preventative maintenance procedures
2. Trouble-shooting
3. Calibration
4. Testing
5. Replacement of components
6. Equipment operation

At least one training sessions, each at least two (2) hours in duration, or as deemed necessary by the Owner, shall be conducted at the facility after start-up of the system. The Contractor shall prepare and assemble specific instruction materials for each training session and shall supply such materials to the Owner at least one (1) week prior to the time of the training.

END OF SECTION 26 05 00

SECTION 26 05 19 – WIRE AND CABLE

PART 1 – GENERAL

1.01 DESCRIPTION

This section specifies conductors and cables rated to 600 volts used for power, lighting, receptacle, signal, and control circuits.

1.02 STANDARDS AND CODES

A. All materials and equipment specified herein shall be within the scope of Nationally Recognized Testing Laboratory (NRTL) examination services, be approved by the NRTL for the purpose for which they are used, and shall bear the appropriate listing label.

B. Equipment listed/labeled by an NRTL shall be as dictated by the latest printing of the Electrical Testing Laboratories Accreditation Report available from the State of Washington Department of Labor and Industries, Electrical Inspection Division. Any NRTL listing/labeling shall be as accepted by the local authority having jurisdiction.

C. When a product is not available with a testing laboratory listing for the purpose for which it is to serve, the product may be required by the inspection authority to undergo a special inspection at the manufacturer's place of assembly. All costs and expenses incurred for such inspections shall be included in the original Bid Price.

1.03 SUBMITTALS

Submit all catalog data in accordance with the Section 01 submittals. Show material information and confirm compliance with these Specifications.

PART 2 - PRODUCTS

2.01 GENERAL

Circuit conductors are unscheduled and shall be sized by the Contractor in accordance with the NEC to limit voltage drop to 3 percent. Number and types of conductors shall be as required for the particular equipment provided.

2.02 POWER AND CONTROL CONDUCTORS

A. Lighting conductors shall be stranded except for 12 AWG which shall be solid. Minimum conductor size shall be 12 AWG.

B. Conductors shall be provided with the following characteristics:

1. Voltage: 600 volts
2. Conductor: Bare soft annealed copper, Class B stranded per ASTM-8; solid per ASTM B-3
    a. Insulation:

1) XHHW-2, 90 degrees C continuous rating, wet or dry
2) THHN/THWN-2, 90 ° C dry, 90 ° C wet, cross-linked polyethylene (XLP)

3. Jacket: Nylon, PVC
4. Flame resistance: UL 83
5. Manufacturer: Okonite; Southwire; Or Equal

2.03 SIGNAL CABLES

A. General

Signal cable shall be provided for instrument signal transmission, alarm, communication and any circuit operating at less than 100 volts. Cables shall be color coded black and white for pairs or black, white and red for triads. Circuit shielding shall be provided in addition to cable shielding. Circuits shall be provided in compliance with the instrument manufacturer's recommendations.

B. Single Circuit

Cable shall consist of one pair or triad, 18 AWG conductors with 15 mils of 90 degree C polyvinylchloride (PVC) insulation, 4 mils nylon conduit or jacket, twisted on a 2-inch lay, and covered with a 100 percent 1.35 mil aluminum-Mylar tape shield with 18 AWG 7-strand tinned copper drain wire and a 45 mil PVC jacket overall. Cable shall be UL listed, Type TC, rated 600 volts. Cable shall be Okonite, Okoseal N TYPE P-OS, Or Equal.

C. Multiple Circuit

Cable shall consist of four or more pairs or triads which are made up of 18 AWG conductors with 15 mils of 90 degree C PVC insulation, 4 mils nylon jacket, twisted on a staggered lay 1-1/2 to 2-1/2 inches, and covered with a 100 percent 1.35 mil aluminum-Mylar tape shield with 22 AWG 7-strand tinned copper drain wire. Overall cable shield shall be 2.35 mil aluminum-Mylar tape with a 20 AWG 7-strand tinned copper drain wire. Cable shall be UL listed, Type TC, 600 volts. Cable shall be Okonite, Okoseal-N Type SP-OS, Or Equal. Manufacturer: Okonite Or Equal

2.04 CONNECTORS

A. Pre-insulated connectors for splices and taps in conductors 10 AWG and smaller shall be Ideal Industries "Wing Nut" or 3M Company "SCOTCHLOCK", Or Equal. For 8 AWG and larger conductors shall be T&B compression connectors, Or Equal. Compress using manufacturer's recommended die and tools.

B. Waterproof silicone filled "wing nut" type connectors or spade/lug type terminations and terminals and coated with liquid insulation shall be used for all connections of wire to cord to removable equipment provided with integral cords (such as floats, transmitters, limit switches, etc.) in junction boxes in underground handholes or outdoor junction boxes. Insulators shall be Thomas and Betts multi splice insulator MSLT112-4, Or Equal.

2.05 SPLICE INSULATION

A. Splice insulation shall be equal or greater than the insulation level of the conductor used.

B. All permanent splices that are underground or in damp or corrosive environments shall be insulated with cast epoxy type insulation which covers the jacket of all cords and the insulation on all wire. Epoxy splice shall be Scotch #3570 Or Equal.

2.06 WIRING SCHEDULE

Refer to pump motor and Controller manufacture requirements for description of conductors required.

2.07 WIRE MARKERS

Field installed wire markers shall be T&B SMS pre-printed clip-on markers, Or Equal.

PART 3 - EXECUTION

3.01 GENERAL

A. Each power and control conductor shall be identified at each terminal to which it is connected.

B. Pulling wire and cable into conduit or trays shall be completed without damaging or putting undue stress on the cable insulation. Soapstone, talc or UL listed pulling compounds are acceptable lubricants for pulling wire and cable. Grease is not acceptable. Raceway construction shall be complete, cleaned, and protected from the weather before cable is placed in the raceway.

3.02 600 VOLT CONDUCTOR AND CABLE

A. Conductors in panels and electrical equipment, 6 AWG and smaller, shall be bundled and laced at intervals not greater than 6 inches, spread into trees and connected to their respective terminals. Lacing shall be made up with plastic cable ties. Lacing is not necessary in plastic panel wiring duct. Conductors crossing hinges shall be bundled into groups not exceeding 12 and shall be so arranged that they will be protected from chafing when the hinged member is moved.

B. Slack shall be provided in junction and pull boxes, and handholes. Slack shall be sufficient to allow cables or conductors to be routed along the walls of the box. Amount of slack shall be equal to largest dimension of the box. Where plastic panel wiring duct is provided for wire runs, lacing is not required.

C. Solid wire shall not be lugged, nor shall electrical spring connectors be used on any except for solid wires in lighting and receptacle circuits. Lugs and connectors shall be installed with a compression tool.

D. All splices and terminations are subject to inspection by the permitting agency prior to and after insulating. Terminations at 460 volt motors shall be made by bolt-connecting the lugged connectors. Connections shall be insulated and sealed with factory-engineered

kits. Bolt connection area shall be kept free of mastics and fillers to facilitate rapid stripping and re-entry. Motor connection kits shall accommodate a range of cable sizes for both in-line and stub-type configurations. Connection kits shall be independent of cable manufacturer's tolerances.

E. In-line splices, where Approved, shall be made with tubular compression connectors and insulated as specified for motor terminations, except that conductors 10 AWG and smaller may be spliced using self-insulating connectors. Splices and tees in underground handholes or pull boxes shall be insulated using Scotch-cast epoxy resin splicing kits. Terminations at devices with 120 volt pigtail leads shall be made using self-insulating tubular compression connectors.

F. Terminations at solenoid valves, 120 volt motors, and other devices furnished with pigtail leads shall be made using self insulating tubular compression connectors.

G. In the case where multiple field located instrumentation and control devices require parallel or series wiring configuration, it shall be done at one location in one junction box or marshalling enclosure with terminals. Interconnection of instrumentation and control devices shall not be done within conduit bodies (i.e. LBs, condulets, etc.).

3.03 SIGNAL CABLING

A. Circuit runs shall be of individually shielded twisted pairs or triads. In no case shall a circuit be made up using conductors from different pairs or triads. Triads shall be used wherever 3-wire circuits are required. Terminal blocks shall be provided at instrument cable junctions unless otherwise specified. Signal circuits shall be run without splices between instruments, terminal boxes, or panels.

B. Shields shall not be used as a signal path, except for coaxial cable circuits operating at radio frequencies.

C. Unless otherwise specified, shields shall be bonded to the signal ground bus at the control panel and isolated from ground and other shields at other locations. Terminals shall be provided for running signal leads and shield drain wires through junction boxes.

D. Spare circuits shall be terminated on terminal blocks at both ends of the cable run and be electrically continuous through terminal boxes. Shield drain wires for spare circuits shall not be grounded at either end of the cable run. Terminal boxes shall be provided at instrument cable splices. If cable is buried or in raceway below grade at splice, an instrument stand shall be provided as specified with terminal box mounted approximately 3 feet above grade.

E. Cable for paging, telephone, and security systems shall be installed and terminated in compliance with the manufacturer's recommendations.

3.04 COLOR CODING

A. Wiring shall conform to the following color code, unless otherwise specified.

B. Insulation on phase conductor sizes 8 AWG and smaller shall be colored, 6 AWG and larger may have black insulation with plastic tape of the appropriate color from the table below.

C. Insulation on the grounded conductor (neutral) sizes 6 AWG and smaller shall be colored;4 AWG and larger may have black insulation with plastic tape of white or gray in accordance with the table below:

Description	240/120V	208Y/120V	480Y/277V	Control
Phase A (Left, Top, Front)	Black	Black	Brown	--
Phase B (Center, Center, Center)	Red	Red	Orange	--
Phase C (Right, bottom, Back)	N/A	Blue	Yellow	--
Neutral	White	White	Gray	White
Ground	Green	Green	Green	Green
120 VAC Control	--	--	--	Red
120 VAC Control	Neutral	Neutral	--	White
DC Control (+)	--	--	--	Purple
DC Control (-)	--	--	--	Gray
External Source	--	--	--	Yellow

D. All control wiring in control panels or other enclosures that is powered from an external source and is not disconnected by the control panel disconnect shall be terminated at a disconnecting terminal block (with energization indicator light) upon entering the enclosure. The color of the wire shall then be changed to yellow to identify it as being powered from an external source. Provide identification nameplate on exterior of enclosure to indicate sources of external power.

E. All wiring in industrial machines and equipment shall be in accordance with NFPA 79. Notify Owner of any deficiencies noted during installation.

3.05 TERMINAL MARKING

All terminals in instrument and relay compartments, motor control centers, in control panels, instrument panels, field panels and control stations, as well as connections to mechanical equipment shall have reference number and letter referencing connected equipment.

3.06 WIRE BENDING RADIUS

The radius of bends in all non-shielded wire (conductors and cables) shall not be less than eight (8) times the outside diameter of the wire. Shielded or lead covered wire shall not be bent to a radius less than twelve (12) times the diameter of the wire. Any wire installed with bends less than the allowed diameter and which the Engineer deems has caused that insulation to be damaged, shall be removed and new wire shall be installed.

3.07 GENERAL TESTS

A. The Contractor shall perform voltage, current and resistance tests as required to complete the Electrical System Test Report form provided at the end of this section. Test reports shall be submitted to the Engineer prior to final acceptance by the Owner. The Contractor shall inform the Engineer of scheduled testing a minimum of 5 days prior to the testing.

Testing shall not take place unless the Engineer or Owner Representative is present to witness the testing.

B. The Contractor shall undertake all such corrective measures if the test results indicate corrective measures are required. No additional compensation will be paid for corrective measures.

C. Test Scope

1. The Contractor shall provide all material, equipment, labor and technical supervision to perform tests and inspections as specified herein.

2. It is the intent of these tests to assure that all electrical equipment as supplied and installed by the Contractor is operational within the industry and manufacturer's tolerances and is installed in accordance with the design documents.

3. The tests and inspection shall determine the suitability for energization.

D. Conductor Tests

1. Following the completion of installation, the following conductors shall be tested:

a. Service and feeder conductors.
b. All new grounding; measure ground resistance at each ground rod.

E. Visual and Mechanical Inspections

1. Inspect exposed section for physical damage.

2. Verify cable is supplied and connected in accordance with Specifications and manufacturer one line diagram, and that phases are labeled correctly.

F. Electrical Tests

1. Perform insulation resistance test on each cable in reference to ground and adjacent conductors in the same raceway.

2. Perform continuity test to ensure proper cable connection.

G. Test Values

1. Insulation resistance tests shall be performed at 1000 volts DC for one-half minute.
2. Minimum megger readings at 20 degrees C shall be one megohm.
3. The maximum acceptable reading for an individual ground rod shall be 25 ohms as required by the NEC and measured by the three rod method. The composite ground electrode shall have a maximum acceptable reading of 15 ohms.

3.08 ELECTRICAL SYSTEM TEST REPORT - 600V CABLE

A. Electrical System Description Data

SERVICE DESCRIPTION:	
nominal voltage, phase to phase	
phase to neutral - single or three phase	
number of conductors	

SERVICE CONDUCTORS:	
phase size and insulation type	
neutral size and insulation type	
ground size and insulation type	

SERVICE DISCONNECT DESCRIPTION:	
circuit breaker or disconnect switch	
size (amps)	
fuse (amps)	

MEASURED CONDITIONS	DATA			
Operating Load Voltage	Volts	Vab	Vbc	Vca
		Van	Vbn	Vcn
Operating Load Feeder Current	Amps	Ia	Ib	Ic
Conductor Insulation	Megohms	a-b	b-c	c-a
Resistance (record the indicated measurement for each of the following circuits:)	Megohms	a-g	b-g	c-g

END OF SECTION 26 05 19

SECTION 26 05 23 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Copper building wire rated 600 V or less.
2. Connectors, splices, and terminations rated 600 V and less.

1.3 DEFINITIONS

A. RoHS: Restriction of Hazardous Substances.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: Indicate type, use, location, and termination locations.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Manufacturers:
1. Alpha Wire Company
2. Belden Inc.
3. General Cable Technologies
4. Service Wire Co.
5. Southwire Company
6. Wesco
7. Or Engineer approved equal

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. RoHS compliant.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

E. Conductor Insulation:

1. Type NM: Comply with UL 83 and UL 719.
2. Type RHH and Type RHW-2: Comply with UL 44.
3. Type USE-2 and Type SE: Comply with UL 854.
4. Type TC-ER: Comply with NEMA WC 70/ICEA S-95-658 and UL 1277.
5. Type THHN and Type THWN-2: Comply with UL 83.
6. Type THW and Type THW-2: Comply with NEMA WC-70/ICEA S-95-658 and UL 83.
7. Type UF: Comply with UL 83 and UL 493.
8. Type XHHW-2: Comply with UL 44.

2.2 METAL-CLAD CABLE, TYPE MC

A. Metal-clad cable, type MC shall not be allowed.

2.3 ARMORED CABLE, TYPE AC

A. Armored cable, type AC shall not be allowed.

2.4 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Manufacturers:
1. 3M Electrical Products
2. Hubble Power Systems Inc.
3. O-Z/Gedney
4. Service Wire Co.
5. Thomas & Betts
6. Or Engineer approved equal.

C. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.

D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Copper.
2. Type: One with standard barrels.
3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Feeders: Copper for feeders smaller than No. 4 AWG; copper for feeders No. 4 AWG and larger. Conductors shall be solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

C. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

D. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

E. Power-Limited Control: Solid for No. 12 AWG and smaller.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN/THWN-2, single conductors in raceway.

B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

C. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

D. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.

E. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

F. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Complete raceway installation between conductor and cable termination points prior to pulling conductors and cables.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.7 FIELD QUALITY CONTROL

A. Agency: L&I and DCPUD are to be engaged to ensure connection and system pass all perform tests and inspection permit requirements.

B. Perform tests and inspections.

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
2. After installing conductors and cables and before electrical circuitry has been energized, test branch circuit and feeder conductors.

3. Perform each of the following visual and electrical tests:

    a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the manufactures or DCPUD supply single-line diagram.
    b. Test bolted connections for high resistance using one of the following:

        1) A low-resistance ohmmeter.
        2) Calibrated torque wrench.
        3) Thermographic survey.

    c. Inspect compression-applied connectors for correct cable match and indentation.
    d. Inspect for correct identification.
    e. Inspect cable jacket and condition.
    f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
    g. Continuity test on each conductor and cable.
    h. Uniform resistance of parallel conductors.

4. Initial Infrared Scanning: After Substantial Completion, but before Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.

    a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
    b. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

C. Cables will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports to record the following:

1. Procedures used.
2. Results that comply with requirements.
3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes grounding and bonding systems and equipment.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency and testing agency's field supervisor.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Certified by NETA.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

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

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

A. Alpha Wire Company

B. Belden Inc.

C. General Cable Technologies

D. Service Wire Co.

E. Southwire Company

F. Wesco

G. Or Engineer approved equal

2.3 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches (6.3 by 100 mm) in cross section, with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

D. Bus-Bar Connectors: Compression type, copper or copper alloy, with two wire terminals.

E. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.

F. Cable-to-Cable Connectors: Compression type, copper or copper alloy.

G. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.

H. Conduit Hubs: Mechanical type, terminal with threaded hub.

I. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.

J. Straps: Solid copper. Rated for 600 A.

K. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.

L. Water Pipe Clamps:

1. Mechanical type, two pieces with zinc-plated bolts.

a. Material: Die-cast zinc alloy.
b. Listed for direct burial.

2. U-bolt type with malleable-iron clamp and copper ground connector rated for direct burial.

2.5 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet (19 mm by 3 m).

B. Ground Plates: 1/4 inch (6 mm) thick, hot-dip galvanized.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 6 AWG and smaller, and stranded conductors for No. 4 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.

1. Bury at least 24 inches (600 mm) below grade.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus horizontally, on insulated spacers 2 inches (50 mm) minimum from wall, 6 inches (150 mm) above finished floor unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.

E. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Flexible raceway runs.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

F. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

G. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.4 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Rods: Drive rods until tops are 12 inches (300 mm) below finished grade when buried in direct earth or 2 inches (50 mm) below finished floor or final grade when encased or covered by concrete or asphalt unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
2. Use exothermic welds for all below-grade connections.
3. For grounding electrode system, install at least two rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

D. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

E. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart. Retain one of two "Concrete-Encased Grounding Electrode (Ufer Ground)" paragraphs below to require concrete-encased grounding electrode. Concrete shall be in direct contact with the earth. Concrete installed with insulation, vapor barriers, films, or similar items separating the concrete from the earth is not considered to be in "direct contact" with the earth.

F. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; using electrically conductive coated steel reinforcing bars or rods, at least 20 feet (6.0 m) long. If reinforcing is in multiple pieces, connect together by the usual steel tie wires or exothermic welding to create the required length.

G. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Make tests at ground rods before any conductors are connected.

    a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than

natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.

b. Perform tests by fall-of-potential method according to IEEE 81.

4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

C. Grounding system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Report measured ground resistances that exceed the following values:
1. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).

F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Steel slotted support systems
2. Conduit and cable support devices.
3. Support for conductors in vertical conduit.
4. Structural steel for fabricated supports and restraints.
5. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:

a. Slotted support systems, hardware, and accessories.
b. Clamps.
c. Hangers.
d. Sockets.
e. Eye nuts.
f. Fasteners.
g. Anchors.
h. Saddles.
i. Brackets.

2. Include rated capacities and furnished specialties and accessories.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M.
2. AWS D1.2/D1.2M.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Hangers and supports shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the supported equipment and systems will remain in place without separation of any parts when subjected to the seismic forces specified."
2. Component Importance Factor: 1.0.

B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame Rating: Class 1.
2. Self-extinguishing according to ASTM D 635.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch- (10-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c. in at least one surface.
1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
2. Material for Channel, Fittings, and Accessories: Galvanized steel.
3. Channel Width: 1-5/8 inches (41.25 mm.
4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
5. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
6. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
7. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.

D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.

E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements per manufacture or in this Section are stricter:

1. NECA 1.
2. NECA 101
3. NECA 102.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and

communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT and RMC may be supported by openings through structure members, according to NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
6. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 CONCRETE BASES

A. Construct concrete bases to not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete."

C. Anchor equipment to concrete base as follows:

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Color and legend requirements for raceways, conductors, and warning labels and signs.
2. Labels.
3. Bands and tubes.
4. Tapes and stencils.
5. Tags.
6. Signs.
7. Cable ties.
8. Paint for identification.
9. Fasteners for labels and signs.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 70.

B. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

C. Comply with ANSI Z535.4 for safety signs and labels.

D. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

A. Raceways and Cables Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.
2. Legend: Indicate voltage.

B. Color-Coding for Phase Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.

1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
2. Colors for 208/120-V Circuits:

a. Phase A: Black.
b. Phase B: Red.
c. Phase C: Blue.

3. Colors for 240-V Circuits:

a. Phase A: Black.
b. Phase B: Red.

4. Colors for 480/277-V Circuits:

a. Phase A: Brown.
b. Phase B: Orange.
c. Phase C: Yellow.

5. Color for Neutral: White.
6. Color for Equipment Grounds: Green.
7. Colors for Isolated Grounds: Green with white stripe.

C. Warning Label Colors:

1. Identify system voltage with black letters on an orange background.

D. Warning labels and signs shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

E. Equipment Identification Labels:

1. Black letters on a white field.

2.3 LABELS

A. Self-Adhesive Wraparound Labels: Preprinted, 3-mil- (0.08-mm-) thick, vinyl flexible label with acrylic pressure-sensitive adhesive.
   1. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
   2. Marker for Labels: Permanent, waterproof, black ink marker recommended by tag manufacturer.
   3. Marker for Labels: Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.

B. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil- (0.08-mm-) thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
   1. Minimum Nominal Size:

      a. 1-1/2 by 6 inches (37 by 150 mm) for raceway and conductors.
      b. 3-1/2 by 5 inches (76 by 127 mm) for equipment.
      c. As required by authorities having jurisdiction.

2.4 TAPES AND STENCILS

A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide; compounded for outdoor use.

C. Tape and Stencil: 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers placed diagonally over orange background and are 12 inches (300 mm) wide. Stop stripes at legends.

D. Floor Marking Tape: 2-inch- (50-mm-) wide, 5-mil (0.125-mm) pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

E. Underground-Line Warning Tape:

1. Tape:

   a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical utility lines.

b. Printing on tape shall be permanent and shall not be damaged by burial operations.
c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.

2. Color and Printing:

a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.
b. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".
c. Inscriptions for Orange-Colored Tapes: "TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE".

F. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch (25 mm).

2.5 TAGS

A. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking cable tie fastener.

B. Nonmetallic Preprinted Tags: Polyethylene tags, 0.015 inch (0.38 mm thick, color-coded for phase and voltage level, with factory printed permanent designations; punched for use with self-locking cable tie fastener.

2.6 SIGNS

A. Laminated Acrylic or Melamine Plastic Signs:

1. Engraved legend.
2. Thickness:

a. For signs up to 20 sq. in. (129 sq. cm), minimum 1/16 inch (1.6 mm) thick.
b. For signs larger than 20 sq. in. (129 sq. cm), 1/8 inch (3.2 mm) thick.
c. Engraved legend with black letters on white face.
d. Punched or drilled for mechanical fasteners with 1/4-inch (6.4-mm) grommets in corners for mounting.
e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

PART 3 - EXECUTION

3.1 PREPARATION

A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

B. Install identifying devices before installing acoustical ceilings and similar concealment.

C. Verify identity of each item before installing identification products.

D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.

E. Apply identification devices to surfaces that require finish after completing finish work.

F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.

G. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.

1. Secure tight to surface of conductor, cable, or raceway.

H. System Identification for Raceways and Cables over 600 V: Identification shall completely encircle cable or conduit. Place adjacent identification of two-color markings in contact, side by side.

1. Secure tight to surface of conductor, cable, or raceway.

I. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

J. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for power transfer].

K. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.

L. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:

1. "EMERGENCY POWER."
2. "POWER."

M. Vinyl Wraparound Labels:

1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.

N. Snap-around Labels: Secure tight to surface at a location with high visibility and accessibility.

O. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.

P. Self-Adhesive Labels:

1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.

Q. Snap-around Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.

R. Heat-Shrink, Preprinted Tubes: Secure tight to surface at a location with high visibility and accessibility.

S. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.

T. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.

1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.

U. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.

V. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's written instructions.

W. Underground Line Warning Tape:

1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches (400 mm) overall.
2. Limit use of underground-line warning tape to direct-buried cables.
3. Install underground-line warning tape for direct-buried cables and cables in raceways.

X. Baked-Enamel Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on minimum 1-1/2-inch- (38-mm-) high sign; where two lines of text are required, use signs minimum 2 inches (50 mm) high.

Y. Laminated Acrylic or Melamine Plastic Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high sign; where two lines of text are required, use labels 2 inches (50 mm) high.

Z. Cable Ties: General purpose, for attaching tags, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

3.3 IDENTIFICATION SCHEDULE

A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.

B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.

C. Accessible Raceways, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels.

1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.

D. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage. System legends shall be as follows:

1. "EMERGENCY POWER."
2. "POWER."

E. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use vinyl wraparound labels to identify the phase.

1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.

F. Auxiliary Electrical Systems Conductor Identification: Self-adhesive vinyl tape that is uniform and consistent with system used by manufacturer for factory-installed connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

G. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.

H. Workspace Indication: Apply floor marking tape to finished surfaces. Show working clearances in the direction of access to live parts. Workspace shall comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

I. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.

J. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Baked-enamel warning signs.

1. Apply to exterior of door, cover, or other access.
2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:

a. Power-transfer switches.
b. Controls with external control power connections.

K. Equipment Identification Labels:

1. Indoor Equipment: Baked-enamel signs.
2. Outdoor Equipment: Laminated acrylic or melamine sign.
3. Equipment to Be Labeled:

a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a engraved, laminated acrylic or melamine label.
b. Enclosures and electrical cabinets.
c. Access doors and panels for concealed electrical items.

END OF SECTION 260553

SECTION 26 27 00 – SERVICE AND METERING

PART 1 - GENERAL

1.01 DESCRIPTION

This section specifies the new electrical service, pad-mounted transformer and service entrance equipment.

1.02 SCHEDULING WORK WITH THE UTILITY COMPANY

The Contractor shall be fully and completely responsible for all scheduling and coordination with the utility company. The Contractor shall coordinate and schedule power outages, power service for operation and construction, and power service as required by the facility prior to Certificate of Occupancy.

1.03 CONTRACTOR/UTILITY INTERFACE RESPONSIBILITIES

The electrical utility providing service to these facilities is Douglas County PUD. The Contractor shall comply with all utility company standards and requirements.

General Utility requirements are listed on the PUD website at douglaspud.org.

All conduit and materials shall be installed in accordance with Douglas County PUD standards. Call 509-881-2227 with any questions related to DCPUD conduit requirements.

Utility company charges for the new service shall be paid by Washington State University.

The following describes the general separation of Contractor and Utility responsibilities:

A. Contractor

1. Provide coordination for service equipment upgrade.

B. Utility

1. Coordinate with utility on requirements to provide and install new 50 kVA transformer and pad from new 3 phase power supply line by DCPUD.
2. Extend spare 3” conduit to transformer and into CTs, disconnects, meters, and breaker service panel.
3. Provide new parallel secondary service conductors from transformer to into CTs, disconnects, meters, and breaker service panel.
4. Provide connections at transformer and into CTs, disconnects, meters, and breaker service panel. .
5. Provide new CTs and utility metering equipment.
6. Energize new service.

1.04 QUALITY ASSURANCE

The Contractor shall comply with all serving Utility company standards and requirements.

1.05 STANDARDS AND CODES

All work involving service installation shall be done in accordance with Douglas County PUD standards and the National Electrical Code (NEC).

Service equipment shall be listed and labeled by UL as "Suitable for Use as Service Equipment".

END OF SECTION 26 27 00

SECTION 31 11 00 - CLEARING AND GRUBBING

PART 1 –GENERAL

1.1 SUMMARY

A. This section includes the requirements for clearing and grubbing of trees, shrubs, and organic materials and the disposal of the cleaned and grubbed materials.

B. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by Work of this Section.

C. Contractor shall note Phasing Plans and that clearing and grubbing activities will be controlled by these timelines.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.1 PROTECTION

A. Roads: Keep roads free of dirt and debris at all times.

B. Trees, Shrubs, and Existing Facilities: Protect landscape areas and trees to remain as indicated on the landscape drawings.

C. Utility Lines: Protect from damage existing utility lines that are indicated to remain. Notify the Owner's Representative immediately of damage to or an encountered unknown or unmapped existing utility line. The Contractor shall be responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations. When utility lines, which are to be removed, are encountered within the area of operations, notify the Owner's Representative in ample time to minimize interruption of the service.

3.2 CLEARING

A. Clearing shall consist of felling, trimming, and cutting of the existing trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including brush and rubbish occurring within the areas to be cleared. Clearing shall include removal of the stumps and roots larger than 3-inches in diameter and the disposal of any rubbish or materials encountered unless noted otherwise on the approved plans.

3.3 GRUBBING

A. Remove and dispose of roots larger than 3 inches in diameter, and the matted roots from the indicated grubbing areas. Excavate these materials together with organic and metallic debris, brush, and refuse and remove to a depth of not less than 18 inches below the original soil surface in areas to be grubbed and in areas indicated as construction areas under this contract. Fill depressions made by grubbing with suitable material.

3.4 DISPOSAL OF CLEARED AND GRUBBED MATERIAL

A. All material generated by clearing and grubbing activities shall be handled in accordance to the requirements specified in Section 01. Disposal shall be at a permitted facility.

END OF SECTION 31 11 00

SECTION 31 20 00 - EARTHWORK

PART 1 –GENERAL

1.1 SUMMARY

A. Section includes: Requirements for excavation, filling, preparation of subgrade, imported material, compaction and testing.

B. Related Sections:
1. Section 01

1.2 REFERENCE

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

B. American Association of State Highway and Transportation Officials (AASHTO):
1. AASHTO T 26 Method of Test for Quality Water to be Used in Concrete

C. American Society For Testing And Materials (ASTM):
1. ASTM C 33 (1993) Concrete Aggregates
2. ASTM C 94 (1996) Ready-Mixed Concrete
3. ASTM C 150 (1997) Portland Cement
4. ASTM C 260 (1995) Air-Entraining Admixture for Concrete
5. ASTM C 494 (1990) Chemical Admixtures for Concrete
6. ASTM C 618 (1997) Coal Fly Ash and Raw or Calcimined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
7. ASTM D 698 (1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft (600 kN-m/m))
8. ASTM D 1556 (1990) Density and Unit Weight of Soil in Place by the Sand-Cone Method
9. ASTM D 1557 (1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft (2,700 kN-m/m))
10. ASTM D 2487 (1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
11. ASTM D 2922 (1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
12. ASTM D 3017 (1988; R 1993) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
13. ASTM D 3786 (1987) Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics - Diaphragm Bursting Strength Tester Method
14. ASTM D 4253 (1993) Maximum Index Density of Soils Using a Vibratory Table
15. ASTM D 4254 (1991) Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
16. ASTM D 4355 (1992) Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
17. ASTM D 4491 (1992) Water Permeability of Geotextiles by Permittivity
18. ASTM D 4533 (1991) Trapezoid Tearing Strength of Geotextiles
19. ASTM D 4632 (1991) Grab Breaking Load and Elongation of Geotextiles
20. ASTM D 4759 (1988; R 1992) Determining the Specification Conformance of Geosynthetics
21. ASTM D 4833 (1988) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products

D. Code of Federal Regulations (CFR):

1. 29 CFR 1910 Occupational Safety and Health Standards
2. 29 CFR 1926 Occupational Safety and Health Regulations for Construction

E. Corps of Engineers (COE):
1. COE EM-385-1-1 (1992) Safety and Health Requirements Manual

F. Washington State Department of Labor and Industries:
1. WAC 296-24 General Safety and Health Standards

G. Washington State Department of Transportation (WSS):
1. WSS-1 (2014) Standard Specifications for Road, Bridge and Municipal Construction.

1.3 QUALITY ASSURANCE

A. Safety Codes and Standards: Perform all earthwork in compliance with applicable requirements of governing authorities having jurisdiction, including the applicable Rules and Regulations of OSHA 1518, Safety and Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations and of OSHA Part 1910, Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations, the Regulations of Washington Industrial Safety and Health Act and Washington Administrative Code 296-24.

B. Pre-Contract Soils Investigation:
1. Pre-Contract soils sampling and analysis has not been performed at the Project site. Owner and Engineer cannot, and do not, guarantee that soils composition will be uniform throughout the site.
2. Contractor shall anticipate and make allowance for an average and reasonable amount of variation from the typical soils types in the area of the work. Contractor (bidders) shall familiarize himself with the site as fully as practicable. Claims for unforeseeable additional cost of earthwork will only be considered if Contractor encounters rock or soils substantially and extensively different and more difficult than those reasonably anticipated in the area.

C. Tests and Inspections: An Independent Special Inspector will perform tests and inspections of work under this Section. Costs associated with tests shall be included in project costs by the Contractor. Relative compactions will be determined as specified under ASTM-D1557, or similar approved standard. Contractor shall cooperate in all respects to allow and assist in testing.

D. Layout:
1. The contractor shall provide all field layout for the proposed work in accordance with the following:
   a) The Engineer shall furnish to the Contractor the primary survey control data. The Contractor shall carefully preserve stakes, makes, and other reference points, including existing monumentation, set by Contracting Agency forces. The Contractor will be charged for the cost of replacing stakes, markers and monumentations that were not to be disturbed but were destroyed or damaged by the Contractor's operations. This charge will be deducted from monies due to the Contractor. Measurement for re-establishment will be per each monument re-established in conformance with RCW 58.09.130.
   b) The Contractor shall be responsible for the setting of all construction staking and installation and or resetting of monuments in accordance local and state requirements. The Contractor's Surveyor shall be responsible for maintaining Record Drawing for the Project in accordance with Section 017123 "Field Engineering"

2. If any discrepancies are found between the Drawings and actual conditions at the site, Engineer reserves the right to make minor adjustments in the work as necessary to accomplish the intent of the Contract Documents without increased cost to the Owner.

E. Contamination: No work of this Section shall allow excavated material to flow into existing creeks,

rivers, lakes, ground waters, storm systems and cause contamination of same. Contractor shall develop a containment plan, acceptable to the Code Enforcement Authority having jurisdiction, for use in performing this work.

1.4 DEFINITIONS

A. Backfill: A specified material used in refilling a cut, trench, or other excavation, placed at a specified degree of compaction.

B. Capillary Break: A layer of clean, poorly graded crushed rock, stone, or natural sand or gravel having a high porosity which is placed beneath a slab with or without a vapor barrier to cut off the capillary flow of pore water to the area immediately below the slab.

C. Cohesive Materials: Cohesive materials include materials classified by ASTM D 2487 as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesive only when the fines have a plasticity index greater than zero.

D. Cohesionless Materials: Cohesionless materials include materials classified by ASTM D 2487 as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines have a plasticity index of zero.

E. Compaction: The process of mechanically stabilizing a material by increasing its density at a controlled moisture condition. “Degree of Compaction” is expressed as a percentage of the maximum density obtained by the test procedure described in ASTM D 698 or ASTM D 1557 for general soil types or ASTM D 4253 and ASTM D 4254 (Relative Density) for isolated cohesionless materials, abbreviated in this specification as “XX percent ASTM D 1557 maximum density.”

F. Controlled Fill: A specified soil mix or gradation of materials constructed to attain maximum bearing strength and minimize consolidation or differential settlement under a load. Controlled fill is sometimes called “structural fill.”

G. Embankment: A “fill” having a top that is higher than adjoining ground.

H. Excavation: The removal of soil, rock, or hard material to obtain a specified depth or elevation.

I. Fill: Specified material placed at a specified degree of compaction to obtain an indicated grade or elevation.

J. Hard Material: Weathered rock, dense consolidated deposits or conglomerate materials, (excluding manmade materials such as concrete) which are not included in the definition of “rock” but which usually require the use of heavy excavation equipment with ripper teeth or the use of jack hammers for removal.

K. In Situ Soil: Existing in place soil.

L. Lift: A layer (or course) of soil placed on top of a previously prepared or placed soil.

M. Rock: Solid, homogeneous, interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement, exceeding 1 cubic yard in volume. Removal of “hard material” will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

N. Soil: The surface material of the earth's crust resulting from the chemical and mechanical weathering of rock and organic material.

O. Subgrade: The material in excavation (cuts) and fills (embankments) immediately below any subbase, base, pavement, or other improvement. Also, as a secondary definition, the level below which work above is referenced.

P. Topsoil: In natural or undisturbed soil formations, the fine-grained, weathered material on the surface or directly below any loose or partially decomposed organic matter. Topsoil may be a dark-colored, fine, silty, or sandy material with a high content of well decomposed organic matter, often containing traces of the parent rock material.

Q. Unsatisfactory Material: Existing, in situ soil or other material which can be identified as having insufficient strength characteristics or stability to carry intended loads in fill or embankment without excessive consolidation or loss of stability. Materials classified as PT, OH, or OL by ASTM D 2487 are unsatisfactory. Unsatisfactory materials also include man-made fills, refuse, frozen material, uncompacted backfills from previous construction, unsound rock or soil lenses, or other deleterious or objectionable material.

R. Unsuitable Material: Existing, in situ, materials classified as ML, or MH by ASTM D 2487 are unsuitable.

S. Working Platform: A layer of compacted crushed rock or natural stone that replaces the in situ soil to provide a stable, uniform bearing foundation for construction equipment to facilitate further site construction.

1.5 SUBMITTALS

Safety Codes and Standards: Perform all earthwork in compliance with applicable requirements of governing authorities having jurisdiction.

A. Submit the following to Owner:
1. Imported Soil Samples: Submit samples of all imported materials (including coarse drainage rock, imported structural fill, top soil) to Engineer for approval at least seven days prior to scheduled start of use. The Contractor shall provide material test results from a certified testing laboratory as part of the submittal. Certify to Engineer that all materials of each type used in the Work is true to approved type sample.
2. Shoring and Sheeting Plan: Describe materials or shoring system to be used. Indicate whether any components will remain after filling or backfilling. Provide plans, sketches, or details along with calculations by a registered professional engineer. Indicate sequence and method for installation and removal.
3. Gradation test of soil material tested at the source showing compliance with the specifications for structural fill, onsite native material, quarry spalls, capillary break, gravel backfill for drains, retaining wall select backfill, floor slab and pavement base course, paver joint/opening filler, bedding course, open graded base, stone subbase and drainage backfill. The Contractor shall provide material test results from a certified testing laboratory as part of the submittal. Certify to Engineer that all materials of each type used in the Work is true to approved type sample.
4. Mix design for controlled density fill.

1.6 REGULATORY REQUIREMENTS

A. Materials and workmanship specified herein with reference to WSS-1 State Standard shall be in accordance with the referenced articles, sections and paragraphs of the standard except that measurement and payment provisions do not apply. Where the term “Engineer” is used, it shall mean “Owner’s Representative.” Where the term “State” is used it shall mean “Owner.”

1.7 DELIVERY AND STORAGE

A. Deliver and store materials in a manner to prevent contamination or segregation. Store geotextile fabric reinforcing to prevent exposure to direct sunlight in accordance with the manufacturer's recommendations.

1.8 CRITERIA FOR BIDDING

A. Base bids on the following criteria:
   1. Surface elevations as indicated.
   2. The character of the material to be excavated or used for subgrade is as indicated. Rock or hard material as defined in paragraph entitled, “Definitions,” will not be encountered.
   3. Ground water elevations indicated are those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.
   4. Blasting will not be permitted.

1.9 JOB CONDITIONS

A. Existing Utilities: Although the Drawings endeavor to show all known existing underground or concealed utilities in the area of work, they do not purport to show all utilities. If existing utilities not shown on Drawings are encountered, support, shore up, protect same and immediately notify the Engineer. Allow access opportunity and ample time for measures necessary, for continuance and/or relocation of such services, if required.

B. Movement of construction machinery and equipment over pipes and utilities during construction shall be at the Contractor's risk. Contact the utility companies for location(s) of their utilities. Perform work adjacent to privately owned utilities in accordance with procedures outlined by the utility company. Excavation made with power-driven equipment is not permitted within 2 feet of known utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work as affected by the contract excavation until approval for backfill is granted by the Owner’s Representative.

C. Inspection: Examine the areas and conditions under which excavating, filling and grading are to be performed. Should any discrepancies between Drawings and Specifications and actual site conditions be encountered, consult Engineer before commencement of work.

D. Erosion and Water Quality Control:
   1. Precautions shall be taken during the entire construction period to minimize wind and water erosion. Bare earth shall be kept moist to prevent wind erosion. Contractor is warned that wind is a problem in the area of construction and he must have means and methods covered in his bid to perform sprinkling to control dust. Bare earth shall be seeded or mulched well in advance of winter rainy season and/or freezing weather. Means and methods (Best Management Practices as defined by DOE) shall be provided by the Contractor to prevent sediment laden runoff from entering the adjacent properties, roads, or waterways.
   2. Accidental spills of petroleum products, solvents, toxic chemicals fertilizers and construction materials shall be cleaned up immediately. Wash water, chemical and petroleum wastes shall be contained and prevented from entering ground water or runoff into waterways and shall be properly disposed of offsite.

E. Protection of Persons and Property
   1. Refer to General Conditions.
   2. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
   3. Refer to various other sections of this specification for additional specific requirements for

capping, temporary re-routing, etc., of existing on-site utilities, irrigation lines, etc.

4. Protect structures (new and existing), utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout and any other hazards created by earthwork operations.
5. All excavation or trenches near or under in-place footings or other improvements shall be cut in such manner so as not to undermine or reduce bearing for such improvements. All backfilling of such trenches shall be compacted to 95% maximum density, as specified, without disturbing bearing for, or integrity of, adjacent footings or improvements.
6. Provide traffic control by a licensed flagger for all work adjacent to roadways unless traffic control plan is submitted and approved by Engineer.

F. Cutting Pavement: Existing pavement surfaces shall be sawcut only to minimum width which will permit proper excavation and bracing of trench. Exact locations of cuts shall be approved by the Engineer in the field.

G. Replacing Pavements, Sidewalks and Curbs
1. All existing driveways, curbs or other paved or surfaced areas which are to remain shall be restored to their original condition, as nearly as practical.

2. All replacement of surfaced areas shall be to the approval of the Engineer.

3. If any pavement or surface area not immediately over or adjacent to a trench is disturbed or damaged as a result of operation of the Contractor, adequate repairs, as approved, shall be made by Contractor at his own expense.

H. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place against unnecessary cutting, creaking or skinning of roots, skinning and bruising of bark, etc.

I. Pumping and Drainage
1. Keep all excavations, pits, trenches, footings, etc., entirely free from water from any source during construction. Use suitable pumping equipment or other means as required by conditions. Continue pumping as necessary until completion of Project or until released by Engineer.
2. When operations are interrupted by unfavorable weather conditions, prepare areas by grading and compacting to avoid ponding and erosion.

J. Cleaning and Surplus Material Cleaning and Surplus Material
1. Conduct work in an orderly manner and so as not to create nuisance. Dirt shall not be permitted to accumulate on streets or sidewalks or to be washed into sewers or drainage systems.
2. Remove from the site and legally dispose of all debris and excavated material not approved for fills, including oversize rock. No rubbish or debris shall be buried on the site.

K. Unique Requirements of Operation: All structural footings for bearing walls and retaining walls must rest on existing undisturbed dense lower soils, level and true, or if over-excavation occurs, on approved concrete fill of over-excavated area.

L. Explosives: Do not bring explosives on site or use in work without prior written permission from authorities having jurisdiction. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

A. All imported materials shall be provided by a WSDOT approved source for the material specified.

B. Mineral aggregate materials composed of recycled material is not suitable for fill within the building area. Recycled mineral aggregates containing portland cement concrete and asphaltic concrete may be used in other areas of the site outside of the building area and permeable pavement areas in accordance with WSS-1, Section 9.03.18 and meeting the gradation requirement for the specified material.

C. Provide materials free from debris, roots, wood, scrap materials, vegetable matter, refuse or frozen material. Maximum particle size permitted is 3 inches. Provide structural fill material where indicated.

D. Structural Fill: Provide imported materials that are pit- or quarry-run rock, crushed rock, or crushed gravel and sand, conforming to WSS-1, Section 9-03.14(2), “Select Borrow,”, except that not more than 5 percent fines by dry weight passes the No. 200 sieve, based on wet sieving the fraction passing the 3/4-inch mesh sieve.

E. Common Fill: Fill placed in areas of the site where structural support is not required (such as planters, landscaped areas, and detention ponds) is defined as "common fill." Common fill may contain a higher concentration of fines and organic matter than structural fill, but should be free of man-made materials. Imported common fill should meet the specifications provided in WSS-1, Section 9-03.14, “Gravel Borrow,” On-site materials used for common fill should have an organic matter content less than 5 percent. Fill placed in nonstructural areas should be compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D1557.

F. Fill and Backfill: Provide structural fill as specified in this section. Soft, spongy, highly plastic, or otherwise unstable material is prohibited. On-site materials are not suitable for use as structural fill.

G. Floor Slab and Pavement Base Course: Imported granular material used as base rock for pavements and beneath hardscape areas should consist of material with a maximum size of 1-1/2 inches and meeting the specifications provided in WSS-1, Section 9-03.9(3), "Crushed Surfacing Base Course,", with the exception that the aggregate have less than 5 percent by dry weight passing a U.S. Standard No. 200 Sieve and at least two mechanically fractured faces. The imported granular material should be placed in lifts with a maximum uncompacted thickness of 6 inches and compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557.

H. Working Platform: Material and thicknesses of working platform for support of construction equipment shall be at the discretion of the construction contractor. The gradation and placement of such material shall not create large void spaces upon which overlying work is indicated to be placed.

I. Washed Gravel for TESC Measures: Provide washed gravel, in accordance with WSS-1, Section 9-03.12(2).

2.2 QUARRY SPALLS AND ROCK

A. Quarry spalls to conform to material specified in WSS-1, Section 9-13.6, “Quarry Spalls.” Quarry spalls for rock construction access shall be 4-inch to 8-inch gradation. Backfill for common and special over-excavations shall be 2-inch to 4-inch gradation.

B. 2-inch to 4-inch Rock: Conform to material specified in WSS-1, Section 9-13.6, except the

gradation shall conform to 2-inch to 4-inch quarry spalls.

2.3 CONTROLLED DENSITY FILL (CDF)

A. Controlled density fill (CDF) shall be in accordance with WSS-1, Section 2-09.3(1) E. CDF shall be mixed in accordance with ASTM C 94 by a ready-mix concrete producer. CDF shall have a minimum compressive strength of 100 psi. The architect shall approve controlled density fill (CDF) prior to being used as fill or backfill material.

2.4 GEOTEXTILE FABRIC

A. Stabilization Geotextile: Geotextile fabric for use at the base of over excavations and to stabilize the exposed subgrade beneath paved areas if construction is completed during the wet season. The geotextile should conform to the specifications for woven soil stabilization material provided in WSS-1, Section 9-33.2, "Geotextile Properties, Table 3 - Geotextile for Separation or Soil Stabilization."

B. Separation and Drainage Geotextile: Geotextile fabric for use around subsurface drains to separate drain rock from adjacent materials. The geotextile should conform to the specifications for nonwoven, separation material provided in WSS-1, Section 9-33.2, "Geotextile Properties, Table 3 - Geotextile for Separation or Soil Stabilization."

C. Subgrade Geotextile: For barrier between native soil subgrade and storage aggregate below permeable paving, provide a non-woven geotextile fabric conforming to the specifications of WSS-1, Section 9-33.2, “Geotextile Properties, Table 3 Geotextile for Separation or Soil Stabilization.”

D. Geogrid Reinforcement: Tensar TX-160 geogrid reinforcement, 13-feet wide roll width.

2.5 TOPSOIL: See Landscape and Grading Section

PART 3 – EXECUTION

3.1 PROTECTION

A. Shoring and Sheeting: Provide shoring bracing, cribbing, or sheeting where required. In addition to WAC 296-155 Construction Work Part N-Excavation, Trenching, and Shoring and Section 25 A and B of COE EM-385-1-1, and other requirements of this contract meet the following:
   1. Prevent undermining of pavements, foundations, and slabs.
   2. Slope banks where space permits.
   3. Where shoring and sheeting materials remain in place in completed work to prevent settlements or damage to adjacent structures or as directed, backfill the excavation to 3 feet below the finished grade and remove the remaining exposed portion of the shoring before completing the backfill.
   4. Where shoring and sheeting abuts an adjacent private property, install shoring in such a manner as to prevent any land disturbance, including sloughing of soils below stairs or sidewalks.
   5. Where shoring and sheeting abuts an adjacent private property, removal of shoring and sheeting elements shall be done in such a manner as to prevent any land disturbance, including sloughing of soils below stairs or sidewalks, that would require work to repair or replace soils, pavements or structure on the adjacent property.
   6. If vibration methods of installation or removal are utilized, vibration levels shall be kept below 0.2 inches per second at the adjacent property line.

B. Drainage and Dewatering: Plan for and provide the structures, equipment, and construction for the collection and disposal of surface and subsurface water encountered in the course of construction.
   1. Drainage: Dispose of surface water which may accumulate in open excavations, unfinished

fills, or other low areas. Remove water by trenching where approved, pumping, or other methods to prevent softening of exposed surfaces. Surface dewatering plan shall include rerouting of any storm water runoff or natural drainage if necessary.

2. Dewatering:
   a. Groundwater flowing toward or into excavations shall be controlled to prevent sloughing or excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, the water level shall be maintained continuously, at least one foot below the working level.
   b. Operate the dewatering system until construction work below existing water levels is complete. Measure and record the performance of the dewatering system at the same time each day by use of observation wells and piezometers installed in conjunction with the dewatering system. Have a back-up pump and system available for immediate use.

C. Disposal of Excavated Material: Dispose of excavated material in such a manner that it will not obstruct the flow of runoff, streams, endanger a partly finished structure, impair the efficiency or appearance of facilities, or be detrimental to the completed work.

3.2 SURFACE PREPARATION

A. Clearing and Grubbing: Unless indicated otherwise, remove trees, logs, stumps, shrubs, and brush within the limits of work. Protect from damage trees and shrubs that are to be saved or that are outside the limits of work. Grub out matted roots and roots over 2 inches in diameter to at least 18 inches below the existing surface. Brush, refuse, stumps, and roots shall be removed from the project site.

B. Stripping of Unsatisfactory and Organic Material: Remove organic matter, sod, muck, rubbish, existing fill, and unsuitable soils under embankments and under pavements, slabs on grade, and all areas indicated to have new grading.

3.3 EXCAVATION

A. Excavation consists of removal and disposal of material encountered when establishing required grade elevations, and includes removal and disposal of material of any classification.

B. Excavate to contours and dimensions indicated. Keep excavations free from water while construction is in progress. Notify the Owner's Representative immediately in writing in the event that it becomes necessary to remove rock, hard material, or other material defined as unsatisfactory to a depth greater than indicated. Refill excavations cut below the depths indicated with imported controlled fill and compact as specified herein.

C. Unauthorized excavation consists of removal of materials beyond indicated sub-grade elevations or dimensions without specific direction of the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at the Contractor's expense.

D. Under footings or foundation base, except those noted to be located on "structural fill or structural gravel mat", fill unauthorized excavation by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to the Engineer.

E. Elsewhere, backfill and compact unauthorized excavations as specified for authorized

excavations of same classification, unless otherwise directed by the Engineer.

F. Rock Excavation:
   1. Material to be excavated on this Project is assumed to be earth, dense earth, weathered rock, and other materials that can be removed by bulldozer with ripper, pneumatic hammer, power shovel, or other normal equipment to excavation work (but not requiring the use of explosives or drills), except for concrete items as may be encountered in demolition. If rock, as herein defined, is encountered within the limits of excavation, the Contract amount will be adjusted by Change Order. When the rock is encountered, the Contractor shall immediately notify the Engineer and shall not proceed further until instructions are given and measurements made for the purpose of establishing volume of rock excavation. The Owner may adjust the grades should excessive rock be encountered in lieu of removing the rock.
   2. Rock is defined as stone or hard shale in original ledge, or boulders, concrete or masonry masses over 4 cubic yards in volume, and (all of) which cannot be broken and removed by normal job equipment as described above without the use of explosives or drills. This classification does not include materials such as soft rock, concrete or other materials that can be removed by means other than drilling and blasting or drilling and wedging, but which for reasons of economy in excavating, the Contractor prefers to remove by drilling and blasting.
   3. Payment for rock excavation, as defined above, shall be at a negotiated unit price per cubic yard.

G. Additional Excavation
   1. When excavation has reached required sub-grade elevations, notify the Engineer and Special Inspector who will make inspections of conditions.
   2. If localized areas of unsuitable bearing materials other than those identified on the Drawings, or other unsuitable conditions not reasonably anticipated from the soils reports and other information contained in the Contract Documents are encountered at the specified sub-grade elevations, the Engineer will authorize the Contractor to carry excavations deeper and replace the excavated material as directed.
   3. Removal of such additional unsuitable material, and its replacement as directed, will be paid for on the basis of unit bid prices and/or Contract Conditions pertaining to changes in the Work.

H. Topsoil Stripping: At areas containing existing topsoil approved for reuse in the Work, where excavations and/or grading is scheduled, strip topsoil to an average depth of 8" after removal of brush, weeds, sod, etc., and stockpile on site at locations not to interfere with Project construction.

I. Stability of Excavations:
   1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
   2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
   3. All excavation which will in any manner affect the bearing capacity of the soil foundation presently supporting retaining walls, pavements, pipe beds, etc. shall be performed so as not to disturb existing soils to remain. Do not undermine or weaken bearing of existing structures foundations, or pavements to remain, except where temporary removal of such bearing is an indicated part of the Work, and then only with adequate provision of temporary support and permanent restoration of bearing.

J. Shoring and Bracing
   1. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.
   2. Establish requirements for trench shoring and bracing to comply with Chapter 296-155 WAC Construction Work Part N-Excavation, Trenching, and Shoring and local codes and

authorities having jurisdiction.

3. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

K. Dewatering:

1. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.
2. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms and soil changes detrimental to stability of sub-grades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
3. Convey water removed from excavations and rainwater to collecting or run-off areas. Establish and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use trench excavations as temporary ditches.

L. Excavated Materials
1. Excavated material suitable for filling shall be transported to the proper location for placing or materials shall be stockpiled on the property at separate location from approved topsoil stockpiles until required for backfill and/or fill. Place, grade and shape stockpiles for proper drainage.
2. Excavated material, such as boulders, not suitable for filling, shall be removed and disposed of off the property. Generally, cobbles and boulders larger than 6" in diameter shall not be included in compacted fills.
3. Locate and retain excavated materials away from edge of excavations while performing work in and around excavations.

M. Excavation for Structures and Spread Footing:
1. Excavate for footings to undisturbed natural bearing sub-soils containing no organic material and in any case not less than 1'- 0" below existing grade or as determined by the geotechnical engineer and sufficient to provide minimum depths below finished grades as indicated on Drawings.
2. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10', and extending a sufficient distance from retaining walls to permit placing of retaining wall units and geogrid reinforcement, installation of services, other construction, and for inspection.
3. In excavating for base drain rock, take care not to disturb bottom of excavation. Excavate by hand to final grade just before filter fabric and drain rock are placed. Trim bottoms to required lines and grades to leave solid base to receive filter fabric and drain rock.

N. Excavation for Pavements: Excavation sub-grade under pavements to comply with cross-sections, elevations and grades as shown.

O. Excavation for Trenches: Dig trenches to the uniform width required for the particular item to be installed, sufficiently wide to provide ample working room, and minimum 12" each side of items to be buried.

P. Cold Weather Protection: Protect excavations against freezing when atmospheric temperature is less than 35 degrees F. Remove or recompact frozen and/or thawed portions as required before backfilling or installation of materials.

3.4 FILLING AND BACKFILLING

A. Ground Surface Preparation:
1. Remove vegetation, brush, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills.
2. When existing ground surface to receive fill has a density less than that specified under

"Compaction" for the particular area classification, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to specified percentage of maximum density to a minimum depth of 6".

3. Do not bury construction debris. Remove such from site.

B. Subgrade Preparation:
   1. Subgrade Proofrolling: After stripping and removal of topsoil or other overburden, proofroll the existing subgrade with at least two passes of a minimum 15 ton vibratory roller or fully loaded, 10 cubic yard dump truck. Operate the roller or truck in a systematic manner to assure the number of passes over all areas, and at speeds between 2.5 and 3.5 miles per hour. Proofrolling shall be done in the presence of the Owner's Representative. Proofrolling shall consist of the following elements:
      a. Proofrolling shall be completed by making at least two passes with the vibratory roller (vibration used if possible) or loaded dump truck and observing deflections below the wheels of the truck or the drum of the roller.
      b. Deflections beneath the wheels of the roller shall be less than about 1 inch to be acceptable within the building footing areas.
      c. Deflections shall be less than about 1 inch for proofrolling to be acceptable within the building subgrade, floor slab, and pavement areas.
      d. Areas found to be soft with deflections in excess of 1 inch shall be probed to determine a suitable depth to which the soft material shall be removed (depth of overexcavation). This shall be accomplished by probing outside of the area where deflection was noted and then probing within the area where deflection was noted. It is expected that soft areas will likely only be present where construction traffic has disturbed the soils during period of wet weather. Furthermore, it is expected that it will be necessary to remove about 3 to 6 inches of soft subgrade soil, but likely no more than 12 inches of the subgrade soils when yielding conditions are observed. Areas of soft soil which are removed shall be replaced with the appropriate fill soil compacted as recommended for the application.
      e. If the subgrade soils are too wet and vibration causes softening of the subgrade, the area shall be proofrolled, as described above, without the vibration (static roll only).
      f. If the subgrade soils are too wet to proofroll then probing shall be used to evaluate the subgrade. The subgrade conditions exposed in the building pad and roadway areas during good weather shall be probed to provide a basis for evaluating subgrade when wet weather necessitates the use of probing to evaluate the subgrade.
   2. Perform proofrolling only when weather conditions permit. Do not proofroll wet or saturated subgrades. Materials degraded by proof rolling a wet or saturated subgrade shall be replaced by the Contractor as directed by the Owner's Representative at no cost to the Owner. Notify the Owner's Representative 3 working days prior to proofrolling.
   3. Compact all native subgrades to a minimum depth of 12 inches.

C. Placement and Compaction
   1. Place backfill and fill materials in layers not more than 6" loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers.
   2. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to required percentage of maximum density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen or contain frost or ice.
   3. Place backfill and fill materials evenly adjacent to structures, to required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately the same elevation in each lift.
   4. Compact with extreme care against retaining walls so as not to damage or weaken walls due to excessive pressure or vibration.
   5. Place required backfill material adjacent to structures and compact in a manner that prevents wedging action or eccentric loading upon or against the structures. Step or serrate slopes

bounding or within areas to be backfilled to prevent sliding of the fill. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Fill and backfill shall be placed in uniform horizontal layers not to exceed 8 inches loose thickness for heavy equipment compactors and 4 inches loose thickness for hand-operated mechanical compactors. Do not place material on surfaces that are muddy, frozen, or contain frost. Do not use equipment for backfilling operations or for the formation of embankments against structures that will overload the structure. Backfilling against concrete will be done only after the concrete has attained its 28-day compressive strength.

D. Structural Fill: Place structural fill where required beneath footings, floor slabs, and pavements in uniform horizontal layers of no more than 8 inches loose thickness for heavy equipment compactors and 4 inches for hand-operated mechanical compactors. Do not place material on surfaces that are muddy, frozen, or contain frost. Compact with equipment well suited to the soil being compacted. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Compact each lift as specified herein before placing the overlaying lift. Compaction shall be accomplished continuously over the entire area. Sufficient passes shall be made to ensure that specified density is obtained. Structural fill should extend away from footings, floor slabs, and pavements a distance equal to the depth of structural fill.

E. Final Backfill for Utilities: Construct backfill (final backfill) for utility lines and other utility appurtenances using the material and compaction requirements specified herein for the adjacent or overlying work. Bedding and initial backfill requirements are specified in Section 31 23 33, “Trenching and Backfilling.” Backfilling against concrete will be done only after the concrete has attained its 28-day compressive strength.

F. Capillary Break: Place under slab on grade where indicated. Crushed rock shall be compacted with a minimum of three complete coverages of a vibratory roller or heavy compactor.

G. Weather Limitations: Fill and backfill shall not be constructed when weather conditions detrimentally affect the quality of the finished course. Place fill and backfill only if the atmospheric temperature is above freezing in the shade and is rising. Do not construct fill and backfill in the rain or on saturated subgrades. If weather conditions are windy, hot or arid, with high rate of evaporation, schedule the placement in cooler portions of the day and furnish equipment to add moisture to the fill or backfill during and after placement.

H. Vibration: Vibration levels at the adjacent property lines shall not exceed 0.2 inches per second.

I. Extent (Areas) of Fill `Under' Structures: Type/compaction of fills designated for `under structures' shall extend laterally to an assumed bearing pressure line sloping downwards from a point at least 3'-0 outside the outermost edge of bearing surface at an angle no steeper than 40 degrees.

3.5 QUARRY SPALLS

A. Place at locations and to thicknesses indicated. After placement, the quarry spalls and gravel surfacing shall be compacted by tracked equipment making a minimum of three passes.

3.6 CONTROLLED DENSITY FILL (CDF)

A. Controlled density fill shall be placed where indicated or in lieu of other backfill materials as approved by the Owners Representative.

B. CDF shall not be placed on frozen ground.

C. CDF batching, mixing and placing shall commence only when weather conditions are favorable. The ambient temperature must be at least 34 degrees F and rising. At the time of placement,

CDF shall have a minimum temperature of 40 degrees F. Mixing and placing of CDF shall stop when the ambient temperature is 38 degrees F or less and falling. Each CDF filling stage shall be as continuous an operation as is practical.

D. Flowable CDF shall be discharged from the mixer by any reasonable means into the area to be filled. Each lift of flowable CDF shall be brought up to a uniform elevation.

3.7 GEOTEXTILE FABRIC

A. Install geotextile fabric in accordance with manufacturer's recommendations.

3.8 COMPACTION

A. Control compaction during construction so that material is compacted to not less than the following percentage densities and according to the following standards, as applicable to the scheduled soil types:
   1. ON-SITE NATURAL SOILS – in accordance with ASTM D-1557 modified proctor, unless otherwise directed by Engineer.
      a. Under Structures: Compact top 12" of sub-grade and each layer of backfill or fill material to 95% maximum density.
      b. At Lawn, Planting and Miscellaneous Unpaved Areas
         (1) Compact top 6" of sub-grade and each subsequent layer of backfill, fill material and/or topsoil to 85% maximum density, except top 6" surface layer which shall be placed loose and brought to final grade with minimum compaction.
         (2) At existing areas to receive topsoil only, till existing sub-grade to a depth of 6" before installing topsoil.
      c. Under Exterior Slabs and Walkways: Compact top 6" of sub-grade and each layer of backfill or fill material to 95% maximum density.
      d. Under Vehicular Pavements: Compact top 12" of sub-grade and each layer of backfill or fill material to 95% maximum density.
   2. IMPORTED (GRADED) GRANULAR MATERIAL – in accordance with ASTM D-1557, unless otherwise directed by Engineer.
      a. Under Structures: Compact top 12" of sub-grade and each layer of backfill or fill material to 95% maximum density.
      b. At Lawn, Planting and Miscellaneous Unpaved Areas:
         (1) Compact top 6" of sub-grade and each subsequent layer of backfill, fill material and/or topsoil to 85% maximum density, except top 6" surface layer which shall be placed loose and brought to final grade with minimum compaction.
         (2) At existing areas to receive topsoil only, till existing sub-grade to a depth of 6" before installing topsoil.
      c. Under Exterior Slabs and Walkways: Compact top 6" of sub-grade and each layer of backfill or fill material to 95% maximum density.
      d. Under Vehicular Pavements: Compact top 12" of sub-grade and each layer of backfill or fill material to 95% maximum density.
   3. IMPORTED COARSE GRANULAR MATERIAL – in accordance with ASTM D4253-54 not conforming to the above standards for proctor test methods:
      a. Under Structures: Compact top 12" of sub-grade and each layer of backfill or fill material to 70% relative density.
      b. Under Exterior Walkways: Compact top 6" of sub-grade and each layer of backfill or fill material to 70% relative density.
      c. Under Vehicular Pavements: Compact top 12" of sub-grade and each layer of backfill or fill material to 70% relative density.
   4. Only imported granular fill material shall be used under structures and slabs unless specifically approved otherwise. Use natural on-site soils for fills at surfaced areas.
   5. Cobbles and boulders larger than 8" in diameter and broken inorganic rubble shall not be placed in compacted fills.
   6. Imported Topsoil fill shall be placed in planting areas in accordance with PLANTINGS,

Section 02900, and as shown on Drawings.

3.10 GRADING

A. Grading
   1. Uniformly grade areas within limits of Project, including perimeter transition areas, to achieve finish grade shown on Drawings and merge properly with existing grades to remain.
   2. Smooth finished surface within specified tolerances, with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
   3. Grade areas adjacent to structures to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:
      a. Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10' above or below the required sub-grade elevations. Bring sub-grades in planting areas to elevations required to allow placement of 2" organic amendment in addition to topsoil.
      b. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10' above or below the required sub-grade elevation. Walks shall slope to drain as approved by Engineer.
      c. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 1/2" above or below the required sub-grade elevation.
      d. Compact sub-grade surfaces to the depth and percentage of maximum density for each area as specified herein before.

B. Proofing/Preparation at Non-Fill Areas: Non-fill areas to receive improvements shall be cleaned up, improved and maintained as required to achieve uniform sub-grade conditions essentially equivalent to those specified above under 'Compacted Filling', prior to placements of any improvements. Compact and proof roll all sub-grade surfaces; excavate and fill (or dry out) any soft, spongy areas; remove all organic or extraneous matter on or near the surface; all as required and approved by the Engineer or Special Inspector. Maintain surface and sub-grade in proper condition until improvements are in place.

C. Finish Grading and Topsoil:
   1. Grade and rake all topsoil finished surfaces smooth and free of debris and weeds to uniform slope and surfaces. Remove all surface rock over 1-1/2" largest dimension.
   2. Machine dressing shall be supplemented by hand work to meet requirements outlined hereto the satisfaction of the Engineer.
   3. Finishing Subgrades Under Structures and Pavements: Finish surface of top lift of fill or top of subgrade to the elevation and cross section indicated. Finished surface shall be smooth and of uniform texture. Lightly scarify or blade the finished surface to bring the finished surface to within 0.10 foot of the indicated grade and to eliminate imprints made by compaction and shaping equipment. Surface shall show no deviations in excess of 3/8 inch when tested with a 10-foot straightedge.
   4. Upon completion of the cleaning and dressing, the Project shall appear uniform in all respects. All graded areas shall drain properly, be true to line and grade as indicated on the Drawings.
   5. Disposition of Surplus Material: Surplus or other soil material not required or suitable for filling, backfilling, or embankment or meeting the requirements of select material shall be removed from the project site.
   6. Protection of Surfaces: Protect newly graded areas from traffic, erosion, and settlements that may occur and as required in the Section 015713, “Temporary Erosion and Sedimentation Control,” and as specified in the paragraph entitled “Protection and Restoration of Surfaces.” Repair or reestablish damaged grades, elevations, or slopes prior to acceptance of work.

D. Maintenance:
   1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Sprinkling of the finish surface with water may be required to control wind erosion of the graded area.
   2. Repair and re-establish grades in settled, eroded and rutted areas to specified tolerances.

3. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

3.11 FIELD QUALITY CONTROL

A. Testing: Operation and acceptance tests, where specified, shall be performed to verify control measures are adequate. These tests shall be documented on forms provided by Owner and a copy shall be provided to the Owner upon completion.

B. Moisture-Density Relationship (Maximum Density):
   1. Test method: ASTM D 1557
   2. Frequency: One test for each of the following:
      a. Select material
      b. Fill
      c. Backfill
      d. Embankment material
      e. Additional test for above materials when source or character changes

C. In-place Density (Compaction) and Moisture Tests:
   1. Test method: One of the following:
      a. ASTM D 1556
      b. Combination: ASTM D 2922 and D 3017
   2. Frequency:
      a. Cut: One test per 1,000 square yards
      b. Fill: One test per lift per 1,000 square yards

END OF SECTION

SECTION 31 23 33 – TRENCHING AND BACKFILLING

PART 1 –GENERAL

1.1 SUMMARY

A. Section includes: Requirements for trench excavation, refilling, bedding and backfilling for buried utilities, pipes, conduits and other related appurtenances.

B. Related Sections:
1. Section 31 23 20 “Earthwork”

1.2 REFERENCE

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

B. ASTM International (ASTM):
1. ASTM D 698 (1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft)
2. ASTM D 1556 (1990) Density and Unit Weight of Soil in Place by the Sand-Cone Method
3. ASTM D 1557 (1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft)
4. ASTM D 2487 (1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
5. ASTM D 2922 (1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
6. ASTM D 3017 (1988; R 1993) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
7. ASTM D 4253 (1993) Maximum Index Density of Soils Using a Vibratory Table
8. ASTM D 4254 (1991) Minimum Index Code of Federal Regulations (CFR):

C. Code of Federal Regulations (CFR):
1. 29 CFR 1910 Occupational Safety and Health Standards
2. 29 CFR 1926 Occupational Safety and Health Regulations for Construction

D. Corps of Engineers (COE):
1. COE EM-385-1-1 (1992) Safety and Health Requirements Manual

E. Washington State Department of Labor and Industries:
1. WAC 296-24 General Safety and Health Standards

F. Washington State Department of Transportation (WSS):
1. WSS-1 (2014) Standard Specifications for Road, Bridge and Municipal Construction.

1.3 QUALITY ASSURANCE

A. Safety Codes and Standards: Perform all earthwork in compliance with applicable requirements of governing authorities having jurisdiction, including the applicable Rules and Regulations of OSHA 1518, Safety and Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations and of OSHA Part 1910, Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations, the Regulations of Washington Industrial Safety and Health Act and Washington Administrative Code 296-24, Chapter 296-155 WAC Construction Work Part N-Excavation, Trenching, and Shoring.

B. Soils and Backfill: Moisture density standard ASTM D1557 method unless otherwise specifically approved. Contractor responsible for all testing costs.

C. In-Place Density Determination: Sandcone method ASTM D1556 or nuclear method ASTM D2922. Contractor responsible for all testing costs.

D. Classification of Soils: ASTM D2487.

1.4 DEFINITIONS

A. Backfill: Material used in refilling a cut, trench or other excavation.

B. Cohesive Materials: Soils classified by ASTM D 2487 as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesive only when fines have a plasticity index greater than zero.

C. Cohesionless Materials: Soils classified by ASTM D 2487 as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines have a plasticity index of zero.

D. Compaction: The process of mechanically stabilizing a material by increasing its density at a controlled moisture condition. “Degree of Compaction” is expressed as a percentage of the maximum density obtained by the test procedure described in ASTM D 698 or ASTM D 1557 for general soil types or ASTM D 4253 or ASTM D 4254 (Relative Density) for isolated cohesionless materials, abbreviated in this specification as “XX” percent ASTM D 1557 maximum density.

E. Granular Pipe Bedding: A dense, well-graded aggregate mixture of sand, gravel, or crushed stone (mixed individually, in combination with each other, or with suitable binder soil) placed on a subgrade to provide a suitable foundation for pipe. Granular bedding material may also consist of poorly graded sands or gravels where fast draining soil characteristics are desired.

F. Hard Material: Weathered rock, dense consolidated deposits, or conglomerate materials (excluding man made materials such as concrete) which are not included in the definition of “rock” but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

G. In-Situ Soil: Existing in place soil.

H. Lift: A layer (or course) of soil placed on top of subgrade or a previously prepared or placed soil in a fill or backfill.

I. Refill: Material placed in excavation to correct overcut in depth.

J. Rock: Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding 4 cubic yards in volume. Removal of “hard material” will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

K. Select Material: In-situ soil material classified as SP, SW, GP, GW, SP-SM, GP-GM, or SM by ASTM D 2487.

L. Topsoil: In natural or undisturbed soil formations, the fine-grained, weathered material on the surface or directly below any loose or partially decomposed organic matter. Topsoil may be a

dark-colored, fine, silty, or sandy material with a high content of well decomposed organic matter, often containing traces of the parent rock material.

M. Unyielding Material: Rock rib, ridge, rock protrusion, or soil with cobbles in the trench bottom requiring a covering of finer grain material or special bedding to avoid bridging in the pipe or conduit.

N. Unsatisfactory Material: In-situ soil or other material which can be identified as having insufficient strength characteristics or stability to carry intended loads in the trench without excessive consolidation or loss of stability. Also backfill material which contains refuse, frozen material, large rocks, debris, soluble particles, and other material which could damage the pipe or cause the backfill not to compact. Materials classified as PT, OH, or OL by ASTM D 2487 are unsatisfactory.

O. Unstable Material: Material in the trench bottom which lacks firmness to maintain alignment and prevent joints from separating in the pipe, conduit, or appurtenance structure during backfilling. This may be material otherwise identified as satisfactory which has been disturbed or saturated.

P. Unsuitable material: In-situ soil material classified as ML or MH by ASTM D 2487.

1.5 SUBMITTALS

Safety Codes and Standards: Perform all earthwork in compliance with applicable requirements of governing authorities having jurisdiction.

A. Submit the following to Owner:
1. Shoring and Sheeting Plan: Describe materials or shoring system to be used. Indicate whether any components will remain after filling or backfilling. Provide plans, sketches, or details along with calculations by a registered professional engineer. Indicate sequence and method for installation and removal.
2. Gradation test of soil material tested at the source showing compliance with the specifications for structural fill, onsite native material, quarry spalls, capillary break, gravel backfill for drains, retaining wall select backfill, floor slab and pavement base course, paver joint/opening filler, bedding course, open graded base, stone subbase and drainage backfill. The Contractor shall provide material test results from a certified testing laboratory as part of the submittal. Certify to Engineer that all materials of each type used in the Work is true to approved type sample.
3. Gradation of material tested at the source showing compliance with the specifications for trench backfill and bedding.

1.6 REGULATORY REQUIREMENTS

A. Materials and workmanship specified herein with reference to WSS-1 State Standard shall be in accordance with the referenced articles, sections and paragraphs of the standard except that measurement and payment provisions do not apply. Where the term “Engineer” is used, it shall mean “Owner’s or District’s Representative.” Where the term “State” is used it shall mean “Owner or District.”

1.7 DELIVERY AND STORAGE

A. Deliver and store materials in a manner to prevent contamination or segregation, freezing, and other damage

1.8 CRITERIA FOR BIDDING

A. Base bids on the following criteria:
1. Surface elevations as indicated.

2. The character of the material to be excavated or used for subgrade is as indicated. Rock or hard material as defined in paragraph entitled, “Definitions,” will not be encountered.
3. Ground water elevations indicated are those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.
4. Blasting will not be permitted.

1.9 PROTECTION

A. Existing Utilities: Although the Drawings endeavor to show all known existing underground or concealed utilities in the area of work, they do not purport to show all utilities. If existing utilities not shown on Drawings are encountered, support, shore up, protect same and immediately notify the Engineer. Allow access opportunity and ample time for measures necessary, for continuance and/or relocation of such services, if required. The Contractor shall be required to contact the Utilities Underground Location Center at 1-800-424-5555 prior to any ground breaking, as required by RCW 19.122.

B. Movement of construction machinery and equipment over pipes and utilities during construction shall be at the Contractor's risk. Contact the utility companies for location(s) of their utilities. Perform work adjacent to privately owned utilities in accordance with procedures outlined by the utility company. Excavation made with power-driven equipment is not permitted within 2 feet of known utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work as affected by the contract excavation until approval for backfill is granted by the Owner’s Representative.

C. Inspection: Examine the areas and conditions under which excavating, filling and grading are to be performed. Should any discrepancies between Drawings and Specifications and actual site conditions be encountered, consult Engineer before commencement of work.

D. The Contractor shall provide written notice to local school districts, local fire district, local law enforcement agencies, and emergency vehicle operators and local transit companies which do business in the general area of the construction site(s), and shall otherwise keep these utility and/or special districts aware of the construction schedule. The Contractor shall further give evidence to the Owner of compliance with this requirement.

E. Erosion and Water Quality Control:
1. Precautions shall be taken during the entire construction period to minimize wind and water erosion. Bare earth shall be kept moist to prevent wind erosion. Contractor is warned that wind is a problem in the area of construction and he must have means and methods covered in his bid to perform sprinkling to control dust. Bare earth shall be seeded or mulched well in advance of winter rainy season and/or freezing weather. Means and methods (Best Management Practices as defined by DOE) shall be provided by the Contractor to prevent sediment laden runoff from entering the adjacent properties, roads, or waterways.
2. Accidental spills of petroleum products, solvents, toxic chemicals fertilizers and construction materials shall be cleaned up immediately. Wash water, chemical and petroleum wastes shall be contained and prevented from entering ground water or runoff into waterways and shall be properly disposed of offsite.

F. Protection of Persons and Property
1. Refer to General Conditions.
2. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
3. Refer to various other sections of this specification for additional specific requirements for capping, temporary re-routing, etc., of existing on-site utilities, irrigation lines, etc.

4. Protect structures (new and existing), utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout and any other hazards created by earthwork operations.
5. All excavation or trenches near or under in-place footings or other improvements shall be cut in such manner so as not to undermine or reduce bearing for such improvements. All backfilling of such trenches shall be compacted to 95% maximum density, as specified, without disturbing bearing for, or integrity of, adjacent footings or improvements.
6. Provide traffic control by a licensed flagger for all work adjacent to roadways unless traffic control plan is submitted and approved by Engineer.
7. All damage done to existing facilities or improvements during the progress of the work covered by these Specifications and the Approved Drawings shall be repaired or restored by the Contractor to the satisfaction of the Owner, affected Utility or governing jurisdiction. If the Contractor fails to furnish the necessary labor and materials for such repair, when ordered, the Owner may cause said labor and materials for such repairs to be furnished by other parties and the cost thereof shall be billed to the Contractor or the Contractor's Surety.

G. Cutting Pavement: Existing pavement surfaces shall be sawcut only to minimum width, which will permit proper excavation and bracing of trench in neat, straight lines with vertical edges along the limits of pavement removal (12" beyond trench). Changes in pavement width shall be made by cutting perpendicular and parallel to the centerline of the trench. The cut line for removal of pavement shall be reviewed by the A/E in the field before cutting. Wheel cutting or jackhammering are not an acceptable means of pavement "cutting." Any existing pavement designated to remain that is damaged during the removal of other pavement shall be removed and replaced.

H. Replacing Pavements, Sidewalks and Curbs
1. All existing driveways, curbs or other paved or surfaced areas which are to remain shall be restored to their original condition, as nearly as practical.
2. All replacement of surfaced areas shall be to the approval of the Engineer.
3. If any pavement or surface area not immediately over or adjacent to a trench is disturbed or damaged as a result of operation of the Contractor, adequate repairs, as approved, shall be made by Contractor at his own expense.

I. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place against unnecessary cutting, creaking or skinning of roots, skinning and bruising of bark, etc.

J. Pumping and Drainage
1. Keep all excavations, pits, trenches, footings, etc., entirely free from water from any source during construction. Use suitable pumping equipment or other means as required by conditions. Continue pumping as necessary until completion of Project or until released by Engineer.
2. When operations are interrupted by unfavorable weather conditions, prepare areas by grading and compacting to avoid ponding and erosion.

K. Cleaning and Surplus Material Cleaning and Surplus Material
1. Conduct work in an orderly manner and so as not to create nuisance. Dirt shall not be permitted to accumulate on streets or sidewalks or to be washed into sewers or drainage systems.
2. Remove from the site and legally dispose of all debris and excavated material not approved for fills, including oversize rock. No rubbish or debris shall be buried on the site.

L. Unique Requirements of Operation: All structural footings for bearing walls and retaining walls must rest on existing undisturbed dense lower soils, level and true, or if over-excavation occurs, on approved concrete fill of over-excavated area.

M. Explosives: Do not bring explosives on site or use in work without prior written permission from authorities having jurisdiction. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

A. All soil materials shall be free of debris, roots, wood, scrap material, organic matter, refuse, ice, or other deleterious and objectionable materials. All imported materials shall be provided by a WSDOT approved source for the material specified.

B. Foundation Stabilization Material: Unless other or additional requirements are specified on the Drawings or Details, foundation stabilization material, where required to replace soft or unsuitable trench bottoms, shall be well graded, 2-1/2 inch minus granular material essentially free of dirt, silt, clay, and organic, or deleterious matter and conforming to the following:

Los Angeles Wear, 500 rev. 40% max.
Degradation Factor 15 min.

Sieve Size	Percent Passing
2” square	65-100
1” square	50-85
U.S. No. 4	26-44
U.S. No. 40	16 max
U.S. No. 200	9 max

Dust Ratio: 2/3 max.
Sand Equivalent: 35 min.

C. Pipe Bedding Material:
1. Ductile Iron & Steel Pipe (all sizes), Thermoplastic Pipe 4” Diameter and Larger: Unless other or additional bedding material requirements are required by the Drawings, pipe bedding material to be installed and compacted under, around and above all pipe as specified in this Section shall be clean, well-graded sand/gravel mixture with a maximum particle size of ¾ inch, entirely free of clay, silt, organic or deleterious matter and frozen material. Minimum material weight shall be 110 pounds per cubic food at 95% relative compaction. Bedding shall conform to the following graduation requirements:

Sieve Size	Percent Passing
1” square	100
¼” square	25-80
U.S. No. 200	0-7

2. Copper Water Service Pipe, Thermoplastic Pipe Less Than 4” Diameter: All requirements of 2.2 A. herein apply, except that bedding material shall be clean and sand, free of gravel, with no more than 5% passing the No. 200 Sieve (by weight).

D. Trench Backfill:
1. To be Structural Fill as specified in Section 312320, “Earthwork” OR
2. Pea Gravel. Bedding shall be a clean, sound, free draining, and granular material conforming to the following gradation:

Sieve Size	Percent Passing
¾“square	100
3/8 inch	90-100
U.S. No. 4	50-100
U.S. No. 10	0-95

U.S. No. 20	0-85
U.S. No. 40	0-55
U.S. No. 100	0-10
U.S. No. 200	0-3

3. Trench backfill shall consist of granular soil and/or aggregate which is free of deleterious material and is non plastic. Deleterious material includes wood, organic waste, coal, charcoal or any other extraneous or objectionable material. The material shall be considered non plastic if the percent by weight passing the U.S. No. 40 sieve cannot be rolled, at any moisture content, into a thread as prescribed in Section 4 of AASHTO T 90 and conforming to the following gradation:

   Los Angeles Wear, 500 rev. 40% max.
   Degradation Factor 15 min.

Sieve Size	Percent Passing
2”	75-100
U.S. No. 4	100
U.S. No. 200	0-10

   Dust Ratio: 2/3 max.
   Sand Equivalent: 330 min.

2.2 GEOTEXTILE FABRIC

A. As specified in Section 312320, “Earthwork”

2.3 BURIED WARNING AND IDENTIFICATION TAPE

A. Polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3-inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, “CAUTION, BURIED (intended service) LINE BELOW” or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.
   1. Warning Tape Color Codes:
      a. Red: Electric
      b. Orange: Telephone and Other Communications.
      c. Blue: Water Systems
      d. Green: Sewer Systems (Storm and Sanitary)
   2. Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum strength of 1,500 psi lengthwise, and 1,250 psi crosswise, with a maximum 350 percent elongation.

2.4 BURIED DETECTION WIRE

A. Detection wire shall be insulated single strand, solid copper with a minimum of 12 AWG.

2.5 CONTROLLED DENSITY FILL

A. As specified in Section 312320, “Earthwork.”

PART 3 – EXECUTION

3.1 PROTECTION

A. Shoring and Sheeting: Provide shoring bracing, cribbing, or sheeting where required. In addition to Section 25 A and B of COE EM-385-1-1, Chapter 296-155 WAC Construction Work Part N-

Excavation, Trenching, and Shoring, and other requirements of this contract meet the following:

1. Prevent undermining of pavements, foundations, and slabs.
2. Slope banks where space permits.
3. Where shoring and sheeting materials remain in place in completed work to prevent settlements or damage to adjacent structures or as directed, backfill the excavation to 3 feet below the finished grade and remove the remaining exposed portion of the shoring before completing the backfill.
4. Where shoring and sheeting abuts an adjacent private property, install shoring in such a manner as to prevent any land disturbance, including sloughing of soils below stairs or sidewalks.
5. Where shoring and sheeting abuts an adjacent private property, removal of shoring and sheeting elements shall be done in such a manner as to prevent any land disturbance, including sloughing of soils below stairs or sidewalks, that would require work to repair or replace soils, pavements or structure on the adjacent property.
6. If vibration methods of installation or removal are utilized, vibration levels shall be kept below 0.2 inches per second at the adjacent property line.

B. Drainage and Dewatering: Plan for and provide the structures, equipment, and construction for the collection and disposal of surface and subsurface water encountered in the course of construction.
   1. Drainage: Dispose of surface water which may accumulate in open excavations, unfinished fills, or other low areas. Remove water by trenching where approved, pumping, or other methods to prevent softening of exposed surfaces. Surface dewatering plan shall include rerouting of any storm water runoff or natural drainage if necessary and shall comply with requirements specified in Section 015713, “Temporary Erosion and Sedimentation Control.”
   2. Dewatering:
      a. Groundwater flowing toward or into excavations shall be controlled to prevent sloughing or excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, the water level shall be maintained continuously, at least one foot below the working level.
      b. Operate the dewatering system until construction work below existing water levels is complete. Measure and record the performance of the dewatering system at the same time each day by use of observation wells and piezometers installed in conjunction with the dewatering system. Have a back-up pump and system available for immediate use. See Section 015713, “Temporary Erosion and Sedimentation Control,” for additional requirements.

C. Structures and Surfaces: Protect newly backfilled areas and adjacent structures, slopes, or grades from traffic, erosion settlement, or any other damage. Repair and reestablish damaged or eroded grades and slopes and restore surface construction prior to acceptance. Protect existing streams, ditches, and storm drain inlets from water-borne soil by means of straw bale dike, filter fabric dams, and as indicated on the contract drawings. Perform work in accordance with requirements specified in Section 015713, “Temporary Erosion and Sedimentation Control.”
   1. Disposal of Excavated Material: Dispose of excavated material in such a manner that it will not obstruct the flow of runoff, streams, endanger a partly finished structure, impair the efficiency or appearance of facilities, or be detrimental to the completed work.

E. Trench Excavation Safety: The Contractor shall provide a Trench Excavation Safety System in compliance with all federal and state regulations. The safety system shall meet the provisions of the Washington Industrial Safety and Health Act, as set forth in the latest Revised Code of

Washington (RCW), as required for trench excavations.

1. Neither the Engineer nor the Owner will inspect, review, approve or have any liability for the adequacy of the Contractor's Trench Excavation Safety System. Payment for the Trench Excavation Safety System shall not be construed as acceptance or approval of the Contractor's Trench Excavation Safety System.

3.2 SURFACE PREPARATION

A. Clearing and Grubbing: Unless indicated otherwise, remove trees, logs, stumps, shrubs, and brush within the limits of work. Protect from damage trees and shrubs that are to be saved or that are outside the limits of work. Grub out matted roots and roots over 2 inches in diameter to at least 18 inches below the existing surface. Brush, refuse, stumps, and roots shall be removed from the project site.

B. Stripping of Unsatisfactory and Organic Material: Remove organic matter, sod, muck, rubbish, existing fill, and unsuitable soils under embankments and under pavements, slabs on grade, and all areas indicated to have new grading.

C. Where clearing or partial clearing of the pipeline alignment and/or work are is required, such clearing shall be completed prior to starting trench excavation. Unless other or additional clearing, grubbing, and/or existing surface removal requirements are specified elsewhere in the Specifications or on the Drawings, pavements, trees, roots, brush, grass and other materials in the pipeline alignment that are unsuitable for trench backfill shall be stripped and disposed of off site, in conformance with all applicable ordinances and regulations. In no case shall trench excavation material cover brush or trees.

D. All bituminous and concrete pavements in the trench exaction area shall be neatly cut in an approved manner prior to trench excavation. Such pavements, including roads, walks, parking areas, curbs, and other paved surfaces, shall be cut on each side at least 12" wider than the width of the top of the trench. In no case shall existing pavements be removed in such a manner as to damage the remaining pavement of lift its base material. Pavement material so cut and removed shall be disposed of offsite, in conformance with all applicable ordinances and regulation. Additional or other pavement removal requirements may be indicated on the Drawings or elsewhere in the Specifications.

E. Unless a separate payment item or items are provided in the Specifications or on the Drawings, all costs of such stripping disposal or waste material shall be considered incidental to trench excavation and no additional payment will be made therefore.

3.3 OBSTRUCTIONS

A. Objects encountered during trench excavation operations, such as tree roots, stumps, abandoned structures or portions of structures, abandoned piping, logs, debris, paving, railroad ties, or any and all other obstructions shall be removed and disposed of off site, in conformance with all applicable ordinances and regulations. The Engineer, if requested, may make changes in the pipeline alignment to minimize interference caused by such obstructions when encountered.

B. Unless a separate payment item or items are provided in the Drawings or Specifications, the cost of removal and disposal of such obstructions, as well as the cost of delays that may be caused by same, shall be considered incidental to trench excavation and no additional payment will be made.

3.4 CLASSIFICATIONS OF TRENCH EXCAVATION

A. GENERAL

1. Trench excavation may be classified or unclassified. If a trench rock excavation or drilling and

blasting bid item is included, then the following definition of trench rock excavation shall apply to that bid item: If no trench rock excavation bid item is provided, and if no other excavation classifications and bid items are provided, then all trench excavation of any nature, including excavation and disposal of rock as defined below, shall be considered included in trench excavation and no additional payment will be made.

2. All trenches shall be sloped and/or braced and sheeted and trench excavation material stored and retained in accordance with the most stringent of the applicable laws and regulations, in accordance with good safety practice, and as necessary to protect persons, adjacent or affected property, and the work. The Contractor shall be solely responsible for determining and utilizing the necessary sloping, bracing and/or sheeting.

B. Trench Excavation: Trench excavation shall be such excavation where the excavated material is piled essentially beside the trench as it is removed and backfilled from this position. Also included in this definition is any and all material or whatever nature that must be transported to another site for disposal or for temporary stockpiling prior to backfill, hauled without stockpiling due to confined work area, or transported to another trench backfill location for any reason. Unless specifically provided for in other bid item(s), all costs of such handling, transport, stockpiling and/or disposal shall be considered incidental to trench excavation and no additional payment will be made.

C. Keep excavations free from water while construction is in progress. Notify the Engineer immediately in writing if it becomes necessary to remove rock or hard, unstable, or otherwise unsatisfactory material to a depth greater than indicated. Make trench sides as nearly vertical as practicable except where sloping of sides is allowed. Sides of trenches shall not be sloped from the bottom of the trench up to the elevation of the top of the pipe, conduit, or duct. Excavate ledge rock, boulders, and other unyielding material to an overdepth at least 6 inches and a maximum of 24 inches below the bottom of the pipe, conduit, duct, and appurtenances unless otherwise indicated or specified. Blasting will not be permitted. Overexcavate soft, weak, or wet excavations as indicated. Use bedding material placed in 6-inch maximum layers to refill overdepths to the proper grade. At the Contractor's option, the excavations may be cut to an overdepth of not less than 4 inches and refilled to required grade as specified. Grade bottom of trenches accurately to provide uniform bearing and support for each section of pipe, conduit, duct, or structure on undisturbed soil, or bedding material as indicated or specified at every point along its entire length except for portions where it is necessary to excavate for bell holes and for making proper joints. Dig bell holes and depressions for joints after trench has been graded. Dimension of bell holes shall be as required for properly making the particular type of joint to ensure that the bell does not bear on the bottom of the excavation. Trench dimensions shall be as indicated or specified.

3.5 LIMITS OF EXCAVATION

A. The length of trench excavated in advance of pipe laying shall be kept to a minimum and, in no case, shall exceed 150 feet, unless specifically approved by the Engineer.

B. The trench shall be of sufficient width to permit proper assembly of the pipe and installation and compaction of bedding and backfill materials. Trench width at the surface of the ground shall be kept to the minimum necessary to install the pipe, but in full conformance with federal, state, and local safety requirements. Trench width shall also conform to applicable Drawing or Details.

3.6 EXCAVATION LINE AND GRADE

A. Trench excavation shall be made to the lines and grades indicated by the Drawings and Specifications and/or as established by the Engineer the field, with proper allowance for all bedding or foundation replacement requirements. Unless specified otherwise on the Drawings or Details excavation shall allow for the installation of bedding material below the pipe as specified herein under 3.10 “Bedding Material Installation and Compaction”. If the trench is excavated

below the required grade at the option of, or error by, the Contractor, the trench bottom shall be brought back to grade with compacted bedding or foundation replacement material compacted in lifts to 95% density, as herein specified, at no addition cost to the Owner.

B. Trench excavation planning and operation shall result in the installation of all pipe, appurtenances and structures in full conformance with the installation and testing requirements specified for the particular type of pipe, structure, and/or appurtenances for which the excavation is intended. In the case of water pipe or other pressure pipe installation, the trench shall provide for straight grades between vertical bends shown on the Drawings, with no localized high points. A depth deeper than the specified minimum excavation depth may be required to avoid such localized high points. In the case of gravity sewer pipes, the specified finished pipe grade and alignment will require excavating and careful trench excavation and workmanship to provide a firm trench bottom and pipe foundation. In all cases, a firm and unyielding trench bottom shall be provided for pipe, structure and appurtenance foundation.

3.7 UNSUITABLE FOUNDATION CONDITIONS

A. Wherever trench excavation results in a trench bottom that contains voids is saturated, soft or is in any other way unsuitable for foundation in the opinion of the Engineer, such trench bottom material shall be removed to a depth approved by the Engineer and disposed of by the Contractor. Approved Foundation Stabilization Material shall be placed and compacted by the Contractor in lifts to a relative density of at least 95%, as herein specified.

3.8 CONTROL OF WATER

A. During excavation, installation of pipe, structures and appurtenances, backfill operation and the placing and cutting of concrete, all excavation areas shall be kept free of water except as otherwise specified or designated on the Drawings. The Contractor shall, at all times, control surface and subsurface drainage so as to prevent its' entering the work. In no case shall the pipe or appurtenances being installed be used as a conduit to remove or transport surface or subsurface drainage.

B. The Contractor shall furnish, install, and operate in such locations and, when necessary, such equipment and materials that are required to keep excavations free from water, and shall dispose of water without causing nuisance, damage, or injury to persons or property. He shall, at all times, have sufficient and reliable pumping equipment and pump drives on hand, in good working order, and operational in spite of all ordinary emergencies, including power outages. He shall also have available, at all times, adequate and competent manpower to operate and maintain such equipment as necessary.

C. The control of groundwater shall also prevent the softening of trench and excavation bottoms and dewatering material, equipment, and methods shall prevent the removal of natural soils. Dewatering operations shall draw down subsurface water to a level at least 1 foot below the bottom of the excavation, result in the maintenance of the undisturbed state of foundation soils, and allow proper pipe, structure, and appurtenance installation, as well as the installation and compaction of all backfill materials to be specified density. Dewatering installation and operations shall not reduce the water level to the extent that it may damage or endanger other structures or improvements in the vicinity.

D. Open and cased stumps shall not be used a primary dewatering methods for excavations deeper than 3 feet below the static water level.

E. The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the foundation soils to prevent disturbance of compacted backfill materials and prevent flotation or movement of pipe, structures or appurtenances.

F. Unless a separate Bid Item is provided, all control of water and dewatering design, labor, materials and equipment shall be considered incidental to trench excavation and no additional payment will be made thereof.

3.9 FOUNDATION MATERIAL INSTALLATION AND COMPACTION

A. Proper preparation of foundation, placement of foundation material where required, and placement of bedding material shall precede the installation of all pipe and structures. This shall include removal of unsuitable material, compaction of native material, leveling the bottom of the excavation, placement and compaction of Gravel Backfill for Foundations, and placement and compaction of bedding material to provide a uniformly dense and unyielding support.

B. The Contractor shall place six (6) inches minimum compacted depth of Gravel Backfill for Foundation compacted to 95 percent of maximum dry density, as determined by ASTM D1557, under structures to the lines, grades and thickness shown on the Approved Drawings.

C. Whenever the excavation is carried beyond the lines and grades shown on the Approved Drawings, or when ordered by the County, the Contractor shall backfill the over excavation with Gravel Backfill for Foundations, as specified herein, or Portland cement concrete as determined by the County. The foundation material shall be placed in maximum 12-inch loose lifts and compacted to 95 percent of maximum dry density as determined by ASTM D1557.

3.10 BEDDING MATERIAL INSTALLATION AND COMPACTION:

A. The specified pipe bedding material shall be placed and compacted for all pipe, structures, and appurtenance. All bedding material shall be compacted to 95% relative density, as determined by ASTM-D1557, unless otherwise indicated on the Drawings of Details.

B. In addition to the requirements specified herein, all pipe backfill and compaction methods and equipment shall also conform to the pipe manufacturer's written installation instructions or manuals, which the Contractor shall have on the site. Water settling of the trench to attempt compaction shall not be allowed, unless specifically approved by the Engineer or indicated on the Drawings.

C. Pipe bedding material shall be placed in the trench in such a manner as to protect the pipe and appurtenances from movement or damage. In general, material shall be placed into the trench by pushing it from the end of the trench at an angle along and over the pipe so that the material is placed in the form of a rolling slope rather than by side filling. Free falling material shall not be allowed to fall directly on the pipe.

D. Pea Gravel. Prior to placing pea gravel for pipe bedding, the Contractor shall level the bottom of excavation or top of Gravel Backfill for Foundations as the case may be, to the elevations required by the Approved Drawings, or as directed by the Owner, and provide pipe bedding material under the pipe and along its sides to twelve (12) inches over the top of pipe. The minimum thickness, after compaction, of the layer of bedding material under the pipe barrel and/or structure shall be six (6) inches. Bedding material shall be placed simultaneously on both sides of the pipe for the full width of the trench in lifts not exceeding six (6) inches. To assure uniform support, the material shall be carefully worked under the pipe haunches with a tool capable of preventing the formation of void spaces around the pipe.

E. Bedding material shall be place in maximum 6" lifts to the spring line of the pipe, taking care to adequately place and compact the material for the full width of the trench to the specified density, under and around the pipe on both sided evenly, and for its full length, so s to provide adequate lateral pope support and strength without altering its proper grade and alignment. T-bars of proper weight and shape shall be used for hand-compacting bedding material under and around the pipe, taking necessary precautions to prevent movement of the pipe during operation.

F. After placement and compaction of bedding material to the pipe spring line, additional bedding material shall be placed and compacted in sufficient lifts to obtain the specified compaction. Unless specified otherwise on the Drawings, bedding material shall be placed and compacted to a depth of at least 12" above the pipe and for the full width of the trench.

G. Bedding and/or side support material that is disturbed by removal or moving the trench excavation safety system shall be re-compacted to specified density before proceeding with backfilling.

3.10 BURIED WARNING AND IDENTIFICATION TAPE

A. Install tape in accordance with manufacturer's recommendations except as modified herein. Bury tape at the depth indicated. The markers shall be installed four feet upstream from manhole and catch basin locations. The markers shall be colored per Section 2.3 in with identifying sticker, stating "WARNING XX PIPELINE", where "XX" is the identifying utility Attached to the upper twelve (12) inches of the marker rail, in a vertical fashion. The bottom portion of the identifying sticker shall state "Before digging in this area call: UNDERGROUND UTILITIES LOCATION CENTER AT 1-800-424-5555" printed in a horizontal fashion

3.11 BURIED DETECTION WIRE

A. Bury detection wire directly above non-metallic piping at a distance not to exceed 12 inches above the top of pipe and for all piping outside of a driving surface. The wire shall extend continuously and unbroken, from manhole to manhole or catch basin to catch basin. The ends of the wire shall terminate inside the manholes or catch basin at each end of the pipe, with a minimum of 3 feet of wire, coiled, remaining accessible in each manhole or catch basin. The wire shall remain insulated over its entire length.

3.12 TRENCH BACKFILL AND COMPACTION

A. Use hand-operated, plate-type, vibratory, or other suitable hand tampers in areas not accessible to larger rollers or compactors. Avoid damaging pipes and protective pipe coatings. Compact material in accordance with the following unless otherwise specified. If necessary, alter, change, or modify selected equipment or compaction methods to meet specified compaction requirements.
   1. Compaction of Material in Subcuts or Overexcavations: Compact to 95 percent of ASTM D 1557 maximum density.
   2. Compaction of Pipe and Conduit Bedding: Compact to 95 percent of ASTM D 1557 maximum density.
   3. Compaction of Backfill: Compact backfill material surrounding pipes, cables, conduits or ducts to 90 percent of ASTM D1557 maximum density. For utilities under structures and pavements compact backfill as specified under paragraph entitled "Special Earthwork Installation Requirements."

B. The Contractor shall not side fill the trench with backfill material until at least 2' of bedding and backfill material has been placed and compacted. Trench backfill material, as specified, shall be placed and compacted in lifts to the specified density, The Contractor shall select and use compaction equipment such that the pipe and appurtenances are not moved or damaged in any way. In general, heavy self-propelled equipments shall not be operated in the trench until at least 3' of backfill has been placed.

C. Construct backfill as indicated and specified in this section. Place backfill in 8-inch maximum loose lifts for heavy equipment compactors and 4-inch maximum loose lifts for hand-operated mechanical compactors for on-site native material and imported controlled fill, unless otherwise specified. Compact each loose lift as specified in the paragraph entitled "General Compaction" before placing the next lift. Do not backfill in freezing weather or where the material in the trench

is already frozen or is muddy, except as authorized. Where settlements greater than the tolerance allowed herein for grading occur in trenches and pits due to improper compaction, excavate to the depth necessary to rectify the problem, then backfill and compact the excavation as specified herein and restore the surface to the required elevation. Coordinate backfilling with testing of utilities. Testing for the following shall be complete before final backfilling: storm drainage, water distribution, and sanitary sewer.

D. No storm or sewer pipe shall be backfilled above the top of the pipe until the elevations, gradient, alignment and the pipe joints have been checked by the Contractor and the Work has been approved by the A/E. Excavations for manholes and structures shall be backfilled as soon as the structures have developed sufficient strength to resist backfilling loads and forces.

E. Controlled density fill shall be placed as backfill where indicated or in lieu of other backfill materials as approved by the Owner's Representative. See Section 312320, "Earthwork" for additional requirements.

3.13 BACKFILL SETTLEMENT

A. Settling of any trench within one year after final acceptance of the work shall be considered incontrovertible evidence of inadequate compaction. Upon notification of such settlement, the Contractor shall promptly perform such remedial work as may be required to correct the deficiency to the satisfaction to the satisfaction of the Owner. If such remedial work is not promptly performed, the Owner may exercise its rights as holder of the required performance bond and make such repairs as it deems fit, recovering the resulting expenses from the bond surety.

3.14 SPECIAL EARTHWORK INSTALLATION REQUIREMENTS

A. Manholes and Other Appurtenances: Provide at least 12 inches clear from outer surfaces to the embankment or shoring. Remove rock as specified herein. Remove unstable soil that is incapable of supporting the structure to an overdepth of one foot and refill with bedding material to the proper elevation. Refill overdepths with bedding material to the required grade and compact to 95 percent of ASTM D 1557 maximum density.

B. Compaction for Structures and Pavements: Place backfill in 4-inch maximum loose lifts for hand-operated mechanical compactors. If a vibratory roller is used for compaction of backfill, the lift thickness can be increased to 8 inches. Compact all backfill surrounding pipes, ducts, conduits, and other structures to 95 percent of ASTM D 1557 maximum density, except backfill more than 2 feet below pavement subgrades shall be compacted to 90 percent of ASTM D 1557 maximum density.

1. Backfill to permit the rolling and compacting of the completed excavation with the adjoining material, providing the specified density necessary to enable paving of the area immediately after backfilling has been completed.

3.15 RESTORATION, FINISHING AND CLEAN-UP

A. Grading: Finish to grades indicated within one-tenth of a foot. Grade areas to drain water away from structures and to provide suitable surfaces for mowing machines. Grade existing grades that are to remain but have been disturbed by the Contractor's operations.

B. Disposition of Surplus Material: Surplus or other soil material not required or suitable for filling, backfilling, or grading shall placed in the soils disposal area or be removed from the project site.

C. Protection of Surfaces: Protect newly graded areas from traffic, erosion, and settlements that may occur and as required in Section 015713, "Temporary Erosion and Sedimentation Control." Repair or reestablish damaged grades, elevations, or slopes.

3.16 FIELD QUALITY CONTROL

A. Testing: Operation and acceptance tests, where specified, shall be performed to verify control measures are adequate. These tests shall be documented on forms provided by Owner and a copy shall be provided to the Owner upon completion.

B. Moisture-Density Relationship (Maximum Density):
   1. Test method: ASTM D 1557
   2. Frequency: One test for each of the following:
      a. Bedding material.
      b. Backfill.
      c. Embankment material.
      d. Additional test for above materials when source or character changes.

C. In-place Density (Compaction) and Moisture Tests:
   1. Test method: One of the following:
      a. ASTM D 1556.
      b. Combination: ASTM D 2922 and D 3017.
   2. Frequency:
      a. Backfill and bedding in trenches: One test per lift per 100 lineal feet.
      b. Appurtenance structures: One test per lift per 100 square feet or fraction thereof.

END OF SECTION 31 23 33

SECTION 32 31 00 FENCES AND GATES

PART 1 –GENERAL

1.1 SUMMARY

A. Section includes general requirements for work and materials for project fencing and gates.

B. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by Work of this Section.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences.

1. Fence and gate posts, rails, and fittings.
2. Chain-link fabric, reinforcements, and attachments.
3. Gates and hardware.
4. Privacy Slats material and manufacturer data and proposed color.

B. Product Certificates: For each type of chain-link fence, from manufacturer.

C. Product Test Reports: For framing strength according to ASTM F 1043.

D. Warranty: Sample of special warranty.

1.3 QUALITY ASSURANCE

A. Pre-installation Conference: Conduct conference at Project site.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
a. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
2. Warranty Period: 10 years from date of Substantial Completion.

1.6 REFERENCE

A. Washington State Department of Transportation (WSS):
1. WSS-1 (2016) Standard Specifications for Road, Bridge and Municipal Construction.

PART 2 – PRODUCTS

2.1. CHAIN-LINK FENCE

A. All material used in the construction of chain link fence and gates shall be new.

B. Chain link fabric shall consist of 11-gage wire. The fabric shall be zinc-coated steel wire conforming to AASHTO M 181, Class C. Zinc 5-percent Aluminum-Mischmetal alloy meeting the requirements of ASTM B 750 may be substituted for zinc coating (hotdipped) at the application rate specified by ASSHTO M 181 for hot-dip zinc coating. Coating for chain link fence fabric shall meet the requirements of ASTM A 817 with minimum weight of coating of uncoated wire surface 1.0-oz/sq ft (305 g/m2). The wire shall be woven into approximately 2-inch diamond mesh. The width and top and bottom finish of the fabric shall be as specified in AASHTO M 181.

C. Tension Wire shall meet the requirements of AASHTO M 181. Tension wire galvanizing shall be Class 1.

D. Tension cable shall be ¼-inch diameter aluminum coated or galvanized, 7 wire strand steel cable conforming to the requirements of ASTM A 474 for aluminum coated or A 475 for galvanized, High-Strength Grade. Galvanizing shall be Class A.

E. Fitting and Hardware. Except where indicated fittings shall be malleable cast iron or pressed steel and shall conform to the requirements of ASTM F626 or AASHTO M232, whichever is applicable. Fittings for any particular fence shall be those furnished by the manufacturer of the fence.

1. Tension truss rods shall be ⅜-inch round galvanized rods with drop forged turnbuckles or other approved type of adjustment. Couplings for tubular sections shall be outside sleeve type and shall be at least 6-inches long.
2. Eye bolts for attaching tension wire shall be ⅜-inch diameter and of sufficient length to fasten to the type of post being used.
3. Tension bars shall be 3⁄16-inch by ¾-inch nominal and cross sectional area shall be 0.141 in2 ± 5%.
4. Hog rings shall be 12 gage galvanized steel wire. Tie wire shall be 9 gage galvanized steel wire or 9 gage aluminum wire meeting the requirements of ASTM F626.
5. Fabric bands and stretcher bars shall be ⅛-inch by 1-inch nominal and stretcher bars 3⁄16-inch by ¾-inch nominal. Nominal shall be construed to be the area of the cross section of the shape obtained by multiplying the specified width by thickness. A variation of minus 5-percent from this theoretical area shall be construed as “nominal” size. Both shall be galvanized to meet the requirements of ASTM F 626.
6. Thimbles, wire rope clips, anchor shackles, and seizing shall be galvanized steel conforming to the requirements of AASHTO M 232 unless otherwise specified. Eye bolts shall have either a shoulder or a back-up nut on the eye end and be provided with an eye nut where needed or standard hex nut and lock washer and be ⅝-inch diameter for tension cable and ⅜-inch diameter for tension wire and of sufficient length to fasten to the type of posts used. Turnbuckles shall be of the shackle end type, ½-inch diameter, with standard take-up of 6-inches and provided with ⅜-inch diameter pins. Thimbles shall be light weight wire rope thimbles for use with ¼-inch diameter cable. Wire rope clips shall have a U-bolt diameter of 5⁄16-inch for use with ¼-inch diameter cable. Anchor shackles shall be ⅜-inch diameter with a minimum distance between eyes of 11⁄16-inches and a pin diameter of 7⁄16-inch. Seizing shall be 0.032-inch diameter galvanized annealed iron wire.

F. Post Material. Except as noted otherwise, round post material shall conform to the requirements of AASHTO M 181, Type I (zinc-coated steel), Grade 1 and shall include all round material (brace rails, top rails, line posts, brace posts, end posts, corner posts and pull posts).

1. Grade 1 post material shall conform to the weight per linear foot, minimum wall thickness and detail requirements of ASTM F1043. Grade 1 post material that exceeds the maximum wall thickness requirement of ASTM F1043 may be accepted, provided it does not interfere with the proper construction of the fence.

2.2. PRIVACY SLATS

A. Privacy slats shall be bottom or top locking, double wall slats manufactured from high density polyethylene and with UV inhibitors or engineer approved equal.

B. Privacy slat color should match the CMU block wall and CXT restroom. Submit proposed color for approval.

C. Privacy slat shall have a minimum of 75% coverage (privacy factor).

2.3. CONCRETE/GROUT

A. CONCRETE FOR POST FOUNDATION SHALL BE CLASS 3000. SEE SECTION 03, CAST-IN-PLACE CONCRETE

PART 3 – EXECUTION

3.1 GENERAL

A. Do not begin installation before completion of final grading unless directed by Architect to do otherwise.

3.2 CHAIN LINK FENCE AND GATES

A. Post shall be placed in accordance with WSS-1, Section 8-12.3(1)A.

B. Top Rails where shown on the approved plans shall pass through the ornamental tops of the line posts, forming a continuous brace from end to end of each stretch of fence. Lengths of tubular top rail shall be joined by sleeve couplings. Top rails shall be securely fastened to terminal posts by pressed steel fittings or other appropriate means..

C. Tension Wire and Tension Cable where shown on the approved plans shall be installed in accordance with WSS-1, Section 8-12.3(1)C.

D. Chain Link Fabric where shown on the approved plans shall be installed in accordance with WSS-1, Section 8-12.3(1)D.

E. Chain Like Gates where shown on the approved plans shall be installed in accordance with WSS-1, Section 8-12.3(1)E.

3.3 PRIVACY SLATS

A. Privacy slats shall be installed for all fencing at the dumpster enclosure.

B. Privacy slats shall be installed in accordance with the manufacturer’s recommendations.

3.4 CLOSEOUT

A. Substantial Completion Requirements:

1. Provide Final Cleaning immediately prior to Substantial Completion inspection.
2. Corrective Work.

3. Provide product data to complete Operation & Maintenance Manuals.
4. Submit executed Warranties.

END OF SECTION 32 31 01

SECTION 33 11 00 WATER DISTRIBUTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO HB-17	(2002; Errata 2003; Errata 2005) Standard Specifications for Highway Bridges

AMERICAN RAILWAY ENGINEERING AND MAINTENANCE-OF-WAY ASSOCIATION (AREMA)

AREMA Eng Man	(2007) Manual for Railway

Engineering AMERICAN WATER WORKS ASSOCIATION

(AWWA)

AWWA B300	(2004) Hypochlorites
AWWA B301	(2004) Liquid Chlorine
AWWA C104/A21.4	(2003) Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C105/A21.5	(2005) Polyethylene Encasement for Ductile-Iron Pipe Systems
AWWA C110/A21.10	(2003) Ductile-Iron and Gray-Iron Fittings for Water
AWWA C111/A21.11	(2000) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C115/A21.15	(2005) Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges
AWWA C151/A21.51	(2002; Errata 2002) Ductile-Iron Pipe, Centrifugally Cast, for Water

AWWA C153/A21.53	(2006) Ductile-Iron Compact Fittings for Water
Service AWWA C200	(2005) Steel Water Pipe - 6 In. (150 mm) and
Larger	
AWWA C203	(2002) Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied
AWWA C205	(2000) Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 In. (100 mm) and Larger - Shop Applied
AWWA C206	(2003) Field Welding of Steel Water Pipe
AWWA C207	(2007) Standard for Steel Pipe Flanges for Waterworks Service-Sizes 100 mm through 3600 mm 4 in. through 144 in.
AWWA C208	(2001; R 2002) Standard for Dimensions for Fabricated Steel Water Pipe Fittings
AWWA C209	(2006) Cold-Applied Tape Coatings for the Exterior of Special Sections, Connections and Fitting for Steel Water Pipe
AWWA C210	(2003; R 2004) Standard for Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
AWWA C300	(2004) Reinforced Concrete Pressure Pipe, Steel-Cylinder Type
AWWA C301	(2007) Prestressed Concrete Pressure Pipe, Steel-Cylinder Type
AWWA C303	(2002) Concrete Pressure Pipe, Bar-Wrapped, Steel-Cylinder Type
AWWA C500	(2002; R 2003) Metal-Seated Gate Valves for Water Supply Service
AWWA C502	(2005) Dry-Barrel Fire Hydrants
AWWA C503	(2005) Wet-Barrel Fire Hydrants
AWWA C504	(2006) Standard for Rubber-Seated Butterfly Valves

AWWA C508	(2001) Swing-Check Valves for Waterworks Service, 2 In. (50 mm) Through 24 In. (600 mm) NPS
AWWA C509	(2001) Resilient-Seated Gate Valves for Water Supply Service
AWWA C600	(2005) Installation of Ductile-Iron Water Mains and Their Appurtenances
AWWA C605	(2005) Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
AWWA C606	(2006) Grooved and Shouldered Joints
AWWA C651 Mains	(2005; Errata 2005) Standard for Disinfecting Water
AWWA C700	(2002; R 2003) Standard for Cold Water Meters - Displacement Type, Bronze Main Case
AWWA C701	(2007) Standard for Cold-Water Meters - Turbine Type for Customer Service
AWWA C702	(2001) Cold-Water Meters - Compound Type
AWWA C703	(1996; R 2004) Cold-Water Meters - Fire Service Type
AWWA C704 Applications	(2002) Propeller-Type Meters for Waterworks
AWWA C706	(1996; R 2005) Direct-Reading, Remote-Registration Systems for Cold-Water Meters
AWWA C707	(2005) Encoder-Type Remote-Registration Systems for Cold- Water Meters
AWWA C800	(2005) Underground Service Line Valves and Fittings
AWWA C900	(2007) Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Distribution
AWWA C901	(2002) Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. (13mm) Through 3 In. (76 mm), for Water Service
AWWA C905	(1997) Polyvinyl Chloride (PVC) Pressure Pipe and

	Fabricated Fittings 14 In. Through 48 In. (350 mm through 1,200 mm)
AWWA C906	(2007) Polyethylene (PE) Pressure Pipe and Fittings, 4 In. (100 mm) through 63 In., (1,575 mm) for Water Distribution and Transmission
AWWA C909	(2002) Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe, 4 IN through 12 IN (100 mm Through 300 mm), for Water Distribution
AWWA C950	(2007) Fiberglass Pressure Pipe
AWWA M11	(2004) Manual: Steel Pipe: A Guide for Design and Installation
AWWA M23	(2002) Manual: PVC Pipe - Design and Installation
AWWA M9	(1995) Manual: Concrete Pressure

Pipe ASME INTERNATIONAL (ASME)

ASME B16.1	(2005) Standard for Gray Iron Threaded Fittings; Classes 125 and 250
ASME B16.15 250	(2006) Cast Bronze Threaded Fittings Classes 125 and
ASME B16.18	(2001; R 2005) Cast Copper Alloy Solder Joint Pressure Fittings
ASME B16.22	(2001; R 2005) Standard for Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
ASME B16.26	(2006) Standard for Cast Copper Alloy Fittings for Flared Copper Tubes
ASME B16.3 300	(2006) Malleable Iron Threaded Fittings, Classes 150 and
ASME B16.4	(2006) Standard for Gray Iron Threaded Fittings; Classes 125 and 250
ASME B18.2.2	(1987; R 2005) Standard for Square and Hex Nuts (Inch Series)
ASME B18.5.2.1M	(2006) Metric Round Head Short Square Neck Bolts
ASME B18.5.2.2M	(1982; R 2005) Metric Round Head Square Neck

Bolts ASTM INTERNATIONAL (ASTM)

ASTM A 307	(2007a) Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
ASTM A 47/A 47M	(1999; R 2004) Standard Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process
ASTM A 48/A 48M	(2003) Standard Specification for Gray Iron Castings
ASTM A 53/A 53M	(2007) Standard Specification for Pipe, Steel, Black and Hot- Dipped, Zinc-Coated, Welded and Seamless
ASTM A 536	(1984; R 2004) Standard Specification for Ductile Iron Castings
ASTM A 563	(2007) Standard Specification for Carbon and Alloy Steel Nuts
ASTM A 563M	(2006) Standard Specification for Carbon and Alloy Steel Nuts (Metric)
ASTM A 746	(2003) Standard Specification for Ductile Iron Gravity Sewer Pipe
ASTM B 32	(2004) Standard Specification for Solder Metal
ASTM B 42	(2002e1) Standard Specification for Seamless Copper Pipe, Standard Sizes
ASTM B 61	(2002) Standard Specification for Steam or Valve Bronze Castings
ASTM B 62	(2002) Standard Specification for Composition Bronze or Ounce Metal Castings
ASTM B 88	(2003) Standard Specification for Seamless Copper Water Tube
ASTM B 88M	(2005) Standard Specification for Seamless Copper Water Tube (Metric)
ASTM C 150	(2007) Standard Specification for Portland Cement
ASTM C 94/C 94M	(2007) Standard Specification for Ready-Mixed Concrete
ASTM D 1527	(1999; R 2005) Standard Specification for

	Acrylonitrile- Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80
ASTM D 1599	(2005) Resistance to Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings
ASTM D 1784	(2006a) Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
ASTM D 1785	(2006) Standard Specification for Poly(Vinyl Chloride) (PVC), Plastic Pipe, Schedules 40, 80, and 120
ASTM D 2235	(2004) Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings
ASTM D 2241	(2005) Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
ASTM D 2282	(1999; R 2005) Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR)
ASTM D 2464	(2006) Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D 2466	(2006) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
ASTM D 2467	(2006) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D 2468	(1996a) Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 40
ASTM D 2564	(2004e1) Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
ASTM D 2657	(2007) Heat Fusion Joining Polyolefin Pipe and Fittings
ASTM D 2774	(2004e1) Underground Installation of Thermoplastic Pressure Piping
ASTM D 2855	(1996; R 2002) Standard Practice for Making Solvent-

	Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings
ASTM D 2996	(2001; R 2007e1) Filament-Wound "Fiberglass" (Glass- Fiber-Reinforced Thermosetting-Resin) Pipe
ASTM D 2997	(2001; R 2007e1) Centrifugally Cast "Fiberglass" (Glass- Fiber-Reinforced Thermosetting-Resin) Pipe
ASTM D 3139	(1998; R 2005) Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ASTM D 3839	(2002e1) Underground Installation of "Fiberglass" (Glass- Fiber-Reinforced Thermosetting-Resin) Pipe
ASTM D 4161	(2001; R 2005) "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals
ASTM F 1483 Pipe	(2005) Oriented Poly(Vinyl Chloride), PVCO, Pressure
ASTM F 402	(2005) Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings
ASTM F 477	(2007) Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-80	(2003) Bronze Gate, Globe, Angle and Check

Valves NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 1961	(2007) Standard on Fire Hose
NFPA 24	(2006) Standard for the Installation of Private Fire Service Mains and Their Appurtenances
NFPA 325	(1994) Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids
NFPA 49	(2003) Hazardous Chemicals Data
NFPA 704	(2006) Identification of the Hazards of Materials

for Emergency Response

UNDERWRITERS LABORATORIES (UL)

UL 246	(1993; Rev thru Dec 1998) Hydrants for Fire-Protection Service
UL 262 Service	(2004) Standard for Gate Valves for Fire-Protection
UL 312	(2004) Check Valves for Fire-Protection Service
UL 789	(2004) Indicator Posts for Fire-Protection

Service UNI-BELL PVC PIPE ASSOCIATION (UBPPA)

UBPPA UNI-B-3	(1992) Recommended Practice for the Installation of Polyvinyl Chloride (PVC) Pressure Pipe (Nominal Diameters 4-36 Inch)
UBPPA UNI-B-8	(2000) Recommended Practice for the Direct Tapping of Polyvinyl Chloride (PVC) Pressure Water Pipe (Nominal Diameters 6-12 Inch)

CALIFORNIA CODE OF REGULATIONS (CCR)

CCR Title 22	Safe Drinking Water Act

1.4 SUBMITTALS

The following shall be submitted in accordance with Section 01 SUBMITTAL PROCEDURES:

SD 02 Drawings

Shop drawings
As-built drawings

SD 03 Product Data

Piping

Materials

Water distribution main piping, fittings, joints, valves, and

coupling Water service line piping, fittings, joints, valves, and

coupling

Corporation

stops Valve

boxes

Joint restraints materials and methods

For the above submit manufacturer's standard drawings or catalog cuts. Include information concerning gaskets with submittal for joints and couplings.

SD 05 Test Plan; G

Connection and Test

Plan

SD 06 Test Reports; G

Bacteriological Disinfection
Test results from commercial, California Dept. of Health certified laboratory verifying disinfection.

Reports of pressure tests

SD 08 Manufacturer's Instructions

Installation procedures for water

piping

1.4 DRAWINGS

1.4.1 Shop Drawings

The Contractor shall submit shop drawings for new water main installation consisting of end to end layout drawings of main with offset dimensions to existing site features; and connection points to existing mains and water services. Shop drawings shall indicate necessary offsets to existing utilities such that crossing points are coordinated. Shop drawings shall be coordinated with shop drawings required by other specification sections. Shop drawings shall be submitted 30 days in advance of start of work.

1.4.2 As-Built Drawings

The as-built drawings shall be a record of the construction as installed. The drawings shall include the information shown on the contract drawings as well as deviations, modifications, and changes from the contract drawings, however minor. The as-built drawings shall be a full

sized set of prints marked to reflect deviations, modifications, and changes. Additional sheets may be added. The as-built drawings shall be jointly inspected for accuracy and completeness by the Contractor and by the Contracting Officer prior to the submission of each monthly pay estimate. Upon completion of the work, the Contractor shall provide three full sized sets of the marked prints to the Contracting Officer for approval. If upon review, the as-built drawings are found to contain errors and/or omissions, they will be returned to the Contractor for correction. The Contractor shall correct and return the as-built drawings to the Contracting Officer for approval within 10 calendar days from the time the drawings are returned to the Contractor.

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery and Storage

Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Store rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes, fittings, valves and hydrants free of dirt and debris.

1.5.2 Handling

Handle pipe, fittings, valves, hydrants, and other accessories in a manner to ensure delivery to the trench in sound undamaged condition. Take special care to avoid injury to coatings and linings on pipe and fittings; make repairs if coatings or linings are damaged. Do not place any other material or pipe inside a pipe or fitting after the coating has been applied. Carry, do not drag pipe to the trench. Use of pinch bars and tongs for aligning or turning pipe will be permitted only on the bare ends of the pipe.
The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material without additional expense to the Government.
Store rubber gaskets that are not to be installed immediately, under cover out of direct sunlight.

1.5.2.3 Miscellaneous Plastic Pipe and Fittings

Handle Polyvinyl Chloride (PVC) pipe and fittings in accordance with the manufacturer's recommendations. Store plastic piping and jointing materials that are not to be installed immediately under cover out of direct sunlight.

Storage facilities shall be classified and marked in accordance with NFPA 704, with classification as indicated in NFPA 49 and NFPA 325.

PART 2 PRODUCTS

2.1 WATER DISTRIBUTION MAIN MATERIALS

2.1.1 Piping Materials

2.1.1.1 Ductile-Iron Piping

a. Pipe and Fittings: Pipe, AWWA C151/A21.51. Flanged pipe, AWWA C115/A21.15. 3 inch through 12 inch Pressure Class 350, 14 inch and larger Pressure Class 250. Fittings, AWWA C110/A21.10 or AWWA C153/A21.53. Fittings shall have pressure rating at least equivalent to that of the pipe. Ends of pipe and fittings shall be suitable for the specified joints. Pipe and fittings shall have cement-mortar lining and interior asphaltic seal coat and exterior asphaltic coating, AWWA C104/A21.4 standard thickness.

Manufacturer: US Pipe or approved equal.

2.1.1.3 Pipe Above Grade or in Below Ground Concrete Pits

a. Same as paragraph 2.1.1.a, except that all fittings shall be flanged.

b. Wall Sleeve Castings: Size and types **will be PVC C-900**. Seal strips, where required shall be Link Seal as manufactured by Thunderline Corp., Wayne, Michigan or equal.

c. Rubber Ring Gaskets: Full face **or 'drop-in'** type, AWWA C111, 2 mm (**1/8** inch) rubber ring gaskets.

d. Pipe and fittings exposed to view in the finished work are to be painted. Pipe shall not receive the standard tar or asphalt coat on the outside surfaces but shall be shop primed on the outside with one coat of Kop-Coat No. 621 Rust Inhibitive Primer or equal. Paint color shall match the wall color.

2.1.1.4 Joints and Jointing Material in Ductile Iron and PVC Pipe

a. Joints: Joints for pipe shall be bell and spigot or mechanical joint. Joints for fittings, valves, couplings and appurtenances shall be mechanical joint or flanged. Push on joint type fittings and valves shall not be used. Flanged joints shall only be installed above grade or below grade in a pit.

b. Bell and spigot Joints (pipe-to-pipe only):

(1) Joints for ductile iron pipe, shape of pipe ends and fitting ends, gaskets, and lubricant for joint assembly, AWWA C111/A21.11.

(2) Joints for PVC pipe shall be bell and spigot joints, ASTM D 3139. Provide each joint connection with an elastomeric gasket suitable for the bell or coupling with which it is to be used.

c. Mechanical Joints: Dimensional and material requirements for pipe ends, glands, bolts and nuts, and gaskets, AWWA C111/A21.11.

d. Flanged Joints: Bolts and nuts, Grade B, domestically produced**,** ASTM A307, low alloy, high strength steel in accordance with AWWA C111. Gaskets for flanged connections as recommended in the Appendix to AWWA C115/A21.15. Flange for setscrewed flanges shall be of ductile iron, ASTM A 536, Grade 65-45-12, and conform to the applicable requirements of ASME B16.1, Class 250. Setscrews for setscrewed flanges

shall be 1310 MPa(190,000 psi) tensile strength, heat treated and zinc-coated steel. Gasket and lubricants for setscrewed flanges, in accordance with applicable requirements for mechanical-joint gaskets specified in AWWA C111/A21.11. Design of setscrewed gasket shall provide for confinement and compression of gasket when joint to adjoining flange is made. Assemble bolts and nuts using anti-seize compound to prevent galling.

Manufacturer: EBBA Iron 'E-Z' Flange or approved equal.

e. Insulating Joints (Where shown on drawings): Designed to effectively prevent metal-to-metal contact at the joint between adjacent sections of piping. Joint shall be of the flanged type with insulating gasket, insulating bolt sleeves, and insulating washers. Gasket shall be of the dielectric type, full face, and in other respects as recommended in the Appendix to AWWA C115/A21.15. Bolts and nuts, as recommended in the Appendix to AWWA C115/A21.15.

2.1.1.5 Joint Restraints

Joint restraints as manufactured by EBBA Iron, Inc. Megalug or approved equal for the type of joint and type of pipe material installed. Field lock type gaskets shall not be used. Installation in
accordance with subparagraph 3.1.2 "Special Requirements for Installation of Water Mains".

2.1.2 Valves, Hydrants, and Other Water Main Accessories

2.1.2.1 Gate Valves on Buried Piping

AWWA C500, AWWA C509, or UL 262. Valves conforming to: (1) AWWA C500 shall be nonrising stem type with double-disc gates and mechanical-joint as appropriate for the adjoining pipe, (2)
AWWA C509 shall be nonrising stem type with mechanical-joint ends , and (3) UL 262 shall be inside-screw type with operating nut, double-disc or split-wedge type gate, designed for a hydraulic working pressure of 175 psi, and shall have mechanical-joint ends ends as appropriate for the pipe to which it is joined. Materials for UL 262 valves shall conform to the reference standards specified in
AWWA C500. Valves shall open by counterclockwise rotation of the valve stem. Stuffing boxes shall have 0-ring stem seals. Stuffing boxes shall be bolted and constructed so as to permit easy removal of parts for repair. The interior and exterior shall be coated with thermo-setting or fusion epoxy coating in accordance with AWWA C550. Except for use with post indicators, furnish valves with 50 mm (2 inch) nut for socket wrench operation. Where a post indicator is shown, the valve shall have an indicator post flange; indicator post flange for AWWA C500 valve shall conform to the applicable requirements of UL 262. Valves shall be of one manufacturer.

Manufacturer: Clow or approved equal.

2.1.2.2 Gate Valves in Valve Pit(s) and Aboveground Locations

AWWA C500, AWWA C509, or UL 262. Valves conforming to: (1) AWWA C500 shall be hand wheel non-rising stem type with double-disc gates and flanged ends, (2) AWWA C509

shall be hand wheel non-rising stem type with flanged ends, and (3) UL 262 shall be hand wheel non-rising stem shall have double-disc type gate and flanged ends, and shall be designed for a hydraulic working pressure of 175 psi. Materials for UL 262 valves shall conform to the reference standards specified in AWWA C500. Provide valves with handwheels that open by counterclockwise rotation of the valve stem. Stuffing boxes shall be bolted and constructed so as to permit easy removal of parts for repair. Valves shall be of one manufacturer.

Manufacturer: Clow or approved equal.

2.1.2.3 Check Valves

Swing-check type, AWWA C508 or UL 312. Valves conforming to: (1) AWWA C508 shall have iron or steel body and cover and flanged ends, designed for a working pressure of 175 psi and (2) UL 312 shall have cast iron or steel body and cover, flanged ends, and designed for a working pressure of 175 psi. Check valves for fire lines shall conform to AWWA C508 and shall be epoxy coated and lined per AWWA C550. Materials for UL 312 valves shall conform to the reference standards specified in AWWA C508. Valves shall have clear port opening. Valves shall be spring-loaded where indicated. Valves shall be of one manufacturer.

2.1.2.5 Pressure Reducing Valves

Pressure reducing valves shall maintain a constant downstream pressure regardless of fluctuations in demand. The valves shall be of the hydraulically-operated, pilot controlled, globe or angle type, and may be actuated either by diaphragm or piston. The pilot control shall be the diaphragm-operated, adjustable, spring-loaded type, designed to permit flow when controlling pressure exceeds the spring setting. Ends shall be flanged. Valve bodies shall be bronze, cast iron or cast steel with bronze trim. Valve stem shall be stainless steel. Valve discs and diaphragms shall be synthetic rubber. Valve seats shall be bronze. Pilot controls shall be bronze with stainless steel working parts.

Manufacturer: Watts ACV 115 or approved equal.

2.1.2.6 Vacuum and Air Relief Valves

Vacuum and air relief valves shall be of the size shown and shall be of a type that will release air and prevent the formation of a vacuum. The valves shall automatically release air when the lines are being filled with water and shall admit air into the line when water is being withdrawn in excess of the inflow. Valves shall be iron body with bronze trim and stainless steel float.

2.1.2.7 Fire Hydrants

Hydrants shall be wet-barrel type. Hydrants shall be factory painted with at least one coat of primer and two coats of yellow enamel paint. Stencil hydrant number and main size on the hydrant barrel using black stencil paint.

a) Wet-Barrel Type Fire Hydrants: AWWA C503 or UL 246, "Wet Barrel" design, shall have 6 inch inlet, one 4 ½ inch pumper connection, and two 2 1/2 inch hose connections. Pumper connection and hose connections shall be

individually valved with independent nozzle gate valves. Inlet shall have flanged end; end shall conform to the applicable requirements as specified for the joint. Size and shape of operating nut, cap nuts, and threads on hose and pumper connections shall be as AWWA C503 or UL 246. Hydrants shall be set on a breakaway spool with breakaway bolts designed to break from a force not less than that which would be imposed by a moving vehicle.

b) A hydrant break-off check valve shall be installed between the breakaway spool and bury.

Manufacturer: Clow #76. Clow break-off check valve Model 400.

2.1.2.9 Indicator Posts

UL 789. Provide for gate valves where indicated.

2.1.2.10 Valve Boxes

Provide a traffic rated valve box for each gate valve on buried piping. Valve boxes shall be round, of precast concrete with a cast iron ring and lid. For boxes installed in pavement boxes shall be set flush with existing grade. Boxes installed in asphalt pavement shall be set in a cast in place concrete ring minimum 6 inches around the valve and 6 inches deep. For boxes installed in landscaped areas boxes shall be set slightly above grade in a cast in place concrete ring minimum 6 inches around the box and 6 inches deep. Provide a field cut 8 inch diameter PVC riser of required length to access the valve nut. Cast the word "WATER" on the lid.

Manufacturer: Christy G5.

2.1.2.11 Valve Pits

Valve pits shall be constructed at locations indicated or as required above and in accordance with the details shown.

2.1.2.12 Meters

Meters shall be provided and installed by Contractor. Meters shall be Neptune T-10, residential or commercial type according to contract drawings. Meters shall be provided with R900i remote reader. For meters installed in vaults a sending module shall be mounted in a pre-drilled hole in the box lid.

2.1.2.14 Meter Vaults

Meters shall be installed in precast, reinforced concrete, fully enclosed vaults. Vault lids will have a pre-drilled hole 1-3/4” and will have a clearance of minimum 12” from top of meter. Vault lids shall be rated for H20 Incidental Traffic in landscaped areas and H20 Full Traffic Rating in paved areas.
Identify cover as

“WATER”. Manufacturer:

Christy

2.1.2.17 Tracer Wire for Nonmetallic Piping

Provide bare solid copper or aluminum wire not less than 2.5 mm(0.10 inch) in diameter in sufficient length to be continuous over each separate run of nonmetallic pipe. Run tracer wire into valve boxes and terminate.

2.1.2.18 WARNING TAPE

Standard, 4-Mil polyethylene 76 mm (3 inch) wide tape, detectable type, blue with black letters, and imprinted with “CAUTION BURIED WATER LINE BELOW”. Tape will be installed 12” above pipe.

2.1.2.19 Backflow Prevention Devices

AWWA approved devices will be used. Domestic and irrigation devices will use RP (Reduced Pressure) type devices. Fire systems will use double check valve type devices. All backflow devices will have 18 inch of clearance on all sides, top and bottom. Installations will not require a ladder to access for testing.

Manufacturer: Wilkins

2.2 WATER SERVICE LINE MATERIALS

2.2.1 Piping Materials

2.2.1.1 Copper Pipe and Associated Fittings

Pipe, ASTM B 42, regular, threaded ends. Fittings shall be copper, brass or bronze, ASME B16.15, 125 psi.

2.2.1.2 Copper Tubing and Associated Fittings

Tubing, ASTM B 88, Type K. Fittings for solder-type joint, ASME B16.18 or ASME B16.22. Compression fittings are not allowed.

2.2.1.8 Ductile-Iron Piping

Comply with "Ductile-Iron Piping" subparagraph under paragraph "Water Distribution Main Materials."

2.2.1.9 Insulating Joints

Joints between pipe of dissimilar metals shall have a rubber-gasketed or other suitable approved type of insulating joint or dielectric coupling which will effectively prevent metal-to-metal contact between adjacent sections of piping.

2.2.2 Water Service Line Appurtenances

2.2.2.1 Corporation Stops

Ground key type; brass, ASTM B 61 or ASTM B 62; and suitable for the working pressure of the system. Corporation stops shall be domestically manufactured, threaded, brass, full port ball valves. Threaded ends for inlet and outlet of corporation stops, AWWA C800.

Manufacturer: Mueller or equal.

2.2.2.2 Service Clamps

Service clamps used for repairing damaged cast-iron, steel, PVC or asbestos-cement pipe shall have a pressure rating not less than that of the pipe to be connected and shall be full circle, either single or double flattened strap type. Clamps shall have a stainless steel body with cadmium plated straps and nuts. Clamps shall have a rubber gasket cemented to the body.

2.2.2.3 Service Connection Saddles

Saddles shall be brass or epoxy coated ductile iron with double stainless steel straps and stainless steel bolts.

Manufacturer: Smith Blair or approved equal.

2.2.2.4 Goosenecks

Type K copper tubing. Joint ends for goosenecks shall be appropriate for connecting to corporation stop and service line. Where multiple gooseneck connections are required for an individual service, goosenecks shall be connected to the service line through a suitable approved brass or bronze branch connection; the total clear area of the branches shall be at least equal to the clear area of the service line. Length of goosenecks shall be in accordance with standard practice.

2.2.2.5 Dielectric Fittings

Dielectric fittings shall be installed between threaded ferrous and nonferrous metallic pipe, fittings and valves, except where corporation stops join mains. Dielectric fittings shall prevent metal-to-metal contact of dissimilar metallic piping elements and shall be suitable for the required working pressure.

2.2.2.6 Check Valves

Check valves shall be designed for a minimum working pressure of 150 psi. Valves shall have a clear waterway equal to the full nominal diameter of the valve. Valves shall open to permit flow when inlet pressure is greater than the discharge pressure, and shall close tightly to prevent return flow when discharge pressure exceeds inlet pressure. The size of the valve, working pressure, manufacturer's name, initials, or trademark shall be cast on the body of each valve. Valves 2 inches and larger shall be outside lever and spring type.

a. Valves 2 inches and smaller shall be all bronze designed for screwed fittings, and

shall conform to MSS SP-80, Class 150, Types 3 and 4 as suitable for the application.

2.2.2.7 Gate Valves 80 mm (3 Inch) Size and Larger

Comply with subparagraph 2.1.2 “Valves, Hydrants, and Other Water Main Accessories” under paragraph "Water Distribution Main Materials."

2.2.2.8 Gate Valves Smaller than 80 mm (3 Inch) in Size

Gate valves smaller than 3 inch size MSS SP-80, Class 150, solid wedge, nonrising stem. Valves shall have flanged or threaded end connections, with a union on one side of the valve for pit mounted installations, only. Provide handwheel or 2 inch nut operators when installed in pits. Provide with a 2 inch nut for operation with a valve key when installed in valve boxes.

2.2.2.9 Isolation Valves

Brass full port ball valves for installation in box or vault.

Manufacturer: Meuller or approved equal.

2.2.2.12 Valve Boxes

Provide a valve box for each gate valve and corporation stop on buried piping. Comply with subparagraph 2.1.2.10 “Valve Boxes” under paragraph "Water Distribution Main Materials."

2.2.2.14 Water Meters

Meters will be provided by the Presidio Trust and installed by the contractor according to the installation requirements in Section “Execution”.

2.2.2.17 Meter Boxes

Meters shall be installed in precast, reinforced concrete vaults. Vault lids will have a pre-drilled hole 1-3/4” and will have a clearance of minimum 12 inch from top of meter. Identify cover as “WATER”. Vault lids shall be H-20 rated.

Manufacturer: Christy B series utility boxes.

2.2.2.18 Disinfection

Chlorinating materials shall conform to the following:

Chlorine, Liquid: AWWA B301.

Hypochlorite, Calcium and Sodium: Calcium hypochlorite shall conform to AWWA B300 supplied in a tablet form and shall contain 65 percent chlorine by weight. Sodium Hypochlorite shall contain 12.5% chlorine by weight.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPELINES

3.1.1 General Requirements for Installation of Pipelines

These requirements shall apply to all pipeline installation except where specific exception is made in the "Special Requirements..." paragraphs.

PVC pipe shall not be used for reservoir tie-ins and applications subject to high pressures and hydraulic surges.

3.1.1.1 Location of Water Lines

Terminate the work covered by this section at a point approximately 5 feet from the building, unless otherwise indicated.

Maintain a minimum separation of 12 inches between copper and ferrous piping when pipes cross or are laid in a common trench.

Where water piping is required to be installed within 1 m 3 feet of existing structures, the water pipe shall be sleeved as required in Paragraph "Casting Pipe". The Contractor shall install the water pipe and sleeve ensuring that there will be no damage to the structures and no settlement or movement of foundations or footings.

3.1.1.2 Water Main Separation

Where water piping is required to be installed in the proximity of sewer mains the separation distances specified as follows in Title 22 California Code of Regulation, Safe Drinking Water Act, Section 64572 shall be met.

(a) New water mains and new supply lines shall not be installed in the same trench as, and shall be at least 10 feet horizontally from and one foot vertically above, any parallel pipeline conveying:

(1) Untreated sewage,
(2) Primary or secondary treated sewage,
(3) Disinfected secondary-2.2 recycled water (defined in CCR Title 22, section 60301.220),
(4) Disinfected secondary-23 recycled water (defined in CCR Title 22,section 60301.225), and
(5) Hazardous fluids such as fuels, industrial wastes, and wastewater sludge.

(b) New water mains and new supply lines shall be installed at least 4 feet horizontally from, and one foot 5 inches vertically above, any parallel pipeline conveying:

(1) Disinfected tertiary recycled water (defined in CCR Title 22,section 60301.230), and
(2) Storm drainage and
(3) Irrigation water.

(c) New supply lines conveying raw water to be treated for drinking purposes shall be

installed at least 4 feet horizontally from, and one foot vertically below, any water main.

(d) If crossing a pipeline conveying a fluid listed in subsection (a) or (b), a new water main shall be constructed no less than 45-degrees to and at least one foot above that pipeline. No connection joints shall be made in the water main within eight horizontal feet of the fluid pipeline.

(e) The vertical separation specified in subsections (a), (b), and (c) is required only when the horizontal distance between a water main and pipeline is less than ten feet.

(f) New water mains shall not be installed within 100 horizontal feet of the nearest edge of any sanitary landfill, wastewater disposal pond, or hazardous waste disposal site, or within 25 horizontal feet of the nearest edge of any cesspool, septic tank, sewage leach field, seepage pit, underground hazardous material storage tank, or groundwater recharge project site.

(g) The minimum separation distances set forth in this section shall be measured from the nearest outside edge of each pipe barrel.

When new water mains, new sanitary sewer mains, or other nonpotable fluid carrying pipelines are being installed in existing developed areas, local conditions (e.g., available space, limited slope, existing structures) may create a situation in which there is no alternative but to install water mains, sanitary sewer mains, or other nonpotable pipelines at a distance less than that required by the regulations. In such cases through permit action California DPH may approve alternate construction criteria. Contractor shall request and receive approval through the COTR, California DPH approval prior to performance of alternative construction criteria.

3.1.1.2 Earthwork

Perform earthwork operations in accordance with Section 31.

3.1.1.3 Pipe Laying and Jointing

Remove fins and burrs from pipe and fittings. Before placing in position, clean pipe, fittings, valves, and accessories, and maintain in a clean condition. Provide proper facilities for lowering sections of pipe into trenches. Do not under any circumstances drop or dump pipe, fittings, valves, or any other water line material into trenches. Cut pipe in a neat workmanlike manner accurately to length established at the site and work into place without springing or forcing. Replace by one of the proper length any pipe or fitting that does not allow sufficient space for proper installation of jointing material. Blocking or wedging between bells and spigots will not be permitted. Lay bell-and-spigot pipe with the bell end pointing in the direction of laying. Grade the pipeline in straight lines; avoid the formation of dips and low points. Support pipe at proper elevation and grade. Secure firm, uniform support. Wood support blocking will not be permitted. Lay pipe so that the full length of each section of pipe and each fitting will rest solidly on the pipe bedding; excavate recesses to accommodate bells, joints, and couplings. Provide anchors and supports where necessary for fastening work into place. Make proper provision for expansion and contraction of pipelines. Keep trenches free of water until joints have been properly made. At the end of

each work day, close open ends of pipe temporarily with wood blocks or bulkheads. Do not lay pipe when conditions of trench or weather prevent installation. Depth of cover over top of pipe shall not be less than 3 feet.

3.1.1.4 Installation of Tracer Wire and Marking Tape

Install a continuous length of tracer wire for the full length of each run of nonmetallic pipe. Attach wire to top of pipe in such manner that it will not be displaced during construction operations.

Install marking tape for the full length of each run of pipe regardless of the material type or service. Lay the tape 1 foot above the top of pipe on the compacted lift of soil.

3.1.1.5 Connections to Existing Water Lines

Connections to existing water mains shall be inspected and approved prior to backfill. Contractor shall notify the Project Manager 24 hours in advance of inspection.

3.1.1.6 Penetrations

Pipe passing through walls of valve pits and structures shall be provided with ductile-iron or C900 PVC wall sleeves. Annular space between walls and sleeves shall be filled with rich cement mortar. Annular space between pipe and sleeves shall be filled with a link seal.

3.1.1.7 Flanged Pipe

Flanged pipe shall only be installed above ground or with the flanges in valve pits.

3.1.2 Special Requirements for Installation of Water Mains

3.1.2.1 Installation of Ductile-Iron Piping

Unless otherwise specified, install pipe and fittings in accordance with paragraph entitled "General Requirements for Installation of Pipelines" and with the requirements of AWWA C600 for pipe installation, joint assembly, valve-and-fitting installation, and thrust restraint.

a. Jointing: Pipe-to-pipe joints shall be bell and spigot or mechanical joint. Joints for fittings, valves, couplings and appurtenances shall be mechanical joint or flanged. Push on joint type fittings and valves shall not be used. Flanged joints shall only be installed above grade or below grade in a pit. Make bell and spigot joints with the gaskets and lubricant specified for this type joint; assemble in accordance with the applicable requirements of AWWA C600 for joint assembly. Make mechanical joints with the gaskets, glands, bolts, and nuts specified for this type joint; assemble in accordance with the applicable requirements of AWWA C600 for joint assembly and the recommendations of Appendix A to AWWA C111/A21.11. Make flanged joints with the gaskets, bolts, and nuts specified for this type joint. Make flanged joints up tight; avoid undue strain on flanges, fittings, valves, and other accessories. Align bolt holes for each flanged joint. Use full size bolts for the bolt holes; use of undersized bolts to make up for misalignment of bolt holes or for any other purpose will not be permitted. Do not allow adjoining flange faces to be out of parallel to such degree that the flanged joint cannot

be made watertight without overstraining the flange. When flanged pipe or fitting has dimensions that do not allow the making of a proper flanged joint as specified, replace it by one of proper dimensions. Use setscrewed flanges to make flanged joints where conditions prevent the use of full-length flanged pipe and assemble in accordance with the recommendations of the setscrewed flange manufacturer. Make insulating joints with the gaskets, sleeves, washers, bolts, and nuts previously specified for this type joint. Assemble insulating joints as specified for flanged joints, except that bolts with insulating sleeves shall be full size for the bolt holes. Ensure that there is no metal-to-metal contact between dissimilar metals after the joint has been assembled.

b. Allowable Deflection: The maximum allowable deflection shall be as given in AWWA C600. If the alignment requires deflection in excess of the above limitations, special bends or a sufficient number of shorter lengths of pipe shall be furnished to provide angular deflections within the limit set forth.

c. Pipe Anchorage: Provide concrete thrust blocks and joint restraints for pipe anchorage at all turns, Tees and 'Y's. Thrust blocks shall be in accordance with the requirements of AWWA C600 for thrust restraint, except that size and positioning of thrust blocks shall be as indicated. Use concrete, ASTM C 94/C 94M, having a minimum compressive strength of 15 MPa(2,500 psi) at 28 days; or use concrete of a mix not leaner than one part cement, 2 1/2 parts sand, and 5 parts gravel, having the same minimum compressive strength.

d. Joint Restraints: All joints, fittings, valves and couplings including but not limited to connection between new and existing pipe, cut-in connections to existing water mains, pipe-to- pipe joints, pipe-to-fitting joints and pipe-to-valve joints shall be restrained with Megalug series joint restraints or approved equal for the type of joint and type of pipe material installed. Contractor shall submit and receive approval on methods of restraining each type of joint prior to start of work. Field lock type gaskets shall not be used.

3.1.2.2 Installation of PVC Plastic Water Main Pipe

Installation of PVC Plastic Water Main Pipe and Associated Fittings: Unless otherwise specified, install pipe and fittings in accordance with paragraph entitled "General Requirements for Installation of Pipelines"; with the requirements of UBPPA UNI-B-3 for laying of pipe, joining PVC pipe to fittings

and accessories, and setting of hydrants, valves, and fittings; and with the recommendations for pipe joint assembly and appurtenance installation in AWWA M23, Chapter 7, "Installation."

a. Jointing: Joints for pipe-to-pipe shall be bell and spigot with restraint. Joints for fittings, valves, couplings and appurtenances shall be mechanical joint. Push on joint type fittings and valves shall not be used. Make push-on joints with the elastomeric gaskets specified for this type joint, using either elastomeric-gasket bell-end pipe or elastomeric-gasket couplings. For pipe-to- pipe bell and spigot joint connections, use only pipe with bell and spigot joint ends having factory-made bevel. Use an approved lubricant recommended by the pipe manufacturer for bell and spigot joints. Assemble push-on joints for pipe-to-pipe joint connections in accordance with the requirements of

UBPPA UNI-B-3 for laying the pipe and the recommendations in AWWA M23, Chapter 7, "Installation," for pipe joint assembly. Make compression-type joints/mechanical joints with the gaskets, glands, bolts, nuts, and internal stiffeners previously specified for this type joint; assemble in accordance with the requirements of UBPPA UNI-B-3 for joining PVC pipe to fittings and accessories, with the applicable requirements of AWWA C600 for joint assembly, and with the recommendations of Appendix A to AWWA C111/A21.11. Cut off spigot end of pipe for compression-type joint/mechanical-joint connections and do not re- bevel. Assemble joints made with sleeve-type mechanical couplings in accordance with the recommendations of the coupling manufacturer using.

b. Offset: Maximum offset in alignment between adjacent pipe joints shall be as recommended by the manufacturer and approved by the Contracting Officer, but shall not exceed 5 degrees.

c. Pipe Anchorage: Provide concrete thrust blocks and joint restraints for pipe anchorage at all turns, tees and 'Y's. Thrust blocks shall be in accordance with the requirements of AWWA C600 for thrust restraint, except that size and positioning of thrust blocks shall be as indicated. Use concrete, ASTM C 94/C 94M, having a minimum compressive strength of 15 MPa(2,500 psi) at 28 days; or use concrete of a mix not leaner than one part cement, 2 1/2 parts sand, and 5 parts gravel, having the same minimum compressive strength.

d. Joint Restraints: All joints, fittings, valves and couplings including but not limited to connection between new and existing pipe, cut-in connections to existing water mains, pipe-to- pipe joints, pipe-to-fitting joints and pipe-to-valve joints shall be restrained with Megalug series joint restraints or approved equal for the type of joint and type of pipe material installed. Contractor shall submit and receive approval on methods of restraining each type of joint prior to start of work. Field lock type gaskets shall not be used.

e. Fittings: Install in accordance with AWWA C605.

3.1.2.8 Installation of Valves and Hydrants

a. Installation of Valves: Install gate valves, AWWA C500 and UL 262, in accordance with the requirements of AWWA C600 for valve-and-fitting installation and with the recommendations of the Appendix ("Installation, Operation, and Maintenance of Gate Valves") to AWWA C500. Install gate valves, AWWA C509, in accordance with the requirements of AWWA C600 for valve-and-fitting installation and with the recommendations of the Appendix ("Installation, Operation, and Maintenance of Gate Valves") to AWWA C509. Install gate valves on PVC water mains in accordance with the recommendations for appurtenance installation in AWWA M23, Chapter 7, "Installation." Install check valves in accordance with the applicable requirements of AWWA C600 for valve-and-fitting installation. Make and assemble joints to gate valves [and check valves] as specified for making and assembling the same type joints between pipe and fittings.

b. Installation of Hydrants: Install hydrants in accordance with AWWA C600 for hydrant installation and as indicated. Make and assemble joints as specified for

making and assembling the same type joints between pipe and fittings. Hydrant bury shall have joints restraints and a concrete thrust block installed. Install hydrants with the 115 mm(4 1/2 inch) connections facing the adjacent paved surface. If there are two paved adjacent surfaces, contact the Contracting Officer for further instructions.

3.1.3 Installation of Water Service Piping

3.1.3.1 Location

Connect water service piping to the building service where the building service has been installed. Where building service has not been installed, terminate water service lines at a point directed by the Contracting Officer; such water service lines shall be closed with plugs or caps.

3.1.3.2 Service Line Connections to Water Mains

Connect service lines 50 mm(2 inch) size to the main with a service saddle and corporation stop for services up to 2 inch and a gate valve for services larger that 2 inch. Connect service lines to ductile- iron water mains in accordance with AWWA C600 for service taps. Connect service lines to PVC plastic water mains in accordance with UBPPA UNI-B-8 and the recommendations of AWWA M23, Chapter 9, "Service Connections."

3.1.4 Special Requirements for Installation of Water Service Piping

3.1.4.1 Installation of Metallic Piping

Install pipe and fittings in accordance with paragraph entitled "General Requirements for Installation of Pipelines" and with the applicable requirements of AWWA C600 for pipe installation, unless otherwise specified.

a. Jointing:

(1) Screwed Joints: Make screwed joints up tight with Teflon tape and joint compound; apply to male threads only. Threads shall be full cut; do not leave more than three threads on the pipe exposed after assembling the joint.

(2) Joints for Copper Tubing: Cut copper tubing with square ends; remove fins and burrs. Handle tubing carefully; replace dented, gouged, or otherwise damaged tubing with undamaged tubing. Make solder joints using ASTM B 32, 95-5 tin-antimony or Grade Sn96 solder. Solder and flux shall contain not more than 0.2 percent lead. Before making joint, clean ends of tubing and inside of fitting or coupling with wire brush or abrasive. Apply a rosin flux to the tubing end and on recess inside of fitting or coupling. Insert tubing end into fitting or coupling for the full depth of the recess and solder. Compression joints are not allowed.

(3) Flanged Joints: Make flanged joints up tight, taking care to avoid undue strain on flanges, valves, fittings, and accessories.

3.1.4.3 Installation and Location of Meters

Meters and meter boxes shall be installed at the locations shown on the drawings or as directed by the Project Manager.

For meters installed in vaults the meters shall be centered in the vault to allow for reading and ease of removal or maintenance. Meters shall be installed with ball valves on both inlet and outlet side of meter. Valves shall be the same nominal size as the service line piping in which installed on both the inlet and outlet side of the meter. There shall be a minimum of 12 inches of clearance between the top of the meter and the underside of the vault lid. Meters and valves will fit inside of meter box/vault.

3.1.5 Disinfection

Prior to disinfection, obtain Contracting Officer approval of the proposed method for disposal of waste water from disinfection procedures. Disinfect new water piping and existing water piping affected by Contractor's operations in accordance with AWWA C651. Fill piping systems with solution containing minimum of 50 parts per million of available chlorine and allow solution to stand for minimum of 24 hours. Flush solution from the systems with domestic water until maximum residual chlorine content is within the range of 0.2 and 0.5 parts per million, or the residual chlorine content of domestic water supply. Obtain at least two consecutive satisfactory bacteriological samples from new water piping, analyze by a CA Dept of Health certified laboratory, and submit the results prior to the new water piping being placed into service. The bacteriological test specified in AWWA C651 shall be performed by a laboratory approved by the CA Dept. of Health Services and the Presidio Trust. The cost of sampling, transportation, and testing shall be the responsibility of the Contractor. Backflow preventers and meters shall not be in place during the flushing.

3.1.6Flushing

Initial flushing shall obtain a minimum velocity in the main of 0.75 m/sec (2.5 feet per second) at 40 PSI residual pressure in water main. The duration of the flushing shall be adequate to remove all particles from the line. Flush tests shall be observed by the Presidio Trust and/or Presidio Fire Dept.

Pipe Diameter		Flow Required to Produce 2.5 ft/sec(approx.) Velocity in Main		Number of Hydrant Outlets			
				Size of Tap. in. (mm)			
				1(25)	1 ½(38)	2(51)	2 1/2-in (64 mm)
In	(mm)	gpm	(L/sec)	Number of taps on pipe			
4	(100)	100	(6.3)	1	--	--	1
6	(150)	200	(12.6)	--	1	--	1
8	(200)	400	(25.2)	--	2	1	1
10	(250)	600	(37.9)	--	3	2	1
12	(300)	900	(56.8)	--	--	3	2

16	(400)	1,600	(100.9)	--	--	4	2

3.2 FIELD QUALITY CONTROL

3.2.1Connection and Testing Plan

Contractor shall submit a Connection and Testing Plan for the new addition to the water system. This Connection and Testing Plan shall specifically address the requirements for connections to the existing system, including but not limited to identifying the point of loading, chlorine feed location, minimum duration of flushing, possible points for disposal of water, and sampling locations. Calculations of the anticipated volume of water and the minimum duration of flushing required to perform the flushing and testing shall be submitted with the Project Plans. All valves, taps and appurtenances and duration of flushing needed to meet these requirements shall be indicated on the Project Plans.

3.2.2 Field Tests and Inspections

Prior to hydrostatic testing, obtain Contracting Officer approval of the proposed method for disposal of waste water from hydrostatic testing. The Contracting Officer will conduct field inspections and witness field tests specified in this section. Hydrostatic testing of the system will be performed after disinfection. It may occur prior to disinfecting the system, provided the pipe section(s) is not attached to an 'in-service' water main. The Contractor shall perform field tests, and provide labor, equipment, and incidentals required for testing. The Contractor shall produce evidence, when required, that any item of work has been constructed in accordance with the drawings and specifications. Do not begin testing on any section of a pipeline where concrete thrust blocks and joint restraints have not been provided.

3.2.3 Testing Procedure

Test water mains and water service lines in accordance with the applicable specified standard, except for the special testing requirements given in paragraph entitled "Special Testing Requirements." Test ductile-iron water mains and water service lines in accordance with the requirements of AWWA C600 for hydrostatic testing. The amount of leakage on ductile-iron pipelines with mechanical-joints or push-on joints shall not exceed the amounts given in AWWA C600; no leakage will be allowed at joints made by any other method. Test PVC plastic water mains in accordance with the requirements of UBPPA UNI-B-3 for pressure and leakage tests. The amount of leakage on pipelines made of PVC plastic water main pipe shall not exceed the amounts given in UBPPA UNI-B-3, except that at joints made with sleeve-type mechanical couplings, no leakage will be allowed. Test water service lines in accordance with applicable requirements of AWWA C600 for hydrostatic testing. No leakage will be
allowed at copper pipe joints, copper tubing joints (soldered, brazed), flanged joints and screwed joints.

3.2.4 Special Testing Requirements

For pressure test, use a hydrostatic pressure 375 kPa(50 psi) greater than the maximum

working pressure of the system, except that for those portions of the system having pipe size larger than 3 inches in diameter, hydrostatic test pressure shall be not less than 1400 kPa(200 psi). Hold this pressure for not less than 2 hours. Prior to the pressure test, fill that portion of the pipeline being tested with water for a soaking period of not less than 24 hours. For leakage test, use a hydrostatic pressure not less than the maximum working pressure of the system. Leakage test may be performed at the same time and at the same test pressure as the pressure test.

3.3 CLEANUP

Upon completion of the installation of water lines, and appurtenances, all debris and surplus materials resulting from the work shall be removed.

END OF SECTION

Section 33 41 00 High Density Polyethylene Pipe

PART 1 – GENERAL

1.1 Specification is for high-density polyethylene (HDPE) water piping systems that conform to AWWA standards. Specification provides minimum requirements for PE 4710 pipes and fittings to be used in the design and construction of pressure water piping systems.

1.2 DESCRIPTION

A. Scope – This section specifies HDPE and fittings for water utility use as indicated on the drawings, and as specified herein.
   i. Furnish, install, and test HDPE piping system as indicated and specified in this section, as referred to in related sections, and as shown in the Drawings.
   ii. The primary installation method is direct burial. The means and methods, including the testing for acceptance shall conform to all applicable standards as noted herein with the intention of providing a leak-free system to the owner.

1.3 REFERENCES

A. To the extent referenced in this specification section, the standards and documents listed in Appendix A are included and are made part of this specification.
B. In the event of a conflict, the requirements of this specification section prevail.
C. Unless otherwise specified, references to documents shall mean the latest published edition of the referenced document in effect at the bid date of the project.

1.4 SYSTEM DESIGN PARAMETERS

A. Per AWWA C901, C906 and M55, the Allowable Total Pressure during Recurring Surge conditions equals 1.5 times the pipe's pressure class. Allowable Total Pressure during Occasional Surge conditions equals 2.0 times the pipe's pressure class.

B. Table 1 lists the preferred pressure classes, Allowable Total Pressure during Recurring and Occasional Surges for PE4710. ***Note****: AWWA defines pressure class (PC) differently for different pipe materials, i.e., PC for ductile iron and PVC is different from that for HDPE. For further information on the proper selection of pressure class, refer to PPI PACE and Tables 1 and 2.*

C. Water Hammer
   i. Fatigue: Use minimum 55 cycles per day for 100-year fatigue design life.
   ii. Flow Velocity: Use minimum 4 fps for recurring surge design and minimum 8 fps for occasional surge design.

Table 1: PE4710 Preferred Pressure Classes per AWWA C906 and C901 (up to 80ºF)

Pipe Dimension Ratio (DR)	Pressure Class / Rating (psi)	Allowable Total Pressure during Recurring Surge (psi)	Allowable Total Pressure during Occasional Surge (psi)	AWWA C906	AWWA C901	Allowable Hydrotest (Field) Pressure (psi)
DR 17	125	188	250	**Yes**	No	188
DR 13.5	160	240	320		No	240
DR 11	200	300	400		No	300
DR 9	250	375	500		**Yes**	375

Table 2: Required Pressure Class (PC) and Dimension Ratio (DR) for PE4710, PVC and DI*

Working Pressure	PE4710 PC (DR)	PVC PC (DR)	Ductile Iron PC
75 psi	PC125 (DR17)	PC305 (DR14)	PC350

***Example**: In accordance with AWWA standards and manuals and per PPI PACE: Calculate the required PC for 8" DIPS PE4710, PVC and Ductile Iron pipes operating at 75 psi working pressure, with 4 fps recurring surge, 8 fps occasional surge, 55 cycles per day for 100 years and at 73ºF temperature.

1.5 SUBMITTALS

Quality Assurance / Control Submittals

A. Affirmation that product shipped meets or exceeds the standards set forth in this specification. This shall be in the form of a written document from the manufacturer attesting to the manufacturing process meeting the standards.
B. Manufacturers recommended fusion procedures for the products.

1.6 DELIVERY – STORAGE – HANDLING

A. Handle the pipe in accordance with the PPI *Handbook of Polyethylene Pipe, Chapter 2* using approved strapping and equipment rated for the loads encountered. Do not use chains, wire rope, forklifts or other methods or equipment that may gouge or damage the pipe or endanger persons or property. Field storage is to be in compliance with AWWA Manual M55, Chapter 7.
B. Shipped with optional, recyclable, end-caps (suggested)
C. If any gouges, scrapes, or other damage to the pipe results in wall loss 10% or greater (of the pipe wall thickness), cut out that gouged section and do not use.

PART 2 – HDPE PRODUCTS FOR 4 INCH AND LARGER PIPE PER AWWA C906

2.1 – PIPE

A. HDPE pipe with 4" to 65" diameter shall be PE4710 conforming to the latest edition of ANSI/AWWA C906 and ANSI/NSF Standard 61. For potable water applications, PE4710 compound shall conform to ASTM D3350 minimum Cell classification *PE445574C*-CC3. Refer to PPI TN-44 for CC3 calculations.
    i. HDPE pipes shall be extruded by a PPI member with dependent listings in PPI TR-4, and shall meet the requirements of AWWA C906. Sample list of sizes is shown in Appendix B.1.
    ii. Dimensions and tolerances for HDPE pipe and fittings shall meet the requirements of AWWA C906.

B. HDPE pipe shall be rated for use at a pressure class of 250 and 125 psi. The outside diameter of the pipe shall be based upon the DIPS sizing system.

C. Pipe marking in accordance with Section 2.3.

2.2 FITTINGS

A. Butt Fusion Fittings – HDPE Fittings shall be made of PE4710 and with a minimum Cell Classification as shown in Section 2.1.A. All HDPE fittings shall meet the requirements of AWWA C906 and shall have a pressure rating equal to the pressure rating of the pipe to which

the fitting is joined.

i. Molded fittings shall be manufactured, tested and marked per ASTM D3261.
ii. Fabricated fittings shall be manufactured, tested and marked per ASTM F2206, or individual fittings standards.

B. Electrofusion Fittings - Fittings shall be made of HDPE material with a minimum material designation code of PE 4710 and with a minimum Cell Classification as noted in Section 2.1A. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans. Markings shall be according to ASTM F1055.

C. Flanges and Mechanical Joint adapters (MJ adapters) – Flanges and MJ adapters shall have a material designation code of PE4710 with a minimum Cell Classification as noted in Section 2.1.A. Flanges shall be made in accordance with ASTM F2880. MJ adapters shall be made to ASTM D3261. Flanges and MJ adapters shall have a pressure rating equal to the pipe to which it is joined unless otherwise specified on the plans. Markings for molded or machined flange adapters or MJ adapters shall be per ASTM D3261. MJ adaptors are the preferred connection method over mechanical fittings. Flanges and MJ adaptors should be double checked for butterfly valve clearance to allow full disc rotation and movement prior to installation in the trench.

D. Mechanical Fittings for pipes - Three primary mechanical fittings or connections that can be used are Stab or insert type; compression type; and clamp ring. Per MAB-4, “Internal stiffeners should be used for all mechanical couplings”. Mechanical fittings shall be designed to restrain and to prevent pull-out or rotation. Refer to Appendix D titled Degradation of Gaskets with Chlorine and Chloramine.

2.3 PIPE AND FITTING IDENTIFICATION

A. The pipe shall be marked in accordance with the standards to which it is manufactured. *[or alternative as below]*

Markings shall include the following items: Nominal size (such as 12”), outside diameter base (such as DIPS), dimension ratio (such as DR 17), manufacturer’s name or trademark, standard materials designation code (PE 4710), cell classification (e.g. PE 445574C), PE compound oxidative resistance for potable water (CC3), pressure class (such as PC 125), standard’s designation (AWWA C906), manufacturer’s production code, date of manufacture, mark of the certifying agency for potable water (such as NSF).

B. Color identification by the use of stripes on pipe to identify pipe service is recommended. If used, stripes or colored exterior pipe product shall be blue for potable water and purple for irrigation. Fittings are typically not striped.

C. Marking/locating tape shall be approved by the engineer and placed between 6 and 12 inches above the crown of pipe.

PART 3 – HDPE PRODUCTS FOR 3 INCH AND SMALLER PIPE PER AWWA C901

3.1 PIPE

A. HDPE pipe with ¾" to 3" diameter shall be PE 4710 conforming to the latest edition of ANSI/AWWA C901 and ANSI/NSF Standard 61. For potable water applications, PE4710 compound shall conform to ASTM D3350 minimum Cell classification PE*445574C-CC3;* refer to ASTM D3350 for other cell classifications and to PPI TN-49 for CC3 calculations.

B. HDPE pipes shall be extruded by a PPI member with dependent listings in PPI TR-4, and shall meet the requirements of AWWA C901. Dimensions and tolerances for pipe and fittings shall meet the requirements of AWWA C901. Sample list of sizes is shown in Appendix B.2.

C. Per AWWA C901, PE4710 pipe shall have a pressure class (min) of 250 psi. The outside diameter of the pipe shall be based upon the IPS or CTS sizing system

3.2 FITTINGS

A. Butt Fusion Fittings – HDPE Fittings shall be made of PE4710 and with a minimum Cell Classification as shown in Section 3.1.A. All HDPE fittings shall meet the requirements of AWWA C901 and shall have a pressure rating equal to the pressure rating of the pipe to which the fitting is joined.
   i. Molded fittings shall be manufactured, tested and marked per ASTM D3261.
   ii. Fabricated fittings shall be manufactured, tested and marked per ASTM F2206, or individual fittings standards.
   iii. Socket fittings shall meet ASTM D2683.

B. Electrofusion Fittings - Fittings shall be PE4710, with a minimum Cell Classification as noted in Section 3.1.A. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans.

C. Flanges and Mechanical Joint adapters (MJ adapters) – Flanges and MJ adapters shall be PE4710, with a minimum Cell Classification as noted in Section 3.1.A. Flanged and MJ adapters can be made to ASTM D3261 or if machined, must meet the requirements of ASTM F2206. Flanges and MJ adapters shall have a pressure rating equal to the pipe unless otherwise specified on the plans. Markings for molded or machined flange adapters or MJ adapters shall be per ASTM D3261. Fabricated (including machined) flange adapters shall be per ASTM F2206.

D. Mechanical Fittings for service pipes - Three primary mechanical fittings or connections can be used, which are: Stab or insert type; compression type; and clamp ring. Per MAB-4, "Internal stiffeners should be used for all mechanical fittings".

E. Mechanical fittings shall be designed to restrain and to prevent pull-out or rotation.

F. Service connections shall be electrofusion saddles with a brass or stainless steel threaded outlet, electrofusion saddles, sidewall fusion branch saddles, tapping tees, or mechanical saddles.

G. For electrofusion saddles with threaded outlet the size of the outlet shall be as shown on the plans. Electrofusion saddles shall be made from materials required in Section 3.1.A.

H. For sidewall fusion saddles, the size of the saddle shall be as indicated on the plans. The saddle can be made in accordance to ASTM D3261 or ASTM F2206.

I. Tapping tees shall be made to ASTM D3261 or D2683 and MSS SP-60.

3.3 PIPE AND FITTING IDENTIFICATION

A. The pipe shall be marked in accordance with the standards to which it is manufactured. *[or alternative as above]*

Markings shall include nominal size, outside diameter base (e.g. CTS), dimension ratio (e.g. DR 9), manufacturer's name or trademark, standard materials designation code (PE 4710), cell classification (e.g. PE 445574C), PE compound oxidative resistance for potable water (CC3), pressure class (e.g. PC 250), standard's designation (AWWA C901), manufacturer's production code, date of manufacture, mark of the certifying agency for potable water (such as NSF).

B. Color identification by the use of stripes on pipe to identify pipe service is recommended. If used, stripes (pipe with color code C) or colored exterior pipe product (pipe with color code E) shall be blue for potable water. Fittings are typically not striped.

C. Marking/locating tape shall be approved by the engineer and placed between 6 and 12 inches above the crown of pipe.

PART 4 – EXECUTION

4.1 TRAINING AND INSPECTION

A. Refer to ASTM F3190, ASTM F1290, MAB-01and MAB-02 for recommended training and inspection for butt-fusion, socket fusion and Electrofusion joints. All equipment shall be inspected and personnel training requirements completed and verified prior to commencing construction. Each fusion technician shall be qualified to specifically make the required fusion joint; qualification shall be demonstrated by evidence of training within one year on the equipment and pipe size(s) to be utilized for this project.

4.2 JOINING METHODS

The pipe and fittings shall be joined by butt fusion or electrofusion couplings, mechanical joint (MJ) adapters, or by flange connections in accordance with manufacturer's recommendations and as required in this document. Unless otherwise shown on Drawings and except for connections to existing utilities, all joints shall be fused.

A. Butt Fusion: The pipe shall be joined by heat fusion of the ends. Prior to fusion the pipe shall be clean and the ends shall be cut square. Butt-fusion joining is applicable to pipes that have the same nominal outside diameter and wall thickness, within one SDR. Field site butt-fusion system operators shall be trained in the use of the high quality butt-fusion equipment that secure and precisely align the pipe ends for the fusion process. Operators shall be trained by the pipe supplier or manufacturer of the fusing machine and be experienced in the operation of the equipment. Fusion quality shall be recorded, the recording of the information must be provided to the Owner. The Owner will review documents within 7 days and identify

any fusion records that might indicate the need to replace an existing fused connection. The recorded fusion information must meet the standard requirements of ASTM F3124. All fusions failing to meet these requirements shall be removed and refused. Refer to ASTM F2620, ASTM F3124, ASTM F3183 and ASTM F3190.

B. Saddle fusion: Saddle fusion shall be done in accordance with ASTM F2620 or TR-41 or the fitting manufacturer's recommendations and PPI TR-41. Saddle fusion joints shall be made by qualified fusion technicians. Qualification of the fusion technician shall be demonstrated by evidence of fusion training within the past year on the equipment to be utilized on this project. (ASTM F905).

C. Socket Fusion: Molded socket fusion fittings are only to be used for joining of HDPE pipe from ¾ inch to 2 inch size. Socket fusion shall be done in accordance with ASTM F2620 or the fitting manufacturer's recommendations. Socket fusion is the process of fusing pipe to pipe, or pipe to fitting by the use of male and female ends that are heated simultaneously, and pressed together so the outside wall of the male end is fused to the inside wall of the female end. Qualification of the fusion technician shall be demonstrated by evidence of socket fusion training within the past year on the equipment to be utilized on this project.

D. Electrofusion: Electrofusion joining shall be done in accordance with the manufacturers recommended procedure and ASTM F1055, ASTM F1290, MAB-01 and MAB-02. Qualification of the fusion technician shall be demonstrated by evidence of electrofusion training within the past year on the equipment and pipe sizes to be utilized for this project. Installers shall follow the guidance shown in the previous documents to fabricate EF assemblies. The installer must remove oxidation from the pipe and maintain a clean surface on both pipe and fitting to ensure acceptable joint quality.

E. Mechanical:
   i. Mechanical connection of HDPE to auxiliary equipment such as valves, pumps, and fittings shall use flanges or mechanical joint adapters and other devices in conformance with the PPI Handbook of Polyethylene Pipe, Chapter 9 and AWWA Manual of Practice M55, Chapter 6. Mechanical connections shall be manufactured for HDPE pipe and approved by the connection manufacturer for use with polyethylene pipe.
   Flanges and MJ adaptors should be double checked for butterfly valve clearance to allow full disc rotation and movement prior to installation in the trench. Uncontrolled tapering or hand-beveling in the field is not allowed.

   ii. Mechanical connections on pipe 3" and smaller are available to connect HDPE pipe to other HDPE pipe, or a fittings, or to a transition to another material. The use of stab-fit style couplings is allowed, along with the use of metallic couplings of brass and other materials. All mechanical and compression fittings shall be recommended by the manufacturer for use with HDPE and with potable water. Refer to fittings manufacturers and to Polyethylene Piping Systems Field Manual for Municipal Water. Manufactured transition fittings are also available.

   iii. Mechanical couplings that wrap around the pipe and act as saddles are made by several manufacturers specifically for HDPE pipe. All such saddles, tapping saddles, couplings and clamps shall be recommended by the manufacturer as being designed for use with HDPE pipe at the required pressure class (Section 1.4); all mechanical

couplings shall be fully restrained either by themselves or by an alternate means.

F. Mechanical Joint/Flange: A flange assembly consists of a metal back-up flange or bolt-ring and a polyethylene flange adapter. MJ assembly consists of a MJ adaptor with gland ring, gasket and bolt kit. Both MJ adapters and flange adapters are fused onto the plain end of the pipe main. Bolting guidance for MJ connections is provided in AWWA C600 and guidance for flanges and gaskets is provided in PPI-TN38. Note that an HDPE flange adapter acts as both a flange and a gasket, and as such, no 'gasket' is required. For further information, refer to PPI TN38.

4.3 INSTALLATION

A. Open Trench Installation:

i. Install the piping system in accordance with the engineering drawings and ASTM D2774 or AWWA M55. Place and compact the embedment and backfill soils with the guidelines in ASTM F1668. Deviations shall be approved by the Engineer.

ii. Take care when placing, moving, or removing the trench boxes, sheeting or shoring, or bracing to prevent disturbance of the pipe and the embedment soils. Any voids or disturbance shall be refilled and re-compacted.

iii. Per AWWA M55, "ANSI/AWWA C906 PE pressure piping systems must be installed with fully restrained joints or with partially restrained joints AND external joint restraints. ANSI/AWWA C906 pressure piping systems that are joined by heat fusion, electrofusion, flanges, and MJ adaptors are fully [self-] restrained and do not require external joint restraints or thrust block joint anchors." Concrete embedded HDPE thrust anchors should be considered prior to connections to unrestrained pipes.
Refer to AWWA M55 for design guidance.

B. Joining Methods. Refer to Section 4.2 for details

C. Water Mains and Accessories. HDPE connections to other pipe materials or valves and fire hydrants shall be made by mechanical joints, flanges or transition fittings. All connections to jointed gasketed pipe materials, valves or fire hydrants must be restrained and supported independently.

i. Restrained Mechanical Joints: Restrained mechanical joints shall be made using mechanical joint adapters. Refer to the manufacturer's instructions on the need for stiffeners when installing a mechanical joint.
ii. Flange: Flange connections shall be as described in Section 4.3.B.

D. Appurtenances: All appurtenances (tees, elbows, services, valves, air relief valves, fire hydrants, etc.), must be independently supported and shall not rely on the pipeline and its connections for this support. Excessive stresses may be encountered when appurtenances are inadequately supported.

E. Installation of Tracer Wire. The Contractor shall be required to install tracer wire along the entire section of pipeline and along all service connections as listed below. The tracer wire shall be installed simultaneously with the polyethylene piping system. . Tracer wire shall be properly spliced at each end connection and each service connection. Care should be taken to adequately wrap and protect wire at all splice locations. No bare tracer wire shall be accepted. Provide Magnesium alloy anode for cathodic protection that conforms to the requirements of ASTM B843. Install tracer wire per local and manufacturer's requirements.

i. Open Trench - Tracer wire shall be solid #12 AWG, (or stronger like #10) Copper Clad Steel, High Strength with minimum 450 lb. break load, and with minimum 30 mil HDPE insulation thickness.

ii. Directional Drilling/Boring - Tracer wire shall be solid #12 AWG (or stronger like #10), copper-clad steel or braided stainless steel (A316), Extra High Strength with minimum 1,150 lb. break load, and with minimum 30 mil HDPE insulation thickness (applies to all wires).

iii. Pipe Bursting/Sliplining - Tracer wire shall be 7 x 7 (or stronger) stranded copper- clad steel with 4,700 lb. breaking strength, or braided stainless steel (A316), with minimum 50 ml HDPE insulation thickness.

F. Embedment and Final Backfill:

1. Embedment material should be Class I, Class II, or Class III soils as defined by ASTM F2774 or AWWA M55. Class IV and Class V materials are not recommended.

2. The allowable maximum particle size in the embedment shall not exceed the values shown in Table 3.

Table 3: Allowable Maximum Particle Size in Embedment

Pipe Diameter	Particle Size
≤ 4”	≤ ½”
6” and 8”	≤ ¾”
10” to 16”	≤ 1”
≥ 18”	≤ 1.5”

3. The final backfill usually consists of the excavated trench material and should not contain any deleterious or hazardous material, organic matter, construction debris, or boulders. Class V soils should not be used for final backfill unless specifically required. If the final backfill is located beneath a paved surface, crossing pipeline, or waterway, the soil should be placed in lifts and compacted to ≥95 % (D698), or in accordance with requirements of the owner or agency. Farmlands and steep slopes may have different requirements for compacted backfill. The maximum particle size should be 3 inches in consideration of future excavation.

G. Cold (Field) Bending. Contractor shall not bend the pipe to fit a trench less than the radius shown in Table 4. The long-term minimum cold (field) bending radius shall be as follows:

Table 4: Minimum Long-Term Bending Radius per Pipe DR

Pipe DR	Minimum Cold Bending Radius (long-term)
≤ 9	20 x pipe OD
11 – 13.5	25 x pipe OD
17 – 21	27 x pipe OD
>21	30 x pipe OD

Fitting or Flange within bend	100 x pipe OD, for a distance 5x pipe OD, on each side of the fittings within the bend

H. Separation: Water Mains, Sewers, and Other Non-potable Fluid-carrying Pipelines shall be governed by the state or local responsible permitting agency.

I. Pull-In Installation
1. This section is applicable for HDD and other pull-in installations

2. Per ASTM F1804 and/or www.HDPEapp.com, the contractor shall determine and document the maximum proposed pull-in length and pull-in force for the pressure class and pipe diameter to be pulled into an open trench. Pull-in lengths will not exceed the maximum lengths for the class and diameter pipe.

3. Prior to pulling the pipeline, contractor shall place rollers or other approved devices beneath the pipe to avoid unnecessary damage and to reduce pipe drag.

4. Per the manufacturer's recommendation, a commercially available load limiter (weak link) approved by the Engineer shall be used between the puller and the pipe. Appendix C.1 lists the Maximum Pull Force for PE4710 DIPS DR11/DR17 and for 12 hours; refer to HDPEapp for other conditions. Per ASTM F1804 and PPI PE Handbook, the maximum safe pull stress for PE4710 shall not exceed the values shown in Table 5**:**

Table 5: PE4710 (PE 445574) Safe Pull Tensile Stress
(Refer to Appendix C.1 for Safe Pull Force)

Load Duration	**Safe Pull Stress at 73ºF**
½ hr. to 1 hr.	1400 psi
12 hrs.	1300 psi
24 hrs.	1250 psi

5. Trenchless installations:
   i. For HDD, refer to ASTM F1962, PPI TR-46, PPI PE Handbook (Chp 12) and www.PPIBoreAid.com
   ii. For sliplining, refer to ASTM F585, PPI PE Handbook (Chp 11) and www.HDPEapp.com
   iii. For pipe bursting, refer to PPI PE Handbook (Chp. 16) and MAB-05

J. Water Service Pipes
   i. The minimum distance between service taps shall be 24 inches to maintain space for future work. All new services shall be shown accurately on the "as-built" drawings and tied to existing property lines. Tracer wire shall be installed along with all new HDPE services per Section 4.3 E.
   ii. The minimum pipe size of a new and replacement water service shall be 1 inch PE4710 SDR 9.

4.4 TESTING.
A. Conduct hydrostatic leakage testing per ASTM F2164 and PPI TN-46. The test pressure shall be limited to a minimum of 1.5 x working pressure (and a maximum of 1.5 x PC- see Table 1) and shall not exceed the rating of the lowest component. In a fused HDPE water

piping system, no leakage shall be present. If the test fails, the test section shall be depressurized and allowed to 'relax' for at least eight hours before starting the next testing sequence. Leaks, failure or defective construction shall be promptly repaired by the Contractor at the Contractor's sole expense. The Contractor is responsible for the safety of their employees during the testing and repair.

4.5 CLEANING AND DISINFECTING

A. Cleaning and disinfecting of potable water systems shall be in accordance with AWWA C651 and AWWA M55 Chapter 10, and PPI Handbook of Polyethylene Pipe Chapter 2.
B. After installation, initial flushing and after completion of the pressure testing, new water mains should be disinfected in accordance with procedures outlined in AWWA C651, using solutions of liquid disinfectants (not powders or tablets).
C. The liquid disinfection chemical solution should be limited to less than 12% active chlorine. The time-duration of the disinfection should not exceed 24 hours.
D. Upon verification of disinfection/purification, all service pipes, branch laterals, and distribution mains shall be thoroughly flushed with fresh potable water, and retested to verify the disinfectant chlorine level has been reduced to potable drinking water concentrations suitable for human consumption.

4.6 HYDRANT ASSEMBLIES AND FIRE SERVICES.

A. Hydrant Assemblies shall be installed and field tested according to the requirements of AWWA M17

END OF SECTION