

TOWN OF CATHLAMET

WAHKIAKUM COUNTY

WASHINGTON



CONTRACT PROVISIONS

for

WATER TREATMENT PLANT GENERATOR

G&O #22238
NOVEMBER 2022



Gray & Osborne, Inc.
CONSULTING ENGINEERS

TOWN OF CATHLAMET

WAHKIAKUM COUNTY

WASHINGTON



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for

WATER TREATMENT PLANT GENERATOR



11/28/2022

G&O #22238
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Gray & Osborne, Inc.
CONSULTING ENGINEERS

CALL FOR BIDS

TOWN OF CATHLAMET

WATER TREATMENT PLANT GENERATOR ENGINEER'S ESTIMATE \$200,000

Sealed Proposals will be received by the undersigned at the Town of Cathlamet, 375 2nd Street, Cathlamet, Washington 98612, up to 12:00 p.m. (noon); local time on Tuesday, December 20, 2022, for furnishing the necessary labor, materials, equipment, tools, and guarantees thereof to construct the Water Treatment Plant Generator.

All labor, materials, and equipment necessary for the installation of a 200 KW Generator and associated conduit and site work.

The Work shall be physically complete within 40 working days after the commencement date stated in the Notice to Proceed. All bidding and construction is to be performed in compliance with the Contract Provisions and Contract Plans for this project and any addenda issued thereto that are on file at the office of the Town Clerk, Town Hall, Cathlamet, Washington.

The Proposals will be publicly opened and read aloud shortly after the time and date stated above. Proposals are to be submitted only on the form provided with the Bid Documents. All Proposals must be accompanied by a certified check, postal money order, cashiers check, or Proposal bond payable to the "Town of Cathlamet" and in an amount of not less than five percent (5%) of the total Proposal amount.

Bid Documents for this project are available free-of-charge at the following website: <http://gobids.grayandosborne.com>. Bidders are encouraged to register in order to receive automatic email notification of future addenda and to be placed on the Bidders List. For assistance, please call (206) 284-0860. Contract questions shall be directed only to the office of the Project Engineer.

A Prebid Conference is scheduled for Wednesday, December 7, 2022. The conference will begin at the Public Works Building, 375 2nd Street, Cathlamet, Washington at 10:00 a.m. (local time). Prospective bidders are encouraged to participate. Any other site visits shall be limited to 8:00 a.m. to 3:00 p.m., Monday through Friday, and shall be coordinated through David McNally, of the Town of Cathlamet, by calling (360) 795-3203, Ext. 4, at least 24 hours in advance of the visit. No unauthorized visits or unscheduled visits will be allowed.

Financing of the Project has been provided by Town of Cathlamet, Washington. The Town of Cathlamet expressly reserves the right to reject any or all Proposals and to waive minor irregularities or informalities in any Proposal.

(Signed)

SARAH CLARK
TOWN CLERK

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WATER TREATMENT PLANT GENERATOR**

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PART 1

BID DOCUMENTS

BIDDER'S CHECKLIST

1. REQUIRED FORMS

The Bidder shall submit the following forms, which must be executed in full and submitted with the Proposal.

- a. Proposal (including Statement of Bidder's Qualifications) (Pages P-1 - P-6)
- b. Bid Deposit or Proposal Bond (PB-1)

2. SUPPLEMENTAL BIDDER CRITERIA

The Apparent two lowest bidders shall submit to the Contracting Agency the completed Supplemental Bidder Criteria forms in the Appendix by noon of the second business day following the bid submittal deadline.

3. AGREEMENT FORMS

The following forms (a., b., and c.) are to be executed and the Certificates of Insurance (d. and e.) are to be provided after the Contract is awarded and prior to Contract execution.

- a. Agreement (Pages A-1 - A-3)
- b. Performance Bond (Page B-1)
- c. Public Works Payment Bond (Page B-2)
- d. Certificate of Insurance
- e. Certificate of Builders Risk Insurance

WATER TREATMENT PLANT GENERATOR PROPOSAL

Town of Cathlamet
375 2nd Street
Cathlamet, Washington 98612

The undersigned has examined the Work site(s), local conditions, the Contract, and all applicable laws and regulations covering the Work. The following unit and lump sum prices are tendered as an offer to perform the Work in accordance with all of the requirements set forth in the Contract and all applicable laws and regulations.

As required by the Contract, a postal money order, certified check, cashier's check or Proposal bond made payable to the Owner is attached hereto. If this Proposal is accepted and the undersigned fail(s) or refuse(s) to enter into a contract and furnish the required performance bond, labor and material payment bond, special guarantee bonds (if required), required insurance and all other required documentation, the undersigned will forfeit to the Owner an amount equal to five percent of the Proposal amount.

After the date and hour set for submitting the Proposals, no bidder may withdraw its Proposal, unless the Award of the contract is delayed for a period exceeding 60 consecutive calendar days.

The undersigned agrees that in the event it is Awarded the contract for the Work, it shall employ only Contractors and Subcontractors that are duly licensed by the State of Washington and remain so at all times they are in any way involved with the Work.

The undersigned agrees that the Owner reserves the right to reject any or all Proposals and to waive any minor irregularities and informalities in any Proposal.

The undersigned agrees that the Owner will Award the Contract to the lowest responsible, responsive bidder whose Proposal is in the best interest of the Owner.

PROPOSAL - Continued

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1.	Mobilization and Demobilization	1 LS	\$ _____	\$ _____
2.	Minor Change	1 CALC	\$10,000.00	\$10,000.00
3.	Sitework	1 LS	\$ _____	\$ _____
4.	Concrete Equipment Pad	1 LS	\$ _____	\$ _____
5.	Generator Assembly	1 LS	\$ _____	\$ _____
6.	Electrical Work	1 LS	\$ _____	\$ _____
Subtotal:			\$ _____	
Washington State Sales Tax (7.9%):			\$ _____	
TOTAL CONSTRUCTION COST:			\$ _____	

Note: A bid must be received on all items.

PROPOSAL - Continued

STATEMENT OF BIDDER'S QUALIFICATIONS

Name of Firm: _____

Address: _____

Telephone No. _____ Fax No. _____

Contact Person for this Project: _____

E-mail: _____

Number of years the Contractor has been engaged in the construction business under the present firm name, as indicated above:

WORK TO BE COMPLETED BY BIDDER

List the Work and the dollar amount thereof that the Bidder will complete with its forces, if awarded the contract.

Work to be Performed	Dollar Amount

PROPOSAL - Continued

PROPOSED SUBCONTRACTORS (Per RCW 39.30.060)

For Proposals exceeding one million dollars, indicate who (either the Contractor submitting this bid or a subcontractor) will be completing the work for each of the five categories listed below. Information shall include their Washington State Department of Licensing Contractor's Registration No. This information shall be provided with the Proposal or within one hour after the published Proposal submittal time in accordance with RCW 39.30.060.

Work to be Performed	Subcontractor or Prime (Name and Registration Number)
Heating, Ventilation and Air Conditioning	
Plumbing	
Electrical	
Structural Steel Installation	
Rebar Installation	

ADDENDA RECEIVED

Addendum No.	Date Received	Name of Recipient

NOTE: Bidder shall acknowledge receipt of all addenda. Bidder is responsible for verifying the actual number of addenda issued prior to submitting a Proposal.

Subject to any extensions of the Contract Time granted under the Contract, the undersigned agrees to substantially complete the Work required under this Contract within 30 working days (the Substantial Completion Date) and to physically complete the Work required under this contract within 40 working days (the Physical Completion Date) from when Contract Time begins.

The undersigned has reviewed and fully understands the provisions in the Contract regarding liquidated damages and agrees that liquidated damages shall be \$1,000.00 per day for each and every working day beyond the Contract Time allowed for substantial completion until the

PROPOSAL - Continued

Substantial Completion Date is achieved and \$1,500.00 for each and every working day required beyond the Contract Time for physical completion until the Physical Completion Date is achieved.

The undersigned is, and will remain in, full compliance with all Washington State administrative agency requirements including, but not limited to registration requirements of Washington State Department of Labor & Industries for contractors, including but not limited to requirements for bond, proof of insurance and annual registration fee. The undersigned's Washington State:

Dept. of Labor and Industries Workman's Compensation Account No. is _____;
Dept. of Licensing Contractor's Registration No. is _____;
Unified Business Identifier Number is _____;
Excise Tax Registration Number is _____; and
Employment Security Account Number is _____.

The undersigned has reviewed all insurance requirements contained in the Contract and has verified the availability of and the undersigned's eligibility for all required insurance. The undersigned verifies that the cost for all required insurance, has been included in this Proposal.

In relation to claims related in whole or in part to workplace injuries to employees, the undersigned waives any immunity granted under the State Industrial Insurance Law, RCW Title 51. This waiver has been specially negotiated by the parties, which is acknowledged by the undersigned in signing this Proposal.

By signing the proposal, the undersigned declares, under penalty of perjury under the laws of the United States and the State of Washington, that the following statements are true and correct:

1. That the undersigned person(s) or entity(ies) has(have) not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the project for which this Proposal is submitted.
2. The bidder hereby certifies that, within the three-year period immediately preceding the bid solicitation date November 28, 2022, that the bidder is not a "willful" violator, as defined in RCW 49.48.082, of any provision of chapters 49.46, 49.48, or 49.52 RCW, as 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.

PROPOSAL - Continued

The undersigned agrees that the Owner is authorized to obtain information from all references included herein.

Sincerely,

Sign Name

Date

By: _____
Print Name, Title

Location Executed (City, State or County)

Print Company Name

Amount of Proposal deposit: \$ _____ Check No. _____,

or Proposal bond in the amount of \$ _____

_____, issued through _____
Name of Bank/Bonding Company

located at _____
Mailing Address

Telephone Number of Bank/Bonding Company

PROPOSAL BOND

KNOW ALL MEN BY THESE PRESENTS, That we _____

of _____ as principal, and the _____

a corporation duly organized under the laws of the state of _____,
_____ and authorized to do business in the State of
Washington, as surety, are held and firmly bound unto the **TOWN OF CATHLAMET** in the
full and penal sum of five percent of the total amount of the bid proposal of said principal for the
work hereinafter described, for the payment of which, well and truly to be made, we bind our
heirs, executors, administrators and assigns, and successors and assigns, firmly by these presents.

The condition of this bond is such, that whereas the principal herein is herewith
submitting his or its sealed proposal for the following construction project, to wit:

WATER TREATMENT PLANT GENERATOR

said bid and proposal, by reference thereto, being made a part hereof.

NOW, THEREFORE, If the said proposal bid by said principal be accepted, and the
contract be awarded to said principal, and if said principal shall duly make and enter into and
execute said Contract and shall furnish bond as required by the **TOWN OF CATHLAMET**
within a period of 10 days from and after said award, exclusive of the day of such award, then
this obligation shall be null and void, otherwise it shall remain and be in full force and effect.

IN TESTIMONY WHEREOF, The principal and surety have caused these presents to be
signed and sealed this _____ day of _____, _____.

(Principal)

(Surety)

(Attorney-in-fact)

PART 2

AGREEMENT AND BONDS

AGREEMENT

THIS AGREEMENT is entered into by and between the **TOWN OF CATHLAMET** (hereinafter called the Owner) and _____ (hereinafter called the Contractor).

The Owner and the Contractor agree as follows:

ARTICLE 1. WORK.

[Include description of all schedules, alternate or additive items awarded]

ARTICLE 2. CONTRACT TIME.

The Contractor shall substantially complete the Work required by the Contract within _____ working days (the Substantial Completion Date) and physically complete the Work within _____ working days (the Physical Completion Date).

ARTICLE 3. LIQUIDATED DAMAGES.

The Owner and the Contractor recognize that time is of the essence and that the Owner will suffer financial loss if the Work is not completed within the time, plus any extensions thereof, allowed in accordance with the Contract. They also recognize the inconvenience, expense, and difficulties involved in a legal proceeding to prove the actual loss suffered by the Owner if the Work is not completed within the time allowed in the Contract. Accordingly, the Owner and the Contractor agree that as liquidated damages for delay, and not as a penalty, the Contractor shall pay the Owner (\$ _____) per day for each working day beyond the Substantial Completion Date until the Contractor achieves substantial completion of the Work and (\$ _____) per day for each working day beyond the Physical Completion Date until the Contractor achieves physical completion of the Work.

ARTICLE 4. CONTRACT PRICE.

The Owner shall pay the Contractor the amount(s) set forth in the Proposal (in United States dollars) for completion of the Work in accordance with the Contract.

ARTICLE 5. CONTRACT.

The Contract, which comprises the entire agreement between the Owner and the Contractor concerning the Work, consists of the following:

- This Agreement;
- The Contractor’s Proposal including the bid, bid schedule(s), information required of bidder, Proposal bond, and all required certificates and affidavits;
- The Performance Bond and the Public Works Payment Bond;
- The Contract Provisions;
- The Plans (or drawings) consisting of _____ sheets, as listed in the index on sheet _____ of the Plans;
- Addenda numbers _____, inclusive; and
- Change Orders issued after the effective date of this Agreement.

There are no Contract Documents other than those listed in this Article 5. The Contract may be amended only in writing by Change Order as provided in the Contract.

ARTICLE 6. MISCELLANEOUS.

For purpose of indemnifying and defending any work place injury claims by employees of the Contractor and Subcontractors, the Contractor waives any immunity granted under the State Industrial Insurance Law, RCW Title 51. This waiver has been specifically negotiated between the parties and is hereby acknowledged by the Contractor.

(Contractor’s initials)

The Contractor shall not assign any rights under or interests in the Contract, including but not limited to rights to payment, without the prior written consent of the Owner. Unless specifically stated in a written consent to an assignment, no assignment will release or discharge the Contractor-assignor from any duty or responsibility under the Contract.

The Contract is binding upon the Owner and the Contractor, and their respective partners, successors, assigns and legal representatives.

AGREEMENT – Continued

IN WITNESS WHEREOF, Owner and Contractor have caused this Agreement to be executed the day and year indicated below.

TOWN OF CATHLAMET

CONTRACTOR

By _____

License No. _____

By _____

Date _____

Title _____

Attest _____

Name and Address for giving notices (print)

INFORMATION ONLY

PUBLIC WORKS PERFORMANCE BOND
to TOWN OF CATHLAMET, WA

Bond No. _____

The **TOWN OF CATHLAMET**, Washington, (Town) has awarded to _____ (Principal), a contract for the construction of the project designated as Water Treatment Plant Generator in Cathlamet, Washington (Contract), and said Principal is required under the terms of that Contract to furnish a bond for performance of all obligations under the Contract.

The Principal, and _____ (Surety), a corporation organized under the laws of the State of _____ and licensed to do business in the State of Washington as surety and named in the current list of "Surety Companies Acceptable in Federal Bonds" as published in the Federal Register by the Audit Staff Bureau of Accounts, U.S. Treasury Dept., are jointly and severally held and firmly bound to the Town, in the sum of _____ US Dollars (\$ _____ **amount to include sales tax**) Total Contract Amount, subject to the provisions herein.

This statutory performance bond shall become null and void, if and when the Principal, its heirs, executors, administrators, successors, or assigns shall well and faithfully perform all of the Principal's obligations under the Contract and fulfill all the terms and conditions of all duly authorized modifications, additions, and changes to said Contract that may hereafter be made, at the time and in the manner therein specified; and if such performance obligations have not been fulfilled, this bond shall remain in full force and effect.

The Surety agrees to indemnify, defend, and protect the Town against any claim of direct or indirect loss resulting from the failure of the Principal, its heirs, executors, administrators, successors, or assigns (or any of the employees, subcontractors, or lower tier subcontractors of the Principal) to faithfully perform the Contract.

The Surety for value received agrees that no change, extension of time, alteration or addition to the terms of the Contract, the specifications accompanying the Contract, or to the work to be performed under the Contract shall in any way affect its obligation on this bond, and waives notice of any change, extension of time, alteration or addition to the terms of the Contract or the work performed. The Surety agrees that modifications and changes to the terms and conditions of the Contract that increase the total amount to be paid the Principal shall automatically increase the obligation of the Surety on this bond and notice to Surety is not required for such increased obligation.

This bond may be executed in two (2) original counterparts, and shall be signed by the parties' duly authorized officers. This bond will only be accepted if it is accompanied by a fully executed and original power of attorney for the officer executing on behalf of the surety.

The Surety agrees to be bound by the laws of the state of Washington and subjected to the jurisdiction of the state of Washington.

PRINCIPAL

SURETY

Principal Signature _____ Date

Surety Signature _____ Date

Printed Name

Printed Name

Title

Title

Local office/agent of Surety Company:

Name _____

Telephone _____

Address _____

PUBLIC WORKS PAYMENT BOND
to TOWN OF CATHLAMET, WA

Bond No. _____

The **TOWN OF CATHLAMET**, Washington, (Town) has awarded to _____ (Principal), a contract for the construction of the project designated as Water Treatment Plant Generator in Cathlamet, Washington (Contract), and said Principal is required under the terms of that Contract to furnish a payment bond in accord with Title 39.08 Revised Code of Washington (RCW) and (where applicable) 60.28 RCW.

The Principal, and _____ (Surety), a corporation organized under the laws of the State of _____ and licensed to do business in the State of Washington as surety and named in the current list of "Surety Companies Acceptable in Federal Bonds" as published in the Federal Register by the Audit Staff Bureau of Accounts, U.S. Treasury Dept., are jointly and severally held and firmly bound to the Town, in the sum of _____ US Dollars (\$ _____ **amount to include sales tax**) Total Contract Amount, subject to the provisions herein.

This statutory payment bond shall become null and void, if and when the Principal, its heirs, executors, administrators, successors, or assigns shall pay all persons in accordance with RCW Titles 60.28, 39.08, and 39.12 including all workers, laborers, mechanics, subcontractors, lower tier subcontractors, and material suppliers, and all persons who shall supply such contractor or subcontractor with provisions and supplies for the carrying on of such work, and all taxes incurred on said Contract under Title 50 and 51 RCW and all taxes imposed on the Principal under Title 82 RCW; and if such payment obligations have not been fulfilled, this bond shall remain in full force and effect.

The Surety agrees to indemnify, defend, and protect the Town against any claim of direct or indirect loss resulting from the failure of the Principal, its heirs, executors, administrators, successors, or assigns, (or the subcontractors or lower tier subcontractors of the Principal) to pay all laborers, mechanics, subcontractors, lower tier subcontractors material persons, and all persons who shall supply such contractor or subcontractors with provisions and supplies for the carrying on of such work.

The Surety for value received agrees that no change, extension of time, alteration or addition to the terms of the Contract, the specifications accompanying the Contract, or to the work to be performed under the Contract shall in any way affect its obligation on this bond, except as provided herein, and waives notice of any change, extension of time, alteration or addition to the terms of the Contract or the work performed. The Surety agrees that modifications and changes to the terms and conditions of the Contract that increase the total amount to be paid the Principal shall automatically increase the obligation of the Surety on this bond and notice to Surety is not required for such increased obligation.

This bond may be executed in two (2) original counterparts, and shall be signed by the parties' duly authorized officers. This bond will only be accepted if it is accompanied by a fully executed and original power of attorney for the officer executing on behalf of the surety.

The Surety agrees to be bound by the laws of the state of Washington and subjected to the jurisdiction of the state of Washington.

PRINCIPAL

SURETY

Principal Signature _____ Date _____

Surety Signature _____ Date _____

Printed Name _____

Printed Name _____

Title _____

Title _____

Local office/agent of Surety Company:

Name _____

Telephone _____

Address _____



PART 3

GENERAL CONDITIONS

GENERAL CONDITIONS

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GENERAL CONDITIONS

SECTION 1 - GENERAL INFORMATION APPLICABLE TO PROPOSAL AND CONTRACT

1.01 DEFINITIONS AND TERMINOLOGY

The following terms are abbreviated and defined as they are used in the Contract. When used in the Proposal form to denote items of Work and units of measurements, abbreviations mean the full expression of the abbreviated term.

1.02 ABBREVIATIONS AND TERMINOLOGY

1.02.1 REFERENCED STANDARDS AND CODES

The following is a partial list of specifications and codes that may be referenced in sections of the Contract. The Contractor shall be responsible for conducting its Work and carrying out its operations and furnishing equipment in accordance with the latest edition or versions, in effect at the time of bid opening, of any applicable specified portions of the referenced standards and codes.

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AFBMA	Anti-friction Bearing Manufacturing Association
AGA	American Gas Association
AGC	Associated General Contractors of America
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANLA	American Nursery and Landscape Association
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
ARA	American Railway Association
AREMA	American Railway Engineering and Maintenance-of-Way Association
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASLA	American Society of Landscape Architects
ASME	American Society Mechanical Engineers
ASNT	American Society for Nondestructive Testing
ASTM	American Society for Testing and Material
AWPA	American Wood Preservers' Association
AWS	American Welding Society

AWWA	American Water Works Association
CFR	Code of Federal Regulations
CLI	Chain Link Institute
CRAB	County Road Administration Board
CRSI	Concrete Reinforcing Steel Institute
CSA	Canadian Standards Associations
CSI	Construction Specifications Institute
DIPRA	Ductile Iron Pipe Research Association
EEI	Edison Electric Institute
EPA	Environmental Protection Agency
ETL	Electrical Testing Laboratories
FHWA	Federal Highway Administration
FM	Factory Mutual
FSS	Federal Specifications and Standards, General Services Administration
HUD	United State Department of Housing and Urban Development
IBC	International Building Code
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronic Engineers
IES	Illumination Engineering Society
IMSA	International Municipal Signal Association
IPC	International Plumbing Code
ISA	Instrumentation Society of America
JIC	Joint Industry Conference Electrical Standards for Industrial Equipment
LID	Local Improvement District
LPI	Lightning Protection Institute
MSHA	Mine Safety and Health Act
MSS	Manufacturer's Standardization Society of the Valve and Fitting Industry
MUTCD	Manual on Uniform Traffic Control Devices
NCMA	National Concrete Manufacturer's Association
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NRMCA	National Ready Mix Concrete Association
OMWBE	Office of Minority and Women's Business Enterprises
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PPI	Plastic Pipe Institute
P/PCI	Precast/Prestressed Concrete Institute
RCW	Revised Code of Washington
SAE	Society of Automotive Engineers
SEPA	State Environmental Policy Act
SIES	Specifications and Illuminating Engineering Society
SSPC	Steel Structures Painting Council
UL	Underwriters' Laboratory
ULID	Utility Local Improvement District
UMTA	Urban Mass Transit Administration

WABO	Washington Association of Building Officials
WAC	Washington Administrative Code
WCLIB	West Coast Lumber Inspection Bureau
WISHA	Washington Industrial Safety and Health Administration
WRI	Wire Reinforcement Institute
WSDL&I	Washington State Department of Labor and Industries
WSDOE	Washington State Department of Ecology
WSDOT	Washington State Department of Transportation
WWPA	Western Wood Products Association

1.02.2 TERMINOLOGY

The use of pronouns of any gender in these General Conditions shall include pronouns of all genders, as applicable.

The terms “provide,” “furnish” and “install” are used interchangeably in the Contract and mean that the Contractor shall provide, furnish, and install the item(s) described unless specifically noted otherwise.

The terms “Plans” and “Drawings” are used interchangeably in the Contract and shall mean the Contract Plans, which show location, character, and dimensions of prescribed Work, including layouts, profiles, cross-sections, and other details.

1.02.3 ITEMS OF WORK AND UNITS OF MEASUREMENT

AC	Asbestos Cement Pipe
Agg.	Aggregate
Al.	Aluminum
ATB	Asphalt Treated Base
BST	Bituminous Surface Treatment
CB	Catch Basin
Cfm	Cubic Feet per Minute
Cfs	Cubic Feet per Second
Cl.	Class
CMP	Corrugated Metal Pipe
Comb.	Combination
Conc.	Concrete
CPEP	Corrugated Polyethylene Pipe
Crib.	Cribbing
Culv.	Culvert
Cy or Cu. Yd.	Cubic Yard(s)
Dia.	Diameter
DI	Ductile Iron
DIM	Dimension
EA	Each
EL	Elevation
Est.	Estimate or Estimated

Excl.	Excluding
F	Fahrenheit
FIG	Figure
Ft.	Foot or Feet
GALV	Galvanized
Gph	Gallon(s) per Hour
Gpm	Gallon(s) per Minute
HDPE	High Density Polyethylene
HMA	Hot Mix Asphalt
HR	Hour
Hund.	Hundred
In.	Inch or Inches
Incl.	Including
L	Liter
Lb.	Pound(s)
LF or Lin. Ft.	Linear Foot (Feet)
LS	Lump Sum
M	Thousand
MBM	Thousand Feet Board Measure
Pres.	Pressure
PSI	Pounds per Square Inch
PSF	Pounds per Square Foot
PVC	Polyvinyl Chloride
QTY	Quantity
Reg.	Regulator
Reinf.	Reinforced, Reinforcing
SF	Square Foot (Feet)
Sec.	Section
SL	Slope
St.	Street
Stl.	Steel
SST	Stainless Steel
Str.	Structural
Sy or Sq. Yd.	Square Yard(s)
Th.	Thick or Thickness
TN	Ton
Tr.	Treatment
TYP	Typical
VC	Vitrified Clay

1.03 DEFINITIONS

ACCEPTANCE

The formal action by Owner or Owner's governing body as provided in RCW 39.08 and RCW 60.28, as existing or amended.

ADDENDUM

A written or graphic document issued to all Bidders prior to bid opening and identified as an addendum, which clarifies, modifies or supplements the bid documents and becomes part of the Contract.

ADDITIVE

A supplemental unit of work or group of bid items, identified separately in the Proposal, which may, at the discretion of the Owner, be awarded in addition to the base bid.

ALTERNATE

One of two or more units of work or groups of bid items, identified separately in the Proposal, from which the Owner may make a choice between different methods or material of construction for performing the same work.

AWARD

The formal decision of the Owner awarding the Contract to the lowest or most favorable responsible and responsive Bidder for the Work.

BID DOCUMENTS

The component parts of the proposed Contract which may include, but not limited to, the Proposal form, the proposed Contract Provisions, the proposed Contract Plans, Addenda, and Subsurface Boring Logs (if any).

BIDDER

A natural person or legal entity (e.g., partnership, corporation, limited liability company, firm, or joint venture) submitting a proposal or bid.

BUSINESS DAY

A business day is any day from Monday through Friday, except holidays, as listed in Section 3.04.14.

CLERK

The duly elected or appointed Clerk of the Commission, Council, or Board of Directors of the Owner or authorized designee.

COMMISSION, COUNCIL, OR BOARD OF DIRECTORS

The duly elected or appointed Council, Commission, or Board of Directors of the Owner.

CONTRACT

The written agreement between the Owner and the Contractor. It describes, among other things:

1. What work will be done, and by when;
2. Who will provide labor and materials; and
3. How Contractor will be paid.

The Contract includes: the agreement form, Bidder's completed Proposal form, all required certificates and affidavits, Performance Bond and Public Works Payment Bond, Contract Provisions, Contract Plans, and all Addenda and Change Orders executed pursuant to the provisions of the Contract.

CONTRACT BOND

The approved form of security furnished by the Contractor and the Contractor's Surety as required by the Contract, that guarantees performance of all the Work required by the Contract and payment to anyone who provides supplies or labor for the performance of the Work.

CONTRACT DOCUMENTS

See definition for "Contract."

CONTRACT PLANS (PLANS OR DRAWINGS)

The Contract Plans (or drawings) are those plans, drawings or other illustrations and all addenda and revisions, whether issued before or after the award of the Contract to Contractor, which show location, character, and dimensions of the Work, including layouts, profiles, cross-sections and other details.

CONTRACT PROVISIONS

A publication addressing the Work required for an individual project. At the time of the Call for Bids, the Contract Provisions may include, for a specific individual project, general conditions, supplemental general conditions, specifications, a listing of the applicable WSDOT Standard Plans, the prevailing minimum hourly wage rates, and an informational Proposal form with the listing of Bid items. The proposed Contract Provisions may also include, for a specific individual project, various required certifications or declarations. At the time of the Contract execution date, the Contract Provisions include the proposed Contract Provisions and include any Addenda, a copy of the agreement form, and a copy of the Proposal form with the Contract prices and extensions.

CONTRACT TIME

The period of time established by the terms and conditions of the Contract within which the Work shall be complete.

CONTRACTOR

The natural person(s) or legal entity (e.g., partnership, corporation, limited liability company, firm, joint venture) Contracting with the Owner to do the prescribed Work.

DATES

Substantial Completion Date is the day that the Engineer determines the Owner has full and unrestricted use and benefit of the Work, from both an operational and safety standpoint, any remaining traffic disruptions will be rare and brief, and only minor incidental work, replacement of temporary substitute facilities, plant establishment periods, or correction or repair remains for the physical completion of the total Work.

Physical Completion Date is the day that the Engineer determines that all of the Work required by the Contract is physically completed and the Owner has received from the Contractor all required record drawings, operation and maintenance manuals, manufacturers' affidavits, and software and programming.

Contract Completion Date is the day when all the Work and all the obligations of the Contractor under the Contract are fulfilled by the Contractor. All documentation and other items required by the Contract and required by law shall be furnished by the Contractor before establishment of this date.

Final Acceptance Date is the date on which the Owner accepts the Work as complete.

FIELD REPRESENTATIVE

The Owner's representative who observes the Contractor's performance of the Work. Such observation shall not be relied upon by the Contractor or others as approval or acceptance of the Work, nor shall it in any manner relieve the Contractor from its obligations and responsibilities under the Contract.

NOTICE TO PROCEED

The written notice from the Owner or Engineer to the Contractor authorizing and directing the Contractor to proceed with the Work and establishing the date on which the Contract Time begins.

OWNER

The government entity or agency that awards the Contract to the Contractor and is responsible for the execution and administration of the Contract.

PROJECT ENGINEER/ENGINEER

The Owner's representative who administers the construction program for the Owner.

PROPOSAL (or BID)

A Bidder's offer, on a properly completed Proposal form, to perform the Work required by the Contract. The terms Proposal and Bid may be used interchangeably.

SPECIFICATIONS

Written provisions describing the Work and requirements thereof.

STANDARD PLANS

A manual of specific plans or drawings adopted by the Owner, which show frequently recurring components of work that, have been standardized for use.

SUBCONTRACTOR

A natural person, or entity (e.g., partnership, corporation, limited liability company, firm or joint venture) to which the Contractor sublets a portion of the Work.

SUBGRADE

The top surface of the roadbed on which subbase, base, surfacing, pavement, or layers of similar materials are placed.

SUPPLEMENTARY GENERAL CONDITIONS

That part of the Contract amends or supplements these General Conditions.

TRAVELED WAY

That part of the roadway made for vehicle travel, excluding shoulders and auxiliary lanes.

WORK

The provision of all labor, materials, tools, equipment, supervision and other things needed to complete the project in full accordance with the Contract Documents.

WORKING DRAWINGS

Shop drawings, shop plans, erection plans, falsework plans, framework plans, cofferdam, cribbing and shoring plans, bending diagrams for reinforcing steel, or any other supplementary plans or similar data, including a schedule of submittal dates for working drawings where specified, that the Contractor shall submit to the Engineer for approval.

SECTION 2 - INSTRUCTIONS FOR PREPARATION OF PROPOSAL (OR BID)

2.01 BID PROCEDURES AND CONDITIONS

2.01.1 QUALIFICATIONS OF BIDDERS

Where applicable and required, Bidders shall provide all requested information relating to experience, financing, equipment, and organization relating to their ability to properly perform the Work. The Owner reserves the right to take whatever action it deems necessary to ascertain the responsibility of the Bidder and the ability of the Bidder to perform the Work satisfactorily.

2.01.2 CONTRACT PROVISIONS AND CONTRACT PLANS

Contract Provisions and Contract Plans are on file in the offices of the Owner and the Engineer, Gray & Osborne, Inc. After award of the Contract, up to five sets of Contracts will be issued without charge to the Contractor. Additional sets of Contracts may be purchased from the Owner by the Contractor.

2.01.3 ESTIMATED QUANTITIES

The quantities shown in the Proposal form are estimates and are stated only for bid comparison purposes. The Owner does not warrant, expressly or by implication, that the actual quantities will correspond with those estimates. Payment will be made on the basis of the actual quantities of each item of Work satisfactorily completed in accordance with the requirements of the Contract.

2.01.4 EXAMINATION OF CONTRACT AND SITE

2.01.4(1) General

Bidders shall satisfy themselves by personal examination of Contract Provisions, Contract Plans, and site of the proposed improvements, and by any other examination and investigation which they may desire to make as to the accuracy of the estimate of quantities, the nature of the Work and the difficulties to be encountered. Bidders shall review the entire Contract to ensure that the completeness of their Proposal includes all items of Work regardless of where shown in the Contract. Bidders are cautioned that alternate sources of information (copies of the Contract obtained from third parties) are not necessarily an accurate or complete representation of the Contract. Bidders shall use such information at their own risk.

Bidders shall be familiar and comply with all applicable federal, state, and local laws, ordinances, and regulations in any way applicable to the performance the Work. Bidders are responsible for familiarizing themselves with all current state and federal wage rates applicable to the Work and its duration before submitting a Proposal based on the Contract Provisions and Contract Plans. Any wage determination contained in the Contract is for the Bidder's general information only and is not warranted to be complete or accurate. The Owner will not consider any plea of misunderstanding or ignorance of such requirements. Bid prices shall reflect what the Bidder has determined to be the total cost of completing the Work, including but not limited to: construction methods, materials, labor, administrative costs, any and all applicable taxes, and equipment.

Except as the Contract may provide, the Bidder to which the Contract is awarded shall receive no payment for any costs that exceed those set forth in the Proposal.

2.01.4(2) Interpretation of the Contract Provisions and Contract Plans

If any Bidder desires interpretation or clarification of the Contract Provisions and Contract Plans, the Bidder shall make a written request to the Engineer for such clarification or interpretation prior to the submission of a Proposal. If the Engineer determines that the Contract Provisions and/or Contract Plans do not require interpretation or clarification, the Engineer will so notify the Bidder making the request. All interpretations and clarifications made by the Engineer will be by written addendum to all planholders of record, and a copy of the addendum will be filed in the office of the Owner. Neither the Owner nor the Engineer will be responsible for any interpretation, clarification or explanation of the Contract Provisions and Contract Plans that is not set forth in a written addendum to all planholders of record, and Bidders shall not under any circumstances rely on any other interpretation, clarification or explanation.

2.01.4(3) Subsurface Information

If the Owner has made a subsurface investigation of the site of the proposed Work, the boring log data and soil sample test data accumulated by the Owner will be made available for inspection by the Bidders. However, the Owner makes no representation or warranty, express or implied, that:

- a. The Bidders' interpretations from the boring logs may be correct;
- b. Moisture conditions and indicated water tables will not vary from those found at the time the borings were made;
- c. The ground at the location of the borings has not been physically disturbed or altered after the boring was made; and
- d. Conditions below the surface of the ground are consistent throughout the site with the information made available hereunder, or that conditions to be encountered on the site are uniform or consistent with geological conditions usually encountered in the area.

The Owner makes no representations, guarantees, or warranties as to the condition, materials, or proportions of the materials between the specific borings, regardless of any subsurface information the Owner may make available to the prospective Bidders. Bidders are solely responsible for making the necessary investigations to support and/or verify any conclusions or assumptions used in preparation of their Proposals.

Any subsurface investigations and analysis were carried out for design purposes only. Contractor may not rely upon or make any claim against Owner, Engineer, or any of their subconsultants, with respect to:

1. The completeness of such reports for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and

procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. Other conclusions, interpretations, opinions, representations, and information contained in such reports; or
3. Any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, conclusions, interpretations, opinions or information.

2.01.4(4) Availability of Specified Items

Prior to submitting a Proposal, all Bidders shall verify that all items necessary to complete the Work will be available in time to allow the Work to be completed within the Contract Time. In the event that one or more items may not be available to allow the Work to be completed within the Contract Time, the Bidder shall notify the Engineer in writing prior to submitting a Proposal. Responsibility for delays and related costs because of non-availability of items necessary to complete the Work shall be borne by the Contractor.

2.01.5 PROPOSAL DEPOSIT

A deposit of at least 5 percent of the total Proposal amount shall accompany each Proposal (Proposal Deposit). The Proposal Deposit may be in the form of a Proposal bond (surety bond), certified check, cashier’s check, or postal money order made payable to the Owner. All Proposal bonds shall be on the form included within the Contract Provisions and shall be signed by the Bidder and the surety. The surety shall: (1) be registered with the Washington State Commissioner, and (2) appear on the current Authorized Insurance List in the State of Washington published by the Office of the Insurance Commissioner. The Proposal bond shall not be conditioned in any way to modify the minimum 5 percent required. The Proposal Deposit will be held as a guaranty that the successful Bidder will, within 10 days from the date of notification of Award, enter into a Contract and furnish approved Performance and Public Works Payment Bonds, on forms attached, in amounts equal to 100 percent of the amount of the Contract, including state sales tax.

The failure to furnish a Proposal Deposit of a minimum of 5 percent with the Proposal shall make the Proposal non responsive and shall cause the Proposal to be rejected by the Owner.

2.01.6 PROPOSAL

- (1) Proposals shall be submitted on the Proposal form included in the Contract Provisions. All Proposals shall be completed, signed by an authorized person and dated. To be considered by the Owner as a responsive Proposal, the Bidder shall bid on all Additive or Alternate items set forth in the Proposal form, unless otherwise specified in the Contract Documents.
- (2) To be responsive, a Proposal shall state that it will remain valid for a period of 60 days following the date of Proposal opening. In the event that a conflict in this

duration appears elsewhere in the Contract Provisions, the longest duration shall apply.

- (3) All prices set forth on the Proposal form shall be legible and either be written in ink or typed. In the space provided on the Proposal form, Bidders shall identify all Addenda that have been received. The Proposal, Proposal Deposit, and all other certificates, forms or other documents required by the Contract Provisions to be executed and delivered with the Proposal shall be submitted in a sealed package, addressed to the Owner, and plainly marked "Proposal for _____ (insert name of project as shown on the Proposal) to be opened on the _____ day of _____, 20 __," (insert the day, month and year shown in the published bid notice). The Owner will not consider any Proposal received after the time established for opening Proposals.
- (4) Where noted in the Proposal, the Bidder is to furnish information concerning its experience with work of a similar nature, equipment to be used on this project, and general background information. Information that is incomplete, evasive, or of a general nature only, may be considered as grounds for rejection of the Proposal.
- (5) RCW 39.30.060 requires Bidders on public works projects expected to cost one million dollars or more to provide the names of the structural steel installation, rebar installation, heating, ventilation and air conditioning, plumbing and electrical Subcontractors to whom the Bidder will directly subcontract those portions of the Work if awarded the Contract. The Bidder may not list more than one Subcontractor for each category of Work identified, unless Subcontractors vary with bid alternates, in which case the Bidder shall indicate which Subcontractor will be used for which alternate. Failure of the Bidder to list the names of such Subcontractors or to name itself to perform such Work, or listing two or more Subcontractors to perform the same Work, shall render the Bidder's Proposal unresponsive and void. Under RCW 39.30.060, the required names of such Subcontractors shall be provided with the Proposal or within one hour after the published Proposal submittal time. In addition to compliance with the requirements of RCW 39.30.060, the apparent successful Bidder may be required to submit to the Engineer as soon as possible after the Proposal opening, and not later than three calendar days thereafter, a written list of all proposed Subcontractors in addition to structural steel installation, rebar installation, heating, ventilation, and air conditioning, plumbing and electrical contractors, that will perform subcontracting Work on the project. If not previously provided, the following information shall be provided for each Subcontractor:
 - a. Name, address, email address, facsimile number, telephone number, contractor registration number and certification numbers;
 - b. The type of Work to be performed;

- c. A list of at least three recently completed projects for Work similar to that to be performed by the proposed Subcontractor, with the following information for each project:
 - i. Name of project,
 - ii. Name, address, and telephone number of the project owner; and
 - d. Any additional pertinent information establishing the experience or qualifications of the proposed Subcontractor.
- (6) After opening and reading Proposals, the Owner will check them for correctness of extensions of the prices per unit and the total price. If a discrepancy exists between the price per unit and the extended amount of any bid item, the price per unit, converted to the actual extension, will control. The total extensions, corrected where necessary, will be used by the Owner for comparison and award purposes and to establish the amount of the Contractor's Performance and Public Works Payment Bonds.

2.01.7 WITHDRAWING OR REVISING PROPOSAL

After submitting a physical Proposal to the Owner, the Bidder may withdraw, or revise it if:

1. The Bidder submits a written request signed by an authorized person and physically delivers it to the place designated for receipt of Proposals; and
2. The Owner receives the request before the time set for receipt of Proposals; and
3. The revised or supplemented Proposal (if any) is received by the Owner before the time set for receipt of Proposals.

If the Bidder's request to withdraw or revise its Proposal is received before the time set for receipt of Proposals, the Owner will return the unopened Proposal package to the Bidder. The Bidder must then submit the revised package in its entirety. If the Bidder does not submit a revised package, then its bid shall be considered withdrawn.

Late revised Proposals or late withdrawal requests will be date recorded by the Owner and returned unopened. Mailed, emailed, or faxed requests to withdraw or revise a Bid Proposal are not acceptable.

2.01.8 DISQUALIFICATION OF BIDDERS

1. A Proposal will be considered irregular and will be rejected if:
 - a. The Bidder is not prequalified when so required;

- b. The authorized proposal form furnished by the Owner is not used or is altered;
 - c. The completed proposal form contains any unauthorized additions, deletions, alternate Bids, or conditions;
 - d. The Bidder adds provisions reserving the right to reject or accept the award, or enter into the Contract;
 - e. A price per unit cannot be determined from the Bid Proposal;
 - f. The Proposal form is not properly executed;
 - g. The Bidder fails to submit or properly complete a Subcontractor list, if applicable;
 - h. The Bidder fails to submit or properly complete a Disadvantaged, Minority or Women’s Business Enterprise Certification, if applicable;
 - i. The Bid Proposal does not constitute a definite and unqualified offer to meet the material terms of the Bid invitation; or
 - j. More than one proposal is submitted for the same project from a Bidder under the same or different names.
2. A Proposal may be considered irregular and may be rejected if:
- a. The Proposal does not include a unit price for every Bid item;
 - b. Any of the unit prices are excessively unbalanced (either above or below the amount of a reasonable Bid) to the potential detriment of the Owner;
 - c. Receipt of Addenda is not acknowledged;
 - d. A member of a joint venture or partnership and the joint venture or partnership submit Proposals for the same project (in such an instance, both Bids may be rejected); or
 - e. If Proposal form entries are not made in ink.
3. A Bidder will be deemed not responsible if the Bidder does not meet the mandatory bidder responsibility criteria in RCW 39.04.350(1), as amended; or does not meet Supplemental Criteria 1 through 8 in this Section:

The Owner will verify that the Bidder meets the mandatory bidder responsibility criteria in RCW 39.04.350(1), and Supplemental Criteria 1. Evidence that the Bidder meets Supplemental Criteria 2 through 8 shall be provided by the Bidder as stated later in this Section.

a. **Criteria 1 – Federal Debarment**

- 1. Criterion: The Bidder shall not currently be debarred or suspended by the Federal government.
- 2. Documentation: The Bidder shall not be listed as having an “active exclusion” on the U.S. government’s “System for Award Management” database (www.sam.gov).

b. **Criteria 2 – Delinquent State Taxes**

1. **Criterion:** The Bidder shall not owe delinquent taxes to the Washington State Department of Revenue without a payment plan approved by the Department of Revenue.
2. **Documentation:** The Bidder shall, if and when required as detailed below, sign a statement (on a form to be provided by the Owner) that the Bidder does not owe delinquent taxes to the Department of Revenue. If the Bidder owes delinquent taxes, they must submit a written payment plan approved by the Department of Revenue, to the Owner by the deadline listed below.

c. **Criteria 3 – Claims Against Retainage and Bonds**

1. **Criterion:** The Bidder shall not have a record of excessive claims filed against the retainage or payment bonds for public works projects in the 3 years prior to the bid submittal date, that demonstrate a lack of effective management by the Bidder of making timely and appropriate payments to its Subcontractors, suppliers, and workers, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Owner.
2. **Documentation:** The Bidder shall, if and when required as detailed below, sign a statement (on a form to be provided by the Owner) that the Bidder has not had claims against claims against retainage and bonds in the 3 years prior to the bid submittal date. If the Bidder has had claims against retainage and bonds in the three years prior to the bid submittal date, they shall submit a list of the public works projects completed in the 3 years prior to the bid submittal date that have had claims against retainage and bonds and include for each project the following information:
 - Name of project
 - The owner and contact information for the owner;
 - A list of claims filed against the retainage and/or payment bond for any of the projects listed;
 - A written explanation of the circumstances surrounding each claim and the ultimate resolution of the claim.

d. **Criteria 4 – Public Bidding Crime**

1. **Criterion:** The Bidder and/or its owners shall not have been convicted of a crime involving bidding on a public works contract in the 5 years prior to the bid submittal date.
2. **Documentation:** The Bidder, if and when required as detailed

below, shall sign a statement (on a form to be provided by the Owner) that the Bidder and/or its owners have not been convicted of a crime involving bidding on a public works contract.

e. **Criteria 5 – Termination for Cause / Termination for Default**

1. **Criterion:** The Bidder shall not have had any public works contract terminated for cause or terminated for default by a government agency in the 5 years prior to the bid submittal date, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Owner.
2. **Documentation:** The Bidder, if and when required as detailed below, shall sign a statement (on a form to be provided by the Owner) that the Bidder has not had any public works contract terminated for cause or terminated for default by a government agency in the 5 years prior to the bid submittal date; or if Bidder was terminated, describe the circumstances.

f. **Criteria 6 – Lawsuits**

1. **Criterion:** The Bidder shall not have lawsuits with judgments entered against the Bidder in the 5 years prior to the bid submittal date that demonstrate a pattern of failing to meet the terms of contracts, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Owner.
2. **Documentation:** The Bidder, if and when required as detailed below, shall sign a statement (on a form to be provided by the Owner) that the Bidder has not had any lawsuits with judgments entered against the Bidder in the 5 years prior to the bid submittal date that demonstrate a pattern of failing to meet the terms of contracts, or shall submit a list of all lawsuits with judgments entered against the Bidder in the 5 years prior to the bid submittal date, along with a written explanation of the circumstances surrounding each such lawsuit. The Owner shall evaluate these explanations to determine whether the lawsuits demonstrate a pattern of failing to meet of terms of construction related contracts.

g. **Criteria 7 – Contract Time (Liquidated Damages)**

1. **Criterion:** The Bidder shall not have had liquated damages assessed on any projects it has completed 5 years prior to the bid submittal date that demonstrate a pattern of failing to meet Contract Time, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Owner.

2. Documentation: The Bidder, if and when required as detailed below, shall sign a statement (on a form to be provided by the Owner) that the Bidder has not had liquidated damages assessed on any projects it has completed within the 5 years prior to the bid submittal date, or shall submit a list of projects with assessed liquidated damages along with Owner contact information, and number of days assessed liquidated damages.

h. **Criteria 8 – Capacity and Experience**

1. Criterion: The Bidder shall have sufficient current capacity and the project superintendent assigned to the project shall have experience to meet the requirements of this project. The Bidder and the project superintendent shall have successfully completed at least two projects as the prime contractor, of a similar size and scope, during the 5-year period immediately preceding the bid submittal deadline for this project. Similar size is defined as a minimum of 70 percent of the bid amount submitted by the Bidder.
2. Documentation: The Bidder shall, if and when required as detailed below, on a form to be provided by the Owner, provide the Bidder's gross dollar amount of work currently under contract, the Bidder's gross dollar amount of contracts currently not completed, five major pieces of equipment anticipated to be on the project and whether the equipment is leased or owned, the superintendent assigned to this project and their number of years of experience, and two project references of similar size and scope during the 5-year period immediately preceding the bid submittal deadline for this project. The Owner may check owner references for the previous projects and may evaluate the owner's assessment of the Bidder performance.

As evidence that the Bidder meets Supplemental Responsibility Criteria 2 through 8 stated above, the apparent two lowest Bidders must submit to the Owner by 12:00 P.M. (noon) of the second business day following the bid submittal deadline, a written statement verifying that the Bidder meets Supplemental Criteria 2 through 8 together with supporting documentation (sufficient in the sole judgment of the Owner) demonstrating compliance with Supplemental Responsibility Criteria 2 through 8. The Owner reserves the right to request further documentation as needed from the low bidder and documentation from other Bidders as well to assess Bidder responsibility and compliance with all bidder responsibility criteria. The Owner also reserves the right to obtain information from third-parties and independent sources of information concerning a Bidder's compliance with the mandatory and Supplemental Criteria, and to use that information in their evaluation. The Owner may consider mitigating factors in determining whether the Bidder complies with the requirements of the Supplemental Criteria.

The basis for evaluation of Bidder compliance with these mandatory and Supplemental Criteria shall include any documents or facts obtained by Owner (whether from the Bidder or third parties) including but not limited to: (i) financial, historical, or operational data from the Bidder; (ii) information obtained directly by the Owner from others for whom the Bidder has worked, or other public agencies or private enterprises; and (iii) any additional information obtained by the Owner which is believed to be relevant to the matter.

If the Owner determines the Bidder does not meet the bidder responsibility criteria above and is therefore not a responsible Bidder, the Owner shall notify the Bidder in writing, with the reasons for its determination. If the Bidder disagrees with this determination, it may appeal the determination within 2 business days of the Owner's determination by presenting its appeal and any additional information to the Owner. The Owner will consider the appeal and any additional information before issuing its final determination. If the final determination affirms that the Bidder is not responsible, the Owner will not execute a contract with any other Bidder until at least 2 business days after the Bidder determined to be not responsible has received the Owner's final determination.

Request to Change Supplemental Bidder Responsibility Criteria Prior To Bid: Bidders with concerns about the relevancy or restrictiveness of the Supplemental Bidder Responsibility Criteria may make or submit requests to the Owner to modify the criteria. Such requests shall be in writing, describe the nature of the concerns, and propose specific modifications to the criteria. Bidders shall submit such requests to the Owner no later than 5 business days prior to the bid submittal deadline and address the request to the Project Engineer or such other person designated by the Owner in the Bid Documents.

2.01.9 PROPOSAL ERRORS

If a Bidder discovers an error in the Bidder's Proposal after the Proposals have been opened and tabulated and desires to withdraw the erroneous Proposal, the Bidder shall submit a notarized affidavit signed by the Bidder, accompanied by original certified worksheets used in the preparation of the Proposal, requesting relief from the Award. The affidavit shall describe the specific error(s) and certify that the worksheets are the originals used in the preparation of the Proposal.

The affidavit and the certified worksheets shall be received by the Engineer before 5:00 p.m. local time on the next business day following the day of the Proposal opening or the claim of error will not be considered. The Engineer will review the certified worksheets to determine the validity of the claimed error, and make its recommendation to the Owner. If the Owner and Engineer concur that the claim of error is allowable under applicable law, the Bidder will be relieved of responsibility for the Proposal, and the Proposal Deposit will be returned to the Bidder. Thereafter, at the discretion of the Owner, all Proposals may be rejected or an Award made to the next lowest responsive, responsible Bidder.

2.02 AWARD AND EXECUTION OF CONTRACT

2.02.1 AWARD OF CONTRACT

A Contract will not be awarded until the Owner is satisfied that the successful Bidder is responsible, reasonably familiar with the Work to be performed and has the necessary capital, tools, personnel and equipment to satisfactorily perform the Work.

The Owner reserves the right to waive informalities in the bidding, accept a Proposal of the lowest responsive, responsible Bidder, reject any or all Proposals, republish the call for Proposals, or revise or cancel the project.

After the date and hour set for the opening of the Proposals, no Bidder may withdraw its Proposal unless the Award of the Contract is delayed for a period exceeding 60 calendar days following Proposal opening. In the event that a conflicting duration appears elsewhere in the Invitation for Proposals or Contract Provisions or advertisement, the longer period shall govern.

2.02.2 EXECUTION OF CONTRACT

Within 10 calendar days after notification by the Owner of the Award, the successful Bidder shall return to the Engineer the signed Owner-prepared Contract, all insurance certificates and endorsements required by the Contract Provisions, all other certificates, information, and forms required by the Contract Provisions, and Performance and Public Works Payment Bonds required by the Contract Provisions. If the Contract is signed by an officer, agent, or other authorized representative of the Contractor, the officer, agent, or other representative shall furnish satisfactory evidence of authority to sign as the legal representative of the Contractor, if required by the Owner. An authorized partner of a joint venture may sign the Contract, subject to the approval of the Owner, which may, at its discretion, require each and every member of the joint venture to sign the Contract.

Should the successful Bidder fail to return to the Engineer the signed Owner-prepared Contract, all insurance certificates and endorsements required by the Contract Provisions, all other certifications, information, and forms required by the Contract Provisions, and Performance and Public Works Payment Bonds required by the Contract Provisions within 10 calendar days after notification by the Owner of the Award, the Owner reserves the right to and may elect to withdraw the award to the successful Bidder and award the Contract to the next responsible, responsive Bidder.

Until the Owner executes the Contract, no Proposal shall bind the Owner, and the Contractor shall not commence any Work. The Contractor shall bear all risks for any Work begun before the Contract is executed by the Owner.

2.02.3 FAILURE TO EXECUTE CONTRACT

If the Contractor fails to submit the insurance certificates, bonds, and all other certificates, forms, information and documents as required by the Contract Provisions, with the executed Contract within the time required by the Contract Provisions, the Owner may then award the Contract to the next lowest responsive, responsible Bidder or reject any or all Proposals.

2.02.4 RETURN OF PROPOSAL DEPOSIT

When Proposals have been examined and corrected as necessary, Proposal Deposits accompanying Proposals ineligible for further consideration will be returned. All other Proposal Deposits will be held until the Contract is awarded and fully executed, after which the Proposal Deposits, except those subject to forfeiture, will be returned.

2.02.5 NOTICE TO PROCEED

A written Notice to Proceed will be issued to the Contractor by the Owner or Engineer after the Contract has been executed by the Contractor and the Owner, and the Performance and Public Works Payment Bonds and required insurance and other certificates and documents are approved by the Owner and, when applicable, by State or Federal agencies responsible for funding any portion of the project. The Contractor shall not commence Work until the Notice to Proceed has been issued.

SECTION 3 - GENERAL REQUIREMENTS OF THE CONTRACT

3.01 SCOPE OF THE WORK

3.01.1 INTENT OF THE CONTRACT

The intent of the Contract is to describe a functionally complete project to be constructed in accordance with the Contract. The Contractor shall provide all labor, supervision, materials, tools, equipment, transportation, supplies, and other things required expressly by, or reasonably implied from, the Contract, to complete all Work. Omissions from the Contract of details of Work which are necessary to carry out the intent of the Contract, or which are customarily performed, shall not relieve the Contractor from performing the complete Work called for by the Contract; such Work shall be performed as if fully set forth and described in the Contract. The unit or other bid prices shall be full payment for everything required to complete the Work, including but not limited to labor, supervision, materials, equipment, jobsite and home office overhead and profit.

3.01.2 COORDINATION OF CONTRACT

The Contract Plans and the Contract Provisions for the Work shall be considered as a whole, and anything shown or called for in one and omitted in any other is as binding as if called for or shown on both. Figure dimensions shall, in all cases, be used in preference to scale dimensions. Any inconsistency in the Contract Documents shall be resolved by the following order of precedence (e.g., 1 presiding over 2 through 4, 2 presiding over 3 through 4, etc.):

1. Addenda;
2. The Agreement and Proposal Form;
3. Specifications;
- 3a. Supplementary General Conditions (including conditions supplied by federal or state agencies on projects funded, in whole or part, by such agencies. In the event of a conflict in various forms of General Conditions, those conditions affording the greatest benefit or protection to the Owner shall govern.);
- 3b. General Conditions;
- 3c. Technical Specifications;
4. Contract Plans.

3.01.3 ASSIGNMENT OF CONTRACT

The Contractor shall not assign the Contract or any part of the Contract or of the funds to be received under the Contract unless such assignment is approved by the Owner and the Contractor's Performance and Public Works Payment Bonds surety prior to the execution or effectiveness of the assignment.

3.02 CONTROL OF WORK

3.02.1 AUTHORITY AND ROLE OF THE ENGINEER

- (1) The Engineer is the authorized representative of the Owner, and is employed to act as advisor and consultant to the Owner in engineering matters relating to the Contract. Among other things, the Engineer may determine the quantity of material installed or Work completed, evaluate whether materials and equipment comply with the Specifications, and assist the Owner with answering questions relating to the meaning and intent of the Contract. The Owner, with the advice of the Engineer, will make the final determination relating to quality, acceptability and conformity of labor and materials to the requirements of the Contract.
- (2) The Engineer does not purport to be a safety expert, and is not engaged in that capacity under the Contract or the Engineer's contract with the Owner. The Engineer does not have either the authority or the responsibility to enforce construction safety laws, rules, regulations or procedures, or to order the stoppage of Work for claimed violations thereof. From time to time, the Engineer may inform the Contractor of conditions that may constitute safety issues or violations. Such information will be provided solely to cooperate with and assist the Contractor and shall not make the Field Representative or the Engineer responsible for the enforcement of safety laws, rules, regulations or procedures. After receiving information relating to safety issues from the Engineer, the Contractor shall make its own examination and analysis of the situation reported and take such action, if any, that the Contractor determines to be appropriate. The Engineer's performance of project representation and observation services shall not make the Engineer responsible for the enforcement of safety laws, rules, regulations or procedures; nor shall it make the Engineer responsible for construction means, methods, techniques, sequences, or procedures, or for the Contractor's failure to properly perform the Work, all of which are entirely the responsibility of the Contractor.
- (3) The Engineer shall have no liability whatsoever to, or contractual relationship with, the Contractor in any way relating to the Contract. The Owner and the Contractor shall look solely to each other for the enforcement with respect to any rights, obligations, claims or liabilities arising under or in any way relating to the Contract. Neither the authority given to the Engineer herein, nor any action or service provided by the Engineer or its subconsultants with regard to the Work, shall create any duty owed by the Engineer or its subconsultants to the Contractor or a cause of action against the Engineer or its subconsultants by Contractor.
- (4) Nothing in the Contract shall, in any way, be construed to place responsibility on the Field Representative, Engineer or the Owner for the method, manner, direction or superintendency of the performance of the Work by the Contractor. Such responsibility rests solely with the Contractor.

- (5) Neither the Engineer nor any of its assistants or agents shall have any power to waive any obligation of the Contract. The Engineer's failure to reject Work that is defective or otherwise does not comply with the requirements of the Contract shall not constitute approval or acceptance of the Work or relieve the Contractor of its obligations under the Contract, notwithstanding that such Work has been estimated for payment or that payments have been made for that Work. Neither shall such failure to reject Work, nor any acceptance by the Engineer or by the Owner of any part or of the whole of the Work bar a claim by the Owner at any subsequent time for recovery of damages for the cost of removal and replacement of any portions of the Work that do not comply with the Contract.
- (6) No order, measurement, determination or certificate by the Engineer or Owner for payment of money or payment for or acceptance of the whole or of any part of the Work by the Engineer or the Owner or extension of time or possession taken by the Owner shall constitute a waiver of any portion of the Contract, nor shall any waiver of any breach of the Contract constitute a waiver of any other or subsequent breach thereof.

3.02.2 AUTHORITY OF FIELD REPRESENTATIVE

- (1) Field Representatives are assigned to the project site to keep the Engineer and Owner generally informed as to the progress of the Work and the manner in which it is being done; to keep records; and to act as liaison between the Contractor, Owner and Engineer. When observed, the Field Representative shall call the attention of the Contractor to any deviations from the Contract. However, failure of the Field Representative to call the attention of the Contractor to faulty Work or deviations from the Contract shall not constitute either a waiver of any requirement in the Contract or acceptance of said Work.
- (2) Since one of the Field Representative's primary responsibilities is to observe that the Work progresses expediently and in a workmanlike manner, the Field Representative may offer suggestions to the Contractor, which the Contractor, at its sole discretion, may or may not choose to follow. Such suggestions are not to be considered as anything but suggestions offered to cooperate with and assist the Contractor and shall not constitute an assumption of responsibility, financial or otherwise, by the Field Representative, the Engineer or the Owner.
- (3) The presence or absence of the Field Representative on the job site will be at the sole discretion of the Owner, and the presence or absence of the Field Representative at any time will not relieve the Contractor of its responsibility to properly perform the Work as required by the Contract.
- (4) The Field Representative will have the authority, but not the obligation, to reject defective materials and equipment if observed; however, the failure of the Field Representative to reject defective materials and equipment or any other Work involving deviations from the Contract will not constitute acceptance of such Work. The Field Representative is not authorized to approve or accept any portion of the

Work or to issue instructions contrary to the Contract; all such approvals, acceptances or instructions shall be in writing and signed by the Engineer or the Owner.

- (5) The Field Representative does not purport to be a safety expert, and is not engaged in that capacity under the Contract or the Engineer's contract with the Owner. The Field Representative does not have either the authority or the responsibility to enforce construction safety laws, rules, regulations or procedures, or to order the stoppage of Work for claimed violations thereof. From time to time, the Field Representative may inform the Contractor of conditions that may constitute safety issues or violations. Such information will be provided solely to cooperate with and assist the Contractor and shall not make the Field Representative or the Engineer responsible for the enforcement of safety laws, rules, regulations or procedures. After receiving information relating to safety issues from the Field Representative, the Contractor shall make its own examination and analysis of the situation reported and take such action, if any, that the Contractor determines to be appropriate. The Field Representative's performance of observation services shall not make the Field Representative responsible for the enforcement of safety laws, rules, regulations or procedures; nor shall it make the Field Representative responsible for construction means, methods, techniques, sequences, or procedures, or for the Contractor's failure to properly perform the Work, all of which are entirely the responsibility of the Contractor.

3.02.3 CONSTRUCTION OBSERVATION AND INSPECTIONS

- (1) All Work required by the Contract, including all materials and equipment to be furnished and the manufacture and preparation thereof shall, at all times, be subject to observation by the Owner's designated representatives, who may, at any time in the performance of their duties, enter upon the Work or the shops and factories where any part of the Work, materials or equipment are being prepared, fabricated or manufactured.
- (2) Observation of Work by the Owner, the Engineer, or the Field Representative shall not relieve the Contractor of its obligation to furnish satisfactory materials and workmanship. Work or materials found unsatisfactory at any time during the life of the Contract, and the applicable warranty periods, guarantees or limitation periods shall be promptly corrected or replaced immediately by the Contractor at its own expense.
- (3) Upon request by the Owner or Engineer, the Contractor shall furnish all tools, labor, equipment and materials necessary to examine any Work that may be completed or in progress, even to the extent of uncovering or taking down portions of completed or covered Work. Work shall be left exposed until examined by the Owner or Engineer, at no additional cost to the Owner. If the Owner or the Engineer determines that the uncovered Work does not comply with the requirements of the Contract, the cost of such examination and the cost of reconstruction and/or repair shall be borne by the Contractor.

- (4) The Contractor shall promptly comply with all directions of the Engineer with reference to correcting any Work or replacing any materials or equipment found to be not in accordance with the Contract. In the event of a dispute, the Contractor may appeal to the Engineer's decision to the Owner in accordance with the Contract, and the Owner's decision shall be final.

3.02.4 EMERGENCY CONTACT LIST

The Contractor shall submit an emergency contact list to the Engineer no later than five calendar days after the date the Contract is executed. The list shall include, at a minimum, the Contractor's project manager or equivalent, project superintendent, traffic control supervisor, and erosion and sediment control lead. The list shall identify a representative with delegated authority to act as the emergency contact on behalf of the Contractor and include one or more alternates. The emergency contact shall be available upon the Engineer's request at other than normal working hours. The emergency contact list shall include 24-hour telephone numbers for all individuals identified as emergency contacts or alternates.

3.02.5 ORAL AGREEMENTS

No oral agreement or conversation with any officer, agent, or employee of the Owner, either before or after execution of the Contract, shall affect or modify any of the terms or obligations contained in any of the documents comprising the Contract. Such oral agreement or conversation shall be considered as unofficial information and in no way binding upon the Owner, unless subsequently put in writing and signed by the Owner.

3.02.6 ELECTRONIC FILES

All Work performed shall be in conformity with the signed Contract Plans and Contract Provisions. If the Contractor requests electronic files, the Engineer may provide the files. The use of the electronic files shall be at the Contractor's sole risk. The Engineer does not warrant the completeness or accuracy of the electronic files and the Engineer assumes no liability for any errors or omissions in the digital data. The Contractor shall be responsible for reviewing and checking the electronic files to ensure that they are suitable for the Contractor's purpose.

3.03 LEGAL RELATIONS AND RESPONSIBILITIES

3.03.1 APPLICABLE LAWS AND REGULATIONS

3.03.1(1) General

The Contractor shall comply with all laws, ordinances, rules and regulations of any authority having jurisdiction in any way relating to the project, including, but not limited to, regulations governing site maintenance, clean-up, air pollution control, noise control, water quality control, surface water control and runoff, tree and vegetation protection, cultural resources and oil and hazardous substance control.

3.03.1(2) Utilities and Similar Facilities

The Contractor shall protect all private and public utilities from damage. Utilities include, among others: telephone lines; cable television and high-speed internet lines; gas; electric power lines; sanitary sewer; septic sewer systems; storm sewer, waterlines, and irrigation lines; street lighting and traffic signal and signing systems; and railroad tracks and related equipment.

In accordance with Chapter 19.122 of the Revised Code of Washington, the Contractor shall call the One-Number Locator Service for the field location of underground utilities. If no locator service is available for the area where the project is located, the Contractor shall provide written notice to all owners of utilities known to, or suspected of, having underground facilities within or near all areas of that will be excavated.

The Contractor shall be responsible for all costs required to protect public and private utilities from damage.

3.03.1(3) Site Maintenance

The Contractor shall keep the Work site, staging areas, and Contractor's facilities clean and free from rubbish and debris. Materials and equipment shall be removed from the Work site when they are no longer necessary. Upon completion of the Work and before final acceptance, the Work site shall be cleared of equipment, unused materials, and rubbish and the Work site shall be left in clean and neat condition.

3.03.1(4) State Taxes

The Washington State Department of Revenue has issued special rules on the State sales tax. Section 3.03.1(4) a through Section 3.03.1(4) c are meant to clarify those rules. The Contractor should contact the Washington State Department of Revenue for answers to questions in this area. The Owner will not adjust its payment if the Contractor bases a bid on a misunderstood tax liability.

The Contractor shall include all Contractor-paid taxes in the unit bid prices or other contract amounts. In some cases, however, state retail sales tax will not be included. Section 3.03.1(4) b describes this exception.

The Owner will pay the retained percentage only if the Contractor has obtained from the Washington State Department of Revenue a certificate showing that all contract-related taxes have been paid (RCW 60.28.051). The Owner may deduct from its payments to the Contractor any amount the Contractor may owe the Washington State Department of Revenue, whether the amount owed relates to the Contract or not. Any amount so deducted will be paid into the proper State fund.

a. State Sales Tax — Rule 171

WAC 458-20-171, and its related rules, apply to building, repairing, or improving streets, roads, etc., which are owned by a municipal corporation, or political

subdivision of the state, or by the United States, and which are used primarily for foot or vehicular traffic. This includes storm or combined sewer systems within and included as a part of the street or road drainage system and power lines when such are part of the roadway lighting system. For work performed in such cases, the Contractor shall include Washington State Retail Sales Taxes in the various unit bid item prices, or other contract amounts, including those that the Contractor pays on the purchase of the materials, equipment, or supplies used or consumed in doing the Work.

b. State Sales Tax — Rule 170

WAC 458-20-170, and its related rules, apply to the constructing and repairing of new or existing buildings, or other structures, upon real property. This includes, but is not limited to, the construction of streets, roads, highways, etc., owned by the state of Washington; water mains and their appurtenances; sanitary sewers and sewage disposal systems unless such sewers and disposal systems are within, and a part of, a street or road drainage system; telephone, telegraph, electrical power distribution lines, or other conduits or lines in or above streets or roads, unless such power lines become a part of a street or road lighting system; and installing or attaching of any article of tangible personal property in or to real property, whether or not such personal property becomes a part of the realty by virtue of installation.

For work performed in such cases, the Contractor shall collect from the Owner, retail sales tax on the full Contract price. The Owner will automatically add this sales tax to each payment to the Contractor. For this reason, the Contractor shall not include the retail sales tax in the unit bid item prices, or in any other contract amount subject to Rule 170, with the following exception.

EXCEPTION: The Owner will not add in sales tax for a payment the Contractor or a Subcontractor makes on the purchase or rental of tools, machinery, equipment, or consumable supplies not integrated into the project. Such sales taxes shall be included in the unit bid item prices or in any other contract amount.

c. Services

The Contractor shall not collect retail sales tax from the Owner on any contract wholly for professional or other services (as defined in Washington State Department of Revenue Rules 138 and 244).

3.03.1(5) Equal Employment Responsibilities

The Contractor shall, at its sole cost and expense, comply with all applicable laws, policies and regulations pertaining to nondiscrimination and equal employment opportunities. The absence of specific provisions or other requirements mandated by state, municipal or federal laws, policies or regulations from these General Conditions shall not excuse the Contractor from compliance with such laws, regulations or policies.

3.03.1(6) Archaeological and Historical Objects

Archaeological or historical objects, such as ruins, human skeletal remains, sites, buildings, artifacts, fossils, or other objects of antiquity that may have significance from a historical or scientific standpoint, which may be encountered by the Contractor, shall not be further disturbed. The Contractor shall immediately notify the Engineer of any such finds.

The Engineer will determine if the material is to be salvaged. The Contractor may be required to stop work in the vicinity of the discovery until such determination is made. The Engineer may require the Contractor to suspend Work in the vicinity of the discovery until salvage is accomplished.

If the Engineer finds that the suspension of Work in the vicinity of the discovery increases or decreases the cost or time required for performance of any part of the Work under the Contract, the Engineer will make an adjustment in payment or the time required for the performance of the Work in accordance with Section 3.04.6.

3.03.2 SAFETY MEASURES

All Work under the Contract shall be performed in a safe manner. The Contractor and all Subcontractors shall comply with all applicable rules, regulations, and safety standards of the Washington State Department of Labor and Industries and all other federal, state, local and other governmental entities having jurisdiction over the project. The Contractor shall be solely and completely responsible for the conditions of the job site, including the safety of all persons and property during the performance of the Work. This requirement shall apply continuously and not be limited to normal working hours.

The Engineer's review of the Contractor's work plan, safety plan, construction sequences, schedule or performance does not and is not intended to include review or approval of the adequacy of the Contractor's safety measures in, on, or near the job site. The Engineer does not purport to be a safety expert, and is not engaged in that capacity under the Contract. The Engineer has neither the authority nor the responsibility to enforce construction safety laws, rules, regulations, or procedures, or to order the stoppage of Work for claimed violations thereof.

The Contractor shall exercise all required and appropriate precautions to protect all persons and property from injury and damage.

3.03.3 HAZARDOUS MATERIAL

Biological hazards and associated physical hazards may be present at the Work site. The Contractor shall take precautions and perform any necessary Work to provide and maintain a safe and healthful Work site in accordance with all applicable laws. The cost for all Work necessary to provide and maintain a safe Work site shall be included in the Contractor's Proposal, unless the Contract includes provisions to the contrary.

3.03.4 PAYMENT OF WAGES AND RELATED REQUIREMENTS

3.03.4(1) Minimum Prevailing Wage Requirements

- a. The Contract is subject to the minimum prevailing wage and hour requirements of RCW 39.12 and RCW 49.28 (as amended or supplemented). On projects having federal funding, federal wage laws and rules may also apply. The Contract may list minimum hourly rates for wages for trades or occupations in the locality within the state where such labor is performed as determined by the Industrial Statistician for the Department of Labor and Industries or under the federal Davis-Bacon Act. These rates are for general reference purposes only and may not be current or complete. The Contractor, any Subcontractor, or other person doing any Work under the Contract shall not pay any worker less than the applicable current minimum hourly wage rates required by applicable law. Higher wages and benefits may be paid.
- b. The Contractor, any Subcontractor, and all individuals or firms required by RCW 39.12, WAC 296-127, or the Federal Davis-Bacon and Related Acts (DBRA) to pay minimum prevailing wages, shall not pay any worker less than the minimum hourly wage rates and fringe benefits required by RCW 39.12 or the DBRA. Higher wages and benefits may be paid.
- c. In accordance with WAC 296-127, the applicable prevailing wage rates that are in effect on the date when Proposals are due shall remain in effect for the duration of the Contract. By incorporating prevailing wage rates into the Contract, the Owner does not warrant or imply that the Contractor will find labor available at those rates. The Contractor shall calculate in its Proposal any amounts above the minimums that it will actually have to pay. Further, rates for wages and/or fringe benefits may change while the Contract is in force. If they do, the Contractor shall bear the cost of paying rates above those in effect at time of bid.
- d. If employing labor in a class not listed in the Contract Provisions on State funded projects, the Contractor shall request the Industrial Statistician, Department of Labor and Industries to determine the correct wage and benefits rate.
- e. If employing labor in a class not listed in the Contract Provisions on a federally funded project, the Contractor shall request the U.S. Secretary of Labor to determine the correct wage and benefits rate.
- f. The Contractor shall ensure that any firm (Supplier, Manufacturer, or Fabricator) that falls under the provisions of RCW 39.12 because of the definition "Contractor" in WAC 296-127-010, complies with all the requirements of RCW 39.12.
- g. The Contractor shall be responsible for compliance with the requirements of the DBRA and RCW 39.12 by all firms (Subcontractors, lower tier Subcontractors, Suppliers, Manufacturers, or Fabricators) engaged in any part of the Work necessary to complete the Contract. Therefore, should a violation of this

Subsection occur by any firm that is providing Work or materials for completion of the Contract whether directly or indirectly responsible to the Contractor, the Owner will take action against the Contractor, as provided by the provisions of the Contract, to achieve compliance, including, but not limited to, withholding payment on the Contract until compliance is achieved.

3.03.4(2) Posting Notice Requirements

Notice of intent to pay prevailing wages and prevailing wage rates for the project shall be posted for the benefit of workers. The Contractor shall post the following, together with anything else necessary to comply with all applicable laws and regulations:

- a. One copy of the approved “Statement of Intent to Pay Prevailing Wages” for the Contractor, each Subcontractor, and any other firm (Supplier, Manufacturer, of Fabricator) that falls under the provisions of RCW 39.12 because of the definition of “Contractor” in WAC 296-127-010;
- b. One copy of the prevailing wage rates for the project;
- c. The address and telephone number of the Industrial Statistician for the Department of Labor and Industries, along with a statement that complaints and questions about wage rates may be directed there; and
- d. FHWA 1495/1495A “Wage Rate Information” poster if the project is funded with federal aid.

Notice shall be posted at a location readily visible to workers at the job site, or where no field office is established, at a local office. The Contractor shall supply a copy of the Notice to any employee upon request.

3.03.4(3) Apprentices

If employing apprentices, the Contractor shall submit to the Owner written evidence showing:

- a. That each apprentice is enrolled in a program approved by the Washington State Apprenticeship and Training Council;
- b. The progression schedule for each apprentice; and
- c. The established apprentice-journeyman ratios and wage rates in the project locality upon which the Contractor shall base such ratios and rates under the Contract. Any worker for whom an apprenticeship agreement has not been registered and approved by the Washington State Apprenticeship and Training Council shall be paid the prevailing hourly rate for journeymen provided in RCW 39.12.021.

3.03.4(4) Required Documents

1. General

All “Statements of Intent to Pay Prevailing Wages”, “Affidavits of Wages Paid” and Certified Payrolls, including a signed Statement of Compliance for Federal-aid projects, shall be submitted on the State L&I online Prevailing Wage Intent & Affidavit (PWIA) system. Statements of Intent to Pay Prevailing Wages”, and “Affidavits of Wages Paid” shall also be submitted to the Engineer. When requested by the Engineer, Certified Payrolls shall also be submitted to the Engineer.

2. Intents and Affidavits

On forms provided by the Industrial Statistician of State L&I, the Contractor shall submit to the Engineer the following for themselves and for each firm covered under RCW 39.12 that will or has provided Work and materials for the Contract:

- a. The approved “Statement of Intent to Pay Prevailing Wages” State L&I’s form number F700-029-000. The Contracting Agency will make no payment under this Contract until this statement has been approved by State L&I and reviewed by the Engineer.
- b. The approved “Affidavit of Prevailing Wages Paid”, State L&I’s form number F700-007-000. The Contracting Agency will not grant Completion until all approved Affidavit of Wages paid for the Contractor and all Subcontractors have been received by the Engineer. The Contracting Agency will not release to the Contractor any funds retained under RCW 60.28.011 until “Affidavit of Prevailing Wages Paid” forms have been approved by State L&I and all of the approved forms have been submitted to the Engineer for every firm that worked on the Contract.

The Contractor is responsible for requesting these forms from State L&I and for paying any fees required by State L&I.

3. Certified Payrolls

Certified payrolls are required to be submitted by the Contractor for themselves, all Subcontractors and all lower tier Subcontractors. The payrolls shall be submitted weekly on all Federal-aid projects and no less than monthly on State funded projects.

4. Penalties for Noncompliance

The Contractor is advised, if these payrolls are not supplied within the prescribed deadlines, any or all payments may be withheld until compliance is achieved. In addition, failure to provide these payrolls may result in other sanctions as provided by State laws (RCW 39.12.050) and/or Federal regulations (29 CFR 5.12).

3.03.5 BONDS, INSURANCE AND INDEMNITY OBLIGATIONS

3.03.5(1) Contract Bonds

The successful Bidder shall provide an executed Performance Bond and Public Works Payment Bond for the full Contract amount (including sales tax). The Contract Bonds shall:

1. Be on Owner-furnished forms;
2. Be signed by an approved Surety (or Sureties) that:
 - a. Is registered with the Washington State Insurance Commissioner; and
 - b. Appears on the current Authorized Insurance List in the State of Washington published by the Office of the Insurance Commissioner.
3. Be conditioned upon the faithful performance of the Contract by the Contractor within the prescribed time; and
4. Be conditioned upon the payment of taxes, increases, and penalties incurred on the project under Titles 50, 51 and 82 RCW; and
5. Guarantee that the Surety shall indemnify, defend, and protect the Owner against any claim of direct or indirect loss resulting from the failure:
 - a. Of the Contractor (or any of the employees, Subcontractors, or lower tier Subcontractors of the Contractor) to faithfully perform the Contract; or
 - b. Of the Contractor (or the Subcontractors or lower tier Subcontractors of the Contractor) to pay all laborers, mechanics, Subcontractors, lower tier Subcontractors, materialperson, or any other person who provides supplies or provisions for carrying out the Work.
6. Be accompanied by a power of attorney for the Surety's officer empowered to sign the bond; and
7. Be signed by an officer of the Contractor empowered to sign official statements (sole proprietor or partner). If the Contractor is a corporation, the bond must be signed by the president or vice-president, unless accompanied by written proof of the authority of the individual signing the bond to bind the corporation (i.e., corporate resolution, power of attorney or a letter to such effect by the president or vice-president).

The Owner may require Sureties or Surety companies on the Contract Bonds to appear and qualify themselves. Whenever the Owner deems the Surety or Sureties to be inadequate, it may, upon

written demand, require the Contractor to furnish additional Surety to cover any remaining Work. Until the added Surety is furnished, payments on the Contract will stop.

3.03.5(1.1) Two-Year Guarantee Period

The Contractor shall return to the project and repair or replace all defects in workmanship and material discovered within 2 years after Final Acceptance of the Work. The Contractor shall start work to remedy any such defects within 7 calendar days of receiving Owner's written notice of a defect, and shall complete such Work within the time stated in the Owner's notice. In case of an emergency, where damage may result from delay or where loss of services may result, such corrections may be made by the Owner's own forces or another contractor, in which case the cost of corrections shall be paid by the Contractor. In the event the Contractor does not accomplish corrections within the time specified, the Work will be otherwise accomplished and the cost of same shall be paid by the Contractor.

When corrections of defects are made, the Contractor shall then be responsible for correcting all defects in workmanship and materials in the corrected work for 2 years after acceptance of the corrections by Owner.

This guarantee is supplemental to and does not limit or affect the requirements that the Contractor's Work comply with the requirements of the Contract or any other legal rights or remedies of the Owner.

3.03.5(2) Worker's Benefits

- a. The Contractor shall make all payments required for unemployment compensation under RCW Title 50 and for industrial insurance and medical aid required under RCW Title 51. If any payment required by Title 50 or Title 51 is not made when due, the Contractor shall indemnify the Owner with respect to all costs and damages, including attorneys' fees and expenses, associated with such nonpayment. The Owner may retain payments due under Title 50 or Title 51 from any money due to the Contractor and make payment to the appropriate fund.
- b. The Contractor shall include in the various items in its bid Proposal all costs for payment of unemployment compensation and for providing the required insurance coverage(s). The Contractor will not be entitled to any additional payment for: (1) failure to include such costs in the Proposal, or (2) post-Award determinations made by the U.S. Department of Labor, the Washington State Department of Labor and Industries, or any other agency or entity regarding insurance coverage requirements.

3.03.5(4) Public Liability & Property Damage Insurance

3.03.5(4.1) General Requirements

- A. The Contractor shall procure and maintain insurance described in all subsections in this Section, from insurers with a current A.M. Best rating not less than A – VII

and licensed to do business in the state of Washington. The Owner reserves the right to approve or reject the insurance provided, based on the insurer (including financial condition), terms and coverage, the Certificate of Insurance, and/or endorsements.

- B. The Contractor shall keep this insurance in force during the term of the Contract and for 30 days after the Physical Completion Date, unless otherwise indicated.
- C. All insurance coverage required by this section shall be written and provided by “occurrence-based” policy forms rather than by “claims made” forms.
- D. The insurance policies shall contain a “cross liability” provision.
- E. The Contractor’s and all Subcontractors’ insurance coverage shall be primary and non-contributory insurance as respects the Owner’s insurance, self-insurance, or insurance pool coverage. Any insurance, self-insurance or self-insured pool coverage maintained by the Owner shall be excess of the Contractor’s insurance and shall not contribute with it.
- F. The Contractor shall provide the Owner and all Additional Insured with written notice of any policy cancellation and the date of effective cancellation within 2 business days of receipt.
- G. The Contractor shall not begin work under the Contract until the required insurance has been obtained and approved by the Owner.
- H. Failure on the part of the Contractor to maintain the insurance as required shall constitute a material breach of Contract, upon which the Owner may, after giving 5 business days notice to the Contractor to correct the breach, immediately terminate the Contract or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith, with any sums so expended to be repaid to the Owner on demand, or at the sole discretion of the Owner, offset against funds due the Contractor from the Owner.
- I. All costs for insurance shall be incidental to and included in the unit or lump sum prices of the Contract and no additional payment will be made.

3.03.5(4.2) Additional Insured

All insurance policies, with the exception of Workers Compensation, shall name the following listed entities as additional insured(s) using the forms or endorsements required herein:

- The Owner and its officers, elected/appointed officials, employees, agents, and volunteers;
- Gray & Osborne, Inc.;

The above-listed entities shall be additional insured(s) for the full available limits of liability

maintained by the Contractor, irrespective of whether such limits maintained by the Contractor are greater than those required by the Contract, and irrespective of whether the Certificate of Insurance provided by the Contractor pursuant to 3.03.5(4.4) describes limits lower than those maintained by the Contractor.

3.03.5(4.3) Subcontractors

Contractor shall ensure that each Subcontractor of every tier obtains and maintains at a minimum the insurance coverages listed in 3.03.5(4.5)A and 3.03.5(4.5)B. Upon request of the Owner, the Contractor shall provide evidence of such insurance.

3.03.5(4.4) Verification of Coverage

The Contractor shall deliver to the Owner a Certificate(s) of Insurance and endorsements for each policy of insurance meeting the requirements set forth herein when the Contractor delivers the signed Contract for the Work. The certificate and endorsements shall conform to the following requirements:

1. An ACORD certificate or a form determined by the Owner to be equivalent. The certificate or an endorsement form shall indicate the Contractor's insurance is primary and non-contributory.
2. The Contractor shall obtain endorsement forms CG 2010 10 01, CG 2032 07 04 and CG 2037 10 01 or the equivalent of each, naming the Owner and all other entities listed in 3.03.5(4.2) as Additional Insured(s) and showing the policy number. If the Contractor is unsuccessful in securing these endorsements after exerting commercially reasonable efforts, the Contractor shall obtain other endorsements providing equivalent protection to the Additional Insured. Commercially reasonable efforts shall be evidenced by a signed statement by the Contractor's insurance broker indicating that endorsement forms CG 2010 10 01, CG 2032 07 04 and CG 2037 10 01 are not available and the endorsements submitted provide equivalent protection to the Additional Insured.
3. Any other amendatory endorsements to show the coverage required herein.
4. A notification of coverage enhancements on the Certification of Insurance shall not satisfy these requirements; actual endorsement must be submitted.

Upon request, the Contractor shall forward to the Owner a full and certified copy of the insurance policy(s). If Builders Risk Insurance is required on this project, a full and certified copy of that policy is required when the Contractor delivers the signed Contract for the Work.

3.03.5(4.5) Coverages and Limits

The insurance shall provide the minimum coverages and limits set forth below. Providing coverage in these stated minimum limits shall not be construed to relieve the Contractor from liability in excess of such limits. All deductibles and self-insured retentions shall be disclosed and

are subject to approval by the Owner. The cost of any claim payments falling within the deductible shall be the responsibility of the Contractor.

3.03.5(4.5)A Commercial General Liability

Commercial General Liability insurance shall be written on coverage forms at least as broad as ISO occurrence form CG 00 01, including but not limited to liability arising from premises, operations, stop gap liability, independent contractors, products-completed operations, personal and advertising injury, and liability assumed under an insured contract. There shall be no exclusion for liability arising from explosion, collapse or underground property damage.

The Commercial General Liability insurance shall be endorsed to provide a per project general aggregate limit, using ISO form CG 25 03 05 09 or an equivalent endorsement.

Contractor shall maintain Commercial General Liability Insurance arising out of the Contractor's completed operations for at least 3 years following Substantial Completion of the Work.

Such policy must provide the following minimum limits:

\$1,000,000	Each Occurrence
\$2,000,000	General Aggregate
\$2,000,000	Products & Completed Operations Aggregate
\$1,000,000	Personal & Advertising Injury, each offence
\$1,000,000	Stop Gap/Employers' Liability

3.03.5(4.5)B Automobile Liability

Automobile Liability for owned, non-owned, hired, and leased vehicles, with an MCS 90 endorsement and a CA 9948 endorsement attached if "pollutants" are to be transported. Such policy(ies) shall provide the following minimum limit:

\$1,000,000	combined single limit each accident
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3.03.5(4.5)C Workers' Compensation

The Contractor shall comply with Workers' Compensation coverage as required by the Industrial Insurance laws of the state of Washington.

3.03.5(4.5)D Excess or Umbrella Liability

The Contractor shall provide Excess or Umbrella Liability coverage at limits of \$2 million per occurrence and annual aggregate. This excess or umbrella liability coverage shall apply, at a minimum, to both the Commercial General and Auto insurance policy coverage and employers liability.

This requirement may be satisfied instead through the Contractor's primary Commercial General and Automobile Liability coverage, or any combination thereof.

3.03.5(4.5)E Builders Risk Insurance

The Contractor shall purchase and maintain Builders Risk insurance covering interests of the Owner, the Contractor, Subcontractors, and lower tier Subcontractors in the Work. Builders Risk shall be required for all structures on the project. A structure is any equipment, facility, building, bridge, retaining wall, or tank extending 4 feet or more above adjacent grade; or any facility less than 4 feet above adjacent grade, and containing more than \$50,000 worth of electrical or mechanical equipment. Poles, light standards, or antenna less than 50 feet in height and less than 2 feet in diameter shall not be considered structures. Builders Risk insurance, when required, shall be on an all-risk policy form and shall insure against the perils of fire and extended coverage and physical loss or damage including flood, earthquake, theft, vandalism, malicious mischief and collapse. The Builders Risk insurance, when required, shall include coverage for temporary buildings, debris removal, and damage to materials in transit or stored off-site. Such insurance shall cover “soft costs” including but not limited to design costs, licensing fees, and architect’s and engineer’s fees. Builders Risk insurance shall be written in the amount of the completed value of the applicable portions of the project, with no coinsurance provisions.

The Builders Risk insurance covering the Work shall have a deductible of \$5,000 for each occurrence, which will be the responsibility of the Contractor. Higher deductibles for flood, earthquake and all other perils may be accepted by the Owner upon written request by the Contractor and written acceptance by the Owner. Any increased deductibles accepted by the Owner will remain the responsibility of the Contractor.

The Builders Risk insurance shall be maintained until the Physical Completion Date.

The Contractor and the Owner waive all rights against each other and any of their Subcontractors, lower tier Subcontractors, agents and employees, each of the other, for damages caused by fire or other perils to the extent covered by Builders Risk insurance or other property insurance applicable to the Work. The policies shall provide such waivers by endorsement or otherwise.

Liability for facilities not covered by Builders Risk shall remain the responsibility of the Contractor.

3.03.5(4.5)F LHWCA Insurance

If the Contract involves work on or adjacent to Navigable Waters of the United States, the Contractor shall procure and maintain insurance coverage in compliance with the statutory requirements of the U.S. Longshore and Harbor Workers' Compensation Act (LHWCA).

Such policy must provide the following minimum limits:

\$1,000,000	Bodily Injury by Accident – each accident
\$1,000,000	Bodily Injury by Disease – each employee
\$1,000,000	Bodily Injury by Disease – policy limits

3.03.5(4.5)G Protection and Indemnity Insurance Including Jones Act

If the Contract involves marine activities, or work from a boat, vessel, or floating platform, the Contractor shall procure and maintain Protection and Indemnity (P&I) coverage including collision liability, injury to crew (Merchant Marine Act of 1920 - Jones Act) and passengers, removal of wreck and liability for seepage, pollution, containment and cleanup using form SP-23 or SP 38 or a form as least as broad.

All entities listed under Section 3.03.5(4.2) of the General Conditions shall be named as additional insureds on the Contractor's Protection and Indemnity insurance policy.

Such policy must provide the following minimum limits:

\$1,000,000	Bodily Injury by Accident – each accident or occurrence
\$1,000,000	Bodily Injury by Disease – each employee
\$1,000,000	Bodily Injury by Disease – policy limits

3.03.5(4.5)H Hull and Machinery

If the Contract involves use of a boat, vessel, or floating platform, the Contractor shall procure and maintain coverage at Market Value of vessel on American Institute Hull Clauses, 6/2/77 form.

3.03.5(4.5)I Marine Pollution

If this Contract is near or on water, the Contractor shall procure and maintain Pollution Liability (OPA, CERCLA) insurance to satisfy U.S. Coast Guard requirements as respects the Federal Oil Pollution Act of 1990 and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended.

Such policy must provide the following minimum limits, or statutory limits of liability as applicable, whichever is higher:

\$1,000,000	per Occurrence
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3.03.5(4.5)J Pollution Liability

If this Contract includes work with lead based paint, materials containing asbestos or transportation of hazardous materials, the Contractor shall provide a Contractors Pollution Liability policy, providing coverage for claims involving bodily injury, property damage (including loss of use of tangible property that has not been physically injured), cleanup costs, remediation, disposal or other handling of pollutants, including costs and expenses incurred in the investigation, defense, or settlement of claims, arising out of any one or more of the following:

1. Contractor's operations related to this project.
2. Remediation, abatement, repair, maintenance or other work with lead-based paint or materials containing asbestos.
3. Transportation of hazardous materials away from any site related to this project.

All entities listed under 3.03.5(4.2) of these general conditions shall be named by endorsement as additional insureds on the Contractors Pollution Liability insurance policy.

Such Pollution Liability policy shall provide the following minimum limits:

\$1,000,000 each loss and annual aggregate

3.03.5(4.5)K Professional Liability

If the Contract requires engineering design services, the Contractor and/or its Subcontractor(s) and/or its design consultant providing construction management, value engineering, or any other design-related non-construction professional services shall provide evidence of Professional Liability insurance covering professional errors and omissions.

Such policy shall provide the following minimum limits:

\$1,000,000 per claim and annual aggregate

If the scope of such design-related professional services includes work related to pollution conditions, the Professional Liability insurance shall include coverage for Environmental Professional Liability.

If insurance is on a claims made form, its retroactive date, and that of all subsequent renewals, shall be no later than the effective date of this Contract.

3.03.5(5) Indemnity and Hold Harmless

- a. To the fullest extent permitted by law and subject to the limitations of RCW 4.24.115, the Contractor shall defend, indemnify and hold harmless the Owner and the Engineer and their appointed and elected officials, agents and employees from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees and expenses arising out of or resulting from the negligent performance of the Work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and (2) is caused by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable. Provided, however, that when any such claim, damage, loss or expense arises from the concurrent negligence of (1) the Owner, or anyone for whose acts it may be liable, and (2) the Contractor, or anyone for whose acts it may be liable, it is expressly agreed that the Contractor's obligations of defense and indemnity under this section shall be effective only to the extent of the Contractor's negligence and those for whose negligence the Contractor is responsible. This obligation of indemnity shall not extend to claims, losses or expenses arising from the sole negligence of the Owner, its appointed or elected officials, agents or employees.

- b. In any and all claims against the Owner or the Engineer or any of their agents or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this section shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts, it being the expressed intent of the parties that Contractor herein specifically waives any immunity granted under the State Industrial Insurance Law, RCW Title 51. **THIS WAIVER HAS BEEN SPECIALLY NEGOTIATED BY THE PARTIES, WHO HAVE ACKNOWLEDGED SAME BY AFFIXING THEIR SIGNATURES TO THE PROPOSAL FORM.**

3.03.5(6) Patent Royalties & Process Fees

The Contractor shall be responsible for all costs arising from the use of patented devices, materials, or processes used in or incorporated in the Work. The Contractor agrees to indemnify, defend, and save harmless the Owner from all claims and damages, in any way relating to the use of patented devices, materials, or processes used in or incorporated in the Work.

3.03.6 METHOD OF SERVING NOTICE

All correspondence from the Contractor constituting any notification, notice of protest, notice of dispute, or other correspondence constituting notification required to be furnished under the Contract, shall be in paper format, hand delivered or sent via mail delivery service to the Owner. Electronic formats such as emails or electronically delivered copies of correspondence will not constitute such notice and will not comply with the requirements of the Contract.

3.04 PROSECUTION AND PROGRESS OF THE WORK

3.04.1 QUALITY OF WORK

3.04.1(1) Workmanship

- a. The Contractor represents that it is fully experienced and possesses all the necessary capital, facilities and expertise to perform all of the Work, and hereby guarantees that all of the Work performed by it under the Contract will be of the highest quality and done in a workmanlike fashion in strict accordance with the requirements of the Contract.
- b. The Contractor shall at all times employ skilled workers and use skilled Subcontractors in the performance of the Work. When required in writing by the Owner or the Engineer, the Contractor or its Subcontractors shall remove from the Work site any person or Subcontractor who is, in the opinion of the Owner or the Engineer, not competent, not qualified, disorderly, or otherwise unsatisfactory and shall not again employ such discharged person or Subcontractor on the Work,

except with the prior written consent of the Owner. Discharge of any person or Subcontractor shall not be the basis of any claim for compensation or damages against the Owner or the Engineer.

- c. All Work performed under the Contract shall be of first quality workmanship throughout, with the Work complete and in full working order upon completion.
- d. Except when otherwise expressly specified in the Contract, the Contractor shall design, survey, layout and be responsible for all methods, materials and equipment used in performing the Work.
- e. If, at any time, the Contractor's workforce (including Subcontractors), in the opinion of the Owner and/or the Engineer, shall be inadequate for maintaining the necessary progress required to complete the Work within the Contract Time, the Contractor shall at its sole cost, if so required by the Owner and/or the Engineer, increase the workforce or equipment to such an extent as to give reasonable assurance of compliance with the Work schedule. The failure of the Owner and/or the Engineer to make such demand shall not relieve the Contractor of its obligation to perform the Work in accordance with the requirements of the Contract. The Contractor alone shall be responsible for the safety, efficiency and adequacy of its activities, construction methods and the rate of progress required by the Contract.

3.04.1(2) Contractor's Supervisory and Site Personnel

- a. The Contractor shall assign sufficient supervisory personnel to ensure the faithful prosecution of the Work and shall have adequate supervisory personnel present at the Work site who are either employees of the Contractor or duly authorized representatives designated in writing to the Owner and/or the Engineer. The Contractor shall at all times maintain at the Work site a complete copy of the Contract Provisions, Contract Plans, and record drawings of the Work that has been completed.
- b. The Contractor shall at all times have at least one duly authorized supervisory representative at the Work site who shall be fully authorized to make binding decisions on behalf of the Contractor with respect to the Work. If the Contractor's duly authorized supervisory representative at the Work site will be absent from the Work site for more than four hours, he/she shall designate an assistant who possesses the same authority and so inform the Owner and the Field Representative, if applicable.

3.04.2 MATERIALS AND EQUIPMENT

- (1) Materials and equipment furnished and installed shall be manufactured, fabricated or constructed to meet all applicable safety requirements. All material and equipment supplied by the Contractor and incorporated in the Work shall be of new manufacture, free from defects and in strict compliance with the requirements of

the Contract. When required by the Owner, a certificate from the manufacturer or other responsible supplier shall be supplied attesting to this fact.

- (2) All tools and equipment used for construction operations shall be of the size and type suitable for the Work and shall be kept in safe and good working condition at all times.
- (3) The Contractor shall, whenever required during the progress of the Work and after completion of the Work, furnish proof acceptable to the Owner that all items of equipment and all materials installed equal or exceed all requirements specified in the Contract.
- (4) The Contractor shall use all means possible to protect materials and equipment from damage or degradation of any kind before, during and after installation.
- (5) The Contractor shall replace any materials or equipment damaged during the performance of the Work to the approval of the Owner and the Engineer. The cost of replacing damaged materials and equipment shall be borne by the Contractor.

3.04.3 SPECIFICATION OF PARTICULAR MATERIALS AND EQUIPMENT

- (1) Within the Contract, certain items are specified by brand, style, trade name, or manufacturer in order to set forth a standard of quality, and/or preference by the Owner. Unless specifically noted otherwise, it is not the intent of the Contract to exclude other processes or materials of a type and quality equal to those designated.
- (2) The term “or equal” as used in the Contract does not mean that the Contractor’s substitution of material or equipment will necessarily be approved as equal by the Engineer. If the Contractor desires to substitute material or equipment on the basis that it is equal to that specified, the Contractor shall submit a written request to the Engineer to substitute the material or equipment. The Contractor shall not use or incorporate such material or equipment into the Work until the Contractor has received written approval from the Engineer.
- (3) If the Contractor proposes substitutions, the Engineer will record all time used to evaluate each proposed substitution. If an approved substitution requires revisions to the Contract Documents, the Engineer will record all time to accomplish the revisions. Whether or not the Engineer approves a proposed substitution all direct and indirect cost to evaluate the proposed substitution shall be deducted from amounts due or to become due to the Contractor.
- (4) No additional compensation or extension of time will be allowed the Contractor for any changes required to incorporate substituted materials or equipment.

3.04.4 STORAGE

3.04.4(1) On-Site Storage

The Contractor shall store all equipment and materials in a safe and suitable place in accordance with the manufacturer's recommendations. Materials and equipment shall be covered or wrapped to protect them from moisture, dust and deterioration, as required or necessary. All on-site storage areas shall be approved in advance by the Owner and the Engineer.

3.04.4(2) Off-Site Storage

The Contractor may be required to provide offsite storage of equipment and materials to enable construction to occur at the Work site. The Contractor has full responsibility to secure all offsite storage areas, if needed, and shall include the costs for providing such storage areas in the bid Proposal for the individual equipment and material items requiring off-site storage. All off-site storage areas shall be enclosed or fenced and be secure.

3.04.5 DEFECTIVE MATERIALS, EQUIPMENT AND WORKMANSHIP

- (1) Materials, equipment, or workmanship which, in the opinion of the Owner or the Engineer, does not conform to the Contract or are in any other way unsatisfactory or unsuited to the purpose for which they are intended may be rejected. The Contractor shall remove from the Work site without delay, all rejected materials, equipment and work, and shall promptly replace the same in strict conformity with the requirements of the Contract. Unsatisfactory materials, equipment and workmanship may be rejected at any time, notwithstanding any previous testing, inspection or acceptance of such materials, equipment or workmanship, or inclusion thereof in any previously issued progress estimates.
- (2) If the Contractor fails to correct defective Work, equipment or materials, the Owner shall have the right to exercise any of the following options or any combination thereof:
 - a. The Owner may replace the defective Work, materials or equipment by purchase from or contract with any other parties at the expense of the Contractor, and in this event, the Owner shall be entitled without compensation to the Contractor, to the use of the defective Work or equipment for such reasonable time as is necessary to enable Owner to replace such defective Work, materials or equipment.
 - b. The Owner may elect to accept the defective Work, materials or equipment and issue a Change Order reflecting a credit against the Contract price, computed under the terms of the Contract in an amount to be determined by the Engineer, which amount shall reflect the actual value to the Owner of the accepted Work.

- c. Upon receipt of notice from the Owner of any defects in material, equipment or workmanship which appear within a two-year period following the Substantial Completion Date, or within any other warranty or guarantee period required by the Contract or provided by a manufacturer or supplier, the Contractor shall promptly and with the least possible delay and inconvenience to the Owner, repair or replace such defective workmanship, material or equipment without expense to the Owner.
- d. The Contractor shall be responsible for the full cost of correcting defective Work and complying with warranties and guarantees as required by the Contract. Direct or indirect costs, including administrative and engineering, incurred by the Owner attributable to correcting and remedying defective or unauthorized work, or Work the Contractor failed or refused to perform, shall be paid by the Contractor. Payment will be deducted by the Owner from monies due, or to become due, the Contractor. Such direct and indirect costs shall include in particular, but without limitation, compensation for additional professional services required, and costs for repair and replacement of work of others destroyed or damaged by correction, removal, or replacement of the Contractor's unauthorized work.
- e. All warranties, guarantees, and other obligations to correct work that does not comply with the Contract are material requirements of the Contract. The performance of all warranties, guarantees and other obligations shall be secured by the Performance Bond and the Public Works Payment Bond submitted by the Contractor at the time the Contract is signed.

3.04.6 CHANGES IN THE WORK

- (1) The Owner or the Engineer may, at any time, without notice to the Performance Bond or Public Works Payment Bond sureties, by written order designated or indicated to be a Change Order or Change Directive, make any change, including modifications to, additions to or deletions from the Work including, but not limited to, changes:
 - a. To the Contract Provisions and Contract Plans;
 - b. To quantities or performance of the Work;
 - c. To Owner-furnished facilities, equipment, materials, services or the Work site; or
 - d. To the schedule for the Work or the Contract Time.
- (2) A Change Order is an amendment to the Contract, which signifies changes in the scope of the Work, the Contract Time, and/or the Contract price. A Change Order shall be the complete expression of the agreement between the Owner and the Contractor. No claims or entitlement to an equitable adjustment or changes to the

Contract Time and/or Contract price will be allowed for alleged verbal or oral agreements or directives.

- (3) The Engineer will issue a written change order for any change. If the Engineer determines that the change increased or decreased the Contractor's costs or time to do any of the Work, the Engineer will make an equitable adjustment to the Contract. The equitable adjustment will be by agreement with the Contractor. However, if the parties are unable to agree, the Engineer will determine the amount of the equitable adjustment in accordance with Section 3.04.6(7) and adjust the time as the Engineer deems appropriate. Extensions of time will be evaluated in accordance with Section 3.04.15(2).

The Contractor shall proceed with the Work upon receiving:

1. A written change order approved by the Owner; or
2. An oral order from the Engineer before actually receiving the written change order.

Within 14 calendar days of delivery of the change order the Contractor shall endorse and return the change order, request an extension of time for endorsement or respond in accordance with Section 3.04.8. The Owner may unilaterally process the change order if the Contractor fails to comply with these requirements. Changes normally noted on field stakes or variation from estimated quantities, except as provided in Section 3.04.6(8), will not require a written change order. These changes shall be made at the unit prices that apply. The Contractor shall respond immediately to changes shown on field stakes without waiting for further notice.

The Contractor shall obtain written consent of the Surety or Sureties if the Engineer requests such consent.

- (4) All Change Orders will be prepared by the Owner or Engineer and executed in triplicate with one copy to the Owner, one to the Contractor, and one retained by the Engineer.
- (5) If the Contractor encounters any circumstances during the performance of the Work that the Contractor contends creates any entitlement to a change in the Contract Time, the Contract price, or both, the Contractor shall immediately provide written notice to the Engineer. Within 10 calendar days after providing written notice, the Contractor shall provide a written request to the Engineer for a change to the Contract Time and/or Contract price and provide detailed information supporting the request, including cost and schedule information.
- (6) No claim by the Contractor shall be allowed if the terms of this Section 3.04.6 are not strictly followed. In the event of any non-compliance, the Contractor shall be conclusively determined to have waived any claim or entitlement to an adjustment of the Contract Time or the Contract price.

- (7) The cost to be included in an adjustment for any changes to the Work, adjustment of the Contract Time or Contract price and any equitable adjustment or entitlement related to the Work or the Contract shall meet the notice provisions of Section 3.04.6, and will be determined strictly by one or a combination of the following methods:
- a. Contract unit bid prices previously agreed upon; or
 - b. If there are no unit bid prices, an agreed lump sum; or
 - c. If the amount of the adjustment cannot be agreed upon in advance or in the manner provided in subparagraph a or b above, the cost will be determined by the actual cost of:
 1. Labor including working foremen. Labor rates will only include the basic wage and fringe benefits, the current rates for Federal Insurance Compensation Act (FICA), Federal Unemployment Tax Act (FUTA) and State Unemployment Tax Act (SUTA), and the company's present rates for medical aid and industrial insurance premiums. Labor reimbursement calculations will be based on a "Labor List" (List) prepared and submitted by the Contractor and any Subcontractor before the Contractor commences force account Work. The Engineer may compare the List to payrolls and other documents and may at any time, require the Contractor to submit a new List.

In the event that an acceptable List is not received by the time that force account calculations are begun, the Engineer will develop a List unilaterally, utilizing the best data available.

2. Materials incorporated permanently into the Work;
3. The ownership or rental cost of equipment during the time of use on the extra work. Equipment rates shall be as set forth in the then current AGC/WSDOT Equipment Rental Agreement. These rates shall be full compensation for all costs incidental to furnishing and operating the equipment. The Contractor shall submit copies of the applicable portions of the AGC/WSDOT Equipment Rental Agreement to the Engineer. The rates listed in the Rental Rate Blue Book (as modified by the current AGC/WSDOT Equipment Rental Agreement) shall be full compensation for all fuel, oil, lubrication, ordinary repairs, maintenance, and all other costs incidental to furnishing and operating the equipment except labor for operation; plus

4. Overhead and Profit as follows:

For Work performed by the Contractor, an amount to be agreed upon but not to exceed 15 percent of the labor, material, and equipment cost agreed to by the Engineer as compensation for supervision, small tools, provisions for safety, home office and field overhead, profit and other general conditions expenses, including, but not limited to, insurance, bond and business and occupation taxes.

For Subcontractor Work, the Subcontractor will be allowed an amount to be agreed upon but not to exceed 15 percent of the labor, material, and equipment cost agreed to by the Engineer as compensation for supervision, small tools, provisions for safety, home office and field overhead, profit and other general conditions expenses, including, but not limited to, insurance, bond and business and occupation taxes. The Contractor will be allowed an additional markup of 10 percent to compensate the Contractor for all administrative costs, including home office and field overhead, profit, bonding, insurance, business and occupation taxes and any other costs incurred.

In no case will the total fixed fee for the Contractor and all Subcontractors of all tiers exceed 30 percent.

- (8) Payment to the Contractor will be made only for the actual quantities of Work performed and accepted in conformance with the Contract. When the accepted quantity of Work performed under a unit item varies from the original bid quantity, payment will be at the unit Contract price for all Work unless the total accepted quantity of any Contract item, adjusted to exclude added or deleted amounts included in change orders accepted by both parties, increases or decreases by more than 25 percent from the original bid quantity, and that bid item represents 10 percent or more of the total original Contract price. In that case, payment for Contract Work may be adjusted as described herein.

The adjusted final quantity shall be determined by starting with the final accepted quantity measured after all Work under an item has been completed. From this amount, subtract any quantities included in additive change orders accepted by both parties. Then, to the resulting amount, add any quantities included in deductive change orders accepted by both parties. The final result of this calculation shall become the adjusted final quantity and the basis for comparison to the original Proposal quantity.

- a. **Increased Quantities.** Either party to the Contract will be entitled to renegotiate the price for that portion of the adjusted final quantity in excess of 1.25 times the original Proposal quantity, if 10 percent or more of the original Contract price. The price for excessive increased quantities will be determined by agreement of the parties, or, where the parties cannot agree,

the price will be determined by the Engineer based upon the actual costs to perform the Work, including reasonable markup for overhead and profit. The final price will be determined by the Engineer.

- b. **Decreased Quantities.** Either party to the Contract will be entitled to an equitable adjustment if the adjusted final quantity of Work performed is less than 75 percent of the original Bid quantity, if 10 percent or more of the original Contract price. The Contractor shall submit the documentation to support the equitable adjustment to the Engineer. The equitable adjustment shall be based upon and limited to three factors:
1. Any increase or decrease in unit costs of labor, materials or equipment, utilized for Work actually performed, resulting solely from the reduction in quantity;
 2. Changes in production rates or methods of performing Work actually done to the extent that the nature of the Work actually performed differs from the nature of the Work included in the original plan; and
 3. An adjustment for the anticipated contribution to unavoidable fixed cost and overhead from the units representing the difference between the adjusted final quantity and 75 percent of the original plan quantity.

The following limitations shall apply to renegotiated prices for increases and/or equitable adjustments for decreases:

1. The equipment rates shall be actual cost but shall not exceed the rates set forth in the AGC/WSDOT Equipment Rental Agreement.
2. No payment will be made for extended or unabsorbed home office overhead and field overhead expenses to the extent that there is an unbalanced allocation of such expenses among the Contract Bid items.
3. No payment for consequential damages or loss of anticipated profits will be allowed because of any variance in quantities from those originally shown in the Proposal form, Contract Provisions, and Contract Plans.
4. The total payment (including the adjustment amount and unit prices for Work performed) for any item that experiences an equitable adjustment for decreased quantity shall not exceed 75 percent of the amount originally Bid for the item.

If the adjusted final quantity of any item does not vary from the quantity shown in the Proposal by more than 25 percent, then the Contractor and the Owner agree that all Work under that item will be performed at the original Contract unit price.

When ordered by the Engineer, the Contractor shall proceed with the Work pending determination of the cost or time adjustment for the variation in quantities.

The Contractor and the Owner agree that there will be no cost adjustment for decreases if the Owner has entered the amount for the item in the Proposal form only to provide a common Proposal for Bidders.

3.04.7 DIFFERING SITE CONDITIONS

The Contractor shall promptly, and before such conditions are disturbed, notify the Engineer in writing of: (1) pre-existing subsurface or latent physical conditions at the Work site that differ materially from those indicated in the Contract Documents, or (2) pre-existing unknown physical conditions at the Work site, of an unusual nature, that differ materially from those ordinarily encountered and generally recognized as inherent in the Work of the character required by the Contract. The Engineer shall be given an opportunity to examine such conditions in order to advise the Owner of possible modifications to the Work to mitigate such conditions. If the Engineer determines that conditions are materially different and cause a material increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, an equitable adjustment shall be made in the Contract Time and/or Contract price in accordance with other applicable provisions of the Contract relating to changes in the Work. Failure of the Contractor to give notice of such conditions at the time of discovery shall constitute a waiver of any claim for an equitable adjustment. Any such adjustments to the Contract price shall be computed strictly limited to amounts provided under paragraph 3.04.6.

3.04.8 PROTEST BY THE CONTRACTOR

If the Contractor disagrees with anything in a Change Order or a written directive, or with any interpretation or determination by the Engineer, the Contractor shall:

- a. Immediately submit a signed written notice of protest to the Engineer before doing the Work;
- b. Supplement the written protest within 14 calendar days with a written statement and supporting documents providing the following:
 1. The date and nature of the protested order, direction, instruction, interpretation or determination;
 2. A full discussion of the circumstances which caused the protest, including names of persons involved, time, duration, and nature of

the Work involved and a review of the Plans and Contract Provisions referenced to support the protest;

3. The estimated dollar cost, if any, of the protested Work and a detailed breakdown showing how that estimate was determined; and
4. An analysis of the progress schedule showing the schedule change or disruption if the Contractor is asserting a schedule change or disruption; and
5. If the protest is continuing, the information required above shall be supplemented upon request by the Engineer until the protest is resolved.

The Contractor shall keep detailed and complete records of extra costs and schedule impacts to Contract Time that in any way relate to a protest. The Contractor shall allow the Engineer to have access to all documents and records needed for evaluating the protest.

The Engineer will evaluate all protests that comply with this Section. If the Engineer determines that a protest is valid, the Engineer will adjust the Contract price and/or the Contract Time by an adjustment in accordance with Section 3.04.6 and 3.04.15(2).

During the time when any protest is pending, the Contractor shall proceed promptly with the Work, as the Engineer orders in writing.

The Contractor's failure to submit a protest in strict accordance with the requirements of this Section shall constitute a waiver of any claim for an adjustment to the Contract Time, the Contract price, or other relief.

3.04.9 SUBCONTRACTORS AND SUBCONTRACTS

3.04.9(1) Contractor Responsibility

Nothing contained in the Contract shall create any contractual or other relationship between the Owner and/or the Engineer and any Subcontractor or lower tier Subcontractor, and no performance undertaken by any such Subcontractor or lower tier Subcontractor shall, under any circumstances, relieve the Contractor of its obligations and responsibilities under the Contract.

Prior to subcontracting any Work, the Contractor shall verify that every first tier Subcontractor meets the responsibility criteria stated below at the time of subcontract execution. The Contractor shall include these responsibility criteria in every subcontract, and require every Subcontractor to:

1. Possess any electrical contractor license required by 19.28 RCW or elevator contractor license required by 70.87 RCW, if applicable;
2. Have a certificate of registration in compliance with Chapter 18.27 RCW;

3. Have a current State unified business identifier number;
4. If applicable, have:
 - a. Industrial insurance coverage for the Subcontractor's employees working in Washington (Title 51 RCW);
 - b. An employment security department number (Title 50 RCW);
 - c. A state excise tax registration number (Title 82 RCW).
5. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or RCW 39.12.065(3);
6. Verify these responsibility criteria for every lower tier subcontractor at the time of subcontract execution; and
7. Include these responsibility criteria in every lower tier subcontract.

3.04.9(2) Contractor Work Performance Requirement

Work done by the Contractor's own organization shall account for at least 30 percent of the awarded Contract price.

3.04.9(3) Approval of Subcontractors

The Contractor shall not subcontract Work unless the Engineer approves in writing. Each request to subcontract shall be on the form the Engineer provides. If the Engineer requests, the Contractor shall provide proof that the Subcontractor has the experience, ability, and equipment the Work requires. The Contractor shall require each Subcontractor to comply with Section 3.03.4 and to furnish all certificates and statements required by the contract. Approval of a Subcontractor by the Owner shall not relieve the Contractor or Subcontractor of any obligations or responsibilities under the Contract. Any delays or other impacts caused by the failure of the Contractor to provide required information and obtain approval of any Subcontractor in a timely manner will not be considered as justification for additional compensation or an extension of the Contract Time.

3.04.9(4) Subcontracts

Upon approval of Subcontractors by the Engineer, the Contractor shall, if requested, provide the Owner with complete copies of all subcontracts entered into between the Contractor and any Subcontractor. Providing requested subcontracts to the Owner shall be a condition precedent to the Owner's obligation to make any progress payment to the Contractor.

3.04.9(5) Incorporation of Contract

Every subcontract entered into by the Contractor shall expressly bind each Subcontractor to all of the terms and conditions of the Contract, which the Contractor shall incorporate into each

subcontract by reference. The Contractor shall provide a copy of the Contract to all Subcontractors and obtain written confirmation from Subcontractors that the Subcontractor received a copy of the Contract. All Subcontractors shall provide a copy of the Contract to all lower tier Subcontractors and obtain written confirmation from lower tier Subcontractors that the lower tier Subcontractor received a copy of the Contract.

3.04.9(6) Replacement of Subcontractors

Subject to the requirements of state and/or federal agencies having jurisdiction over MBE/WBE/DBE requirements applicable to the Work, should it become impossible for a Subcontractor to perform the Subcontractor's intended work, the Contractor shall submit the information required above for an alternate Subcontractor at least 10 days prior to the time that the Subcontractor is scheduled to begin work. The failure of any Subcontractor to perform its portion of the Work in a timely or workmanlike fashion is the sole responsibility of the Contractor.

3.04.10 MUTUAL RESPONSIBILITY OF CONTRACTORS

The Owner reserves the right to perform other work on or near the Work site using its own forces and/or other contractors. The Contractor shall take all reasonable steps to coordinate its performance of the Work with the Owner and/or such other contractors and Subcontractors. If, through acts of commission or omission on the part of the Contractor, any other contractor or any Subcontractor shall suffer loss or damage with respect to the other work being performed by the Owner, the Contractor agrees to promptly settle with such other Contractor or Subcontractor by agreement or other dispute resolution process. The Contractor agrees to indemnify and hold harmless the Owner and the Engineer from all claims asserted against and liability incurred by the Owner or the Engineer resulting from disputes between the Contractor and any other contractor or any Subcontractor or material supplier. The indemnification rights of the Owner and the Engineer include expenses such as, but not limited to, salaries/wages of employees and all other expenses relating to any mediation, litigation, or arbitration, including costs, consulting fees and attorneys' fees. If such other Contractor or Subcontractor shall assert any claim against the Owner on account of any damage alleged to have been sustained by an act or omission of the Contractor or anyone for whose acts it may be liable, the Owner or the Engineer shall notify the Contractor, which shall defend, indemnify and save harmless the Owner and the Engineer against such claim.

The coordination of the Work with other work by the Owner shall be taken into account by the Contractor as part of its site investigation obligations under Section 2.01.4, and all costs thereof shall be borne by the Contractor as part of the Contract price for the Work.

3.04.11 RISK OF LOSS

The Contractor shall have all risk of loss for all Work in progress, all materials, all equipment and all other items in any way relating to the Work through theft, fire, other casualty, act of God, or any other cause until the Contract Completion Date.

3.04.12 MEASUREMENT AND PAYMENT

3.04.12(1) General

The Contract price for the Work, whether lump sum or unit prices, shall constitute full compensation for furnishing all facilities, labor, materials, appurtenances, and incidentals and performing all operations necessary to construct and complete all items of the Work in accordance with the Contract, notwithstanding that minor or incidental features of the Work may not be shown on the Contract Plans or Contract Provisions.

3.04.12(2) Measurement

Measurement for all items shall be as specified in the Contract for unit price and lump sum price items.

3.04.12(3) Payment

Payment for all of the Work will be made at the lump sum or unit Contract price as set forth in the Contract. Payment of the Contract price shall constitute full compensation for the complete performance of all of the Work.

3.04.12(4) Access to Books and Records

The Contractor shall, whenever so requested, give the Owner and/or the Engineer access to all invoices, bills of lading and other documents relating to the Work. The Contractor shall, without charge, provide personnel and measures and scales with adequate capacity for measuring or weighing any materials or other items paid for on a unit price basis.

3.04.12(5) Progress Payment Estimates

Progress payment estimates shall be prepared by the Engineer and reviewed by the Contractor and will be submitted with the Engineer's recommendation to the Owner for its approval on the first day of the month for all Work completed through the 26th day of the preceding month, unless otherwise agreed upon by the Owner, the Engineer and the Contractor. The Engineer will prepare progress payment estimates as accurately as available information permits. The Owner will make no payment under the Contract for the Work performed until the "Statement of Intent to Pay Prevailing Wages," in accordance with RCW 39.12.040, is submitted to the Engineer, including Subcontractor wage rates. In general, each progress payment will be based upon the payment schedule and the value of Work performed during the preceding pay period. Before the final progress payment estimate is prepared, all quantities will be reviewed by the Engineer.

3.04.12(6) Payment for Materials on Hand

The Owner may reimburse the Contractor for 90 percent of the invoice amount of materials and equipment purchased before their incorporation into the Work if properly stored on or near the Work site. Invoices for equipment and materials will be verified and approved by the Engineer. Each invoice shall be sufficiently detailed to enable the Engineer to determine actual costs.

Payment for materials on hand shall not exceed the total Contract cost of the Contract item. Payment will not be made for granular materials, forming materials, consumables, nails, tie wire, etc. Payment will not be made for materials for any invoice that is less than \$2,000.00 or for freight bills and similar items. Payment for equipment or materials on hand shall not constitute acceptance of the equipment or materials. Equipment and materials will be rejected if found to be faulty, even if payment for it has been made.

3.04.12(7) Payments Withheld

The Engineer may decide not to recommend approval of all or a portion of a progress estimate, and/or the Owner may decide to withhold from a progress estimate an amount sufficient to protect the Owner from loss because of:

- a. Defective Work not remedied;
- b. Third-party claims or reasonable evidence indicating the probability that a third-party claim will be asserted;
- c. Failure of the Contractor to make timely and proper payments to Subcontractors or for labor, materials or equipment;
- d. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract price;
- e. Damage to the Owner or another contractor;
- f. Reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance of the Contract price will not be adequate to cover actual or liquidated damages for the anticipated delay;
- g. Repeated failure by the Contractor to comply with the directions of the Owner or the Engineer or to carry out the Work in accordance with the Contract;
- h. Other appropriate reasons necessary to protect the Owner.

3.04.12(8) Payment Upon Correction of Deficiencies

When the reason or reasons for withholding payment are resolved, payment will be made for amounts previously withheld.

3.04.12(9) Final Payment

After final inspection (Section 3.04.16(2)) of the Work and a determination by the Engineer that the Physical Completion Date has been achieved, the balance of the Contract price due to the Contractor will be paid based upon the final estimate by the Engineer and presentation of a Final Contract Voucher Certification signed by the Contractor. The Final Contract Voucher Certification shall be deemed to be a release of all claims of the Contractor unless a claim is filed

in accordance with the requirements of Section 3.05 and is expressly excepted from release in the Contractor's Final Contract Voucher Certification. The date the Owner signs the Final Contract Voucher Certification constitutes the Contract Completion Date in accordance with Section 3.04.16(3).

If the Contractor fails, refuses, or is unable to sign and return the Final Contract Voucher Certification or any other documentation required in order to achieve the Contract Completion Date, the Owner reserves the right to establish a completion date (for the purpose of meeting the requirements of RCW 39.08 and RCW 60.28) and unilaterally accept the Work. Unilateral final acceptance will occur only after the Contractor has been provided the opportunity, by written request from the Engineer, to voluntarily submit such documents. If voluntary compliance is not achieved, formal notification of the impending establishment of a completion date and unilateral final acceptance will be provided by certified letter from the Owner to the Contractor, which will provide 30 calendar days for the Contractor to submit the necessary documents. The 30 calendar day period will begin on the date the certified letter is received by the Contractor. The date on which the Owner unilaterally signs the Final Contract Voucher Certification shall constitute the Contract Completion Date under Section 3.04.16(3). The Owner shall have the right to unilaterally establish a Contract Completion Date when either (1) the Physical Completion Date for the Work has been achieved in accordance with Section 3.04.16(2), or (2) the Owner terminates the contract in accordance with Section 3.07. Unilateral establishment of the Contract Completion Date by the Owner shall not in any way relieve the Contractor of any liability for failing to comply with the Contract or from responsibility for compliance with all federal, state, tribal, or local laws, ordinances, and regulations that affect the Work.

Payment to the Contractor of partial or final payment estimates and retained percentages shall be subject to applicable laws.

3.04.13 WORK HOURS

Except in the case of emergency or unless otherwise approved by the Owner, the normal straight time working hours for the Contract shall be any consecutive 8-hour period between 7:00 a.m. and 6:00 p.m. of a working day with a maximum 1-hour lunch break and a 5-day work week. The normal straight time 8-hour working period for the Contract shall be established at the preconstruction conference or prior to the Contractor commencing the Work.

Written permission from the Engineer is required, if a Contractor desires to perform Work on holidays, Saturdays, or Sundays; before 7:00 a.m. or after 6:00 p.m. on any day; or longer than an 8-hour period on any day. The Contractor shall apply in writing to the Engineer for such permission, no later than noon on the working day prior to the day for which the Contractor is requesting permission to work.

Permission to work between the hours of 10:00 p.m. and 7:00 a.m. during weekdays and between the hours of 10:00 p.m. and 9:00 a.m. on weekends or holidays may also be subject to noise control requirements. Approval to continue work during these hours may be revoked at any time the Contractor exceeds the Owner's noise control regulations or complaints are received from the public or adjoining property owners regarding the noise from the Contractor's operations. The

Contractor shall have no claim for damages or delays should such permission be revoked for these reasons.

Permission to work Saturdays, Sundays, holidays, or other than the agreed upon normal straight time working hours Monday through Friday may be given subject to certain other conditions set forth by the Owner or Engineer. These conditions may include but are not limited to:

- The Engineer may require designated representatives to be present during the Work. Representatives who may be deemed necessary by the Engineer include, but are not limited to: survey crews; personnel from the Owner's material testing lab; inspectors; and other Owner employees when in the opinion of the Engineer, such Work necessitates their presence.
- Requiring the Contractor to reimburse the Owner all the costs in excess of straight time costs for the Owner's representatives who work during such times. These costs shall be deducted from amounts due or to become due to the Contractor.
- Considering the Work performed on Saturdays, Sundays, and holidays as working days with regard to the Contract Time.
- Considering multiple work shifts as multiple working days with respect to Contract Time, even though the multiple shifts occur in a single 24-hour period.

3.04.14 CONTRACT TIME

The Contract Time shall begin on the first working day following the 10th calendar day after the issuance of the written Notice to Proceed or the first day on which the Contractor begins to perform Work on the site, whichever occurs first. Time is of the essence of the Contract. All of the Work shall be completed within the time limits set forth in the Contract, and the Contractor's unexcused failure to do so shall result in the assessment of liquidated damages as provided in the Contract.

The Contractor shall complete all of the physical Work within the number of working days that are specified as the Contract Time. Every day will be counted as a working day unless it is a non-working day or the Engineer determines the day to be an unworkable day. A non-working day is a Saturday, a Sunday, a day on which the Contract suspends work, or one of the following holidays: January 1st; the third Monday of January; the third Monday of February; Memorial Day; June 19th; July 4th; Labor Day; November 11th; Thanksgiving Day; the day after Thanksgiving; and Christmas. Whenever any of these holidays falls on a Sunday, the following Monday shall be counted a non-working day. When the holiday falls on a Saturday, the preceding Friday shall be counted a non-working day.

The days between December 25th and January 1st will be classified as nonworking days, provided that the Contractor actually suspends performance of the Work.

An unworkable day is defined as a partial or whole day that the Engineer determines to be unworkable because of weather, conditions caused by the weather, or such other conditions beyond the control of the Contractor that prevent the satisfactory and timely performance of the Work, and

such performance, if not hindered, would have otherwise progressed toward physical completion of the Work.

Each working day shall be charged to the Contract Time as it occurs until the Work is physically complete. If requested by the Contractor in writing, the Engineer will provide the Contractor with a weekly statement that shows the number of working days: (1) charged to the Contract Time the week before; (2) specified for the substantial and physical completion of the Contract Time; and (3) remaining to achieve the substantial and physical completion of the Contract. The statement will also show the nonworking days and any partial or whole days that the Engineer declares to be unworkable. If the Contractor disagrees with any statement issued by the Engineer, the Contractor shall submit a written protest within 10 calendar days after the date of the statement. The protest shall be sufficiently detailed to enable the Engineer to ascertain the basis for the dispute and amount of time disputed. Any statement that is not protested by the Contractor as required in this Section shall be deemed as having been accepted as correct. If the Contractor elects to work 10 hours a day 4 days a week (a 4-10 schedule), the fifth day of that week will be charged as a working day if that day would be chargeable as a working day if the Contractor had not elected to utilize a 4-10 schedule.

3.04.15 CONSTRUCTION SCHEDULE

3.04.15(1) Progress Schedule

- a. The Contractor shall submit to the Engineer four copies of a progress schedule no later than at the preconstruction conference, or some other mutually agreed upon submittal time. The schedule shall be a critical path method (CPM) schedule, bar chart, or other standard schedule format unless otherwise specified in the Technical Specifications. Regardless of which format is used, the schedule shall identify the critical path. The Engineer will evaluate the schedule and return the schedule for corrections. No progress payments will be made until the required progress schedules have been submitted in a form acceptable to the Engineer.
- b. Scheduling terms and practices shall conform to the standards established in Construction Planning and Scheduling, Second Edition, published by the Associated General Contractors of America. Except for Weekly Look-Ahead Schedules, all schedules shall meet these general requirements, and provide the following information:
 - i. Show the construction start date.
 - ii. Include all activities necessary to physically complete the Work on the project.
 - iii. Show the planned order of Work activities in a logical sequence.
 - iv. Show the durations of Work activities in working days as defined in Section 3.04.13 and 3.04.14.

- v. Show activities in durations that are reasonable for the intended Work.
- vi. Define activity duration in sufficient detail to evaluate the progress of individual activities on a daily basis.
- vii. Show the Substantial and Physical Completion of all Work within the Contract Time.

Total float belongs to the project and shall not be for the exclusive benefit of any party. If the Engineer determines that the Progress Schedule or any necessary Schedule Update does not provide the required information, then the schedule will be returned to the Contractor for correction and resubmittal.

- c. Each week the Work is performed, the Contractor shall submit a Weekly Look-Ahead Schedule showing the Contractor's and all the Subcontractors' proposed Work activities for the next two weeks. The Weekly Look Ahead Schedule shall include the description, duration and sequence of Work, along with the planned hours of Work. This schedule may be network schedule, bar chart, or other standard schedule format. The Weekly Look-Ahead Schedule shall be submitted to the Engineer by the mid-point of the week preceding the scheduled Work or some other mutually agreed upon submittal time.
- d. The Engineer may request a Schedule Update when any of the following events occur:
 - i. The project has experienced a change that affects the critical path.
 - ii. The sequence of Work is changed from that in the approved schedule.
 - iii. The project is significantly delayed.
 - iv. Upon receiving an extension of Contract Time.

The Contractor shall submit four copies of the Schedule Update within 15 calendar days of receiving a written request, or when an update is required by any other portion of the Contract. A "significant" delay in time is defined as 10 working days or 10 percent of the original Contract Time, whichever is greater.

In addition to the other requirements in this Section, Schedule Updates shall reflect the following information:

- v. The actual duration and sequence of as-constructed Work activities, including changed Work.
- vi. Approved time extensions.

- vii. Any construction delays or other conditions that affect the progress of the Work.
- viii. Any modifications to the as-planned sequence or duration of remaining activities.
- ix. The Substantial and Physical Completion of all remaining Work in the remaining Contract Time.

Unresolved request for time extensions shall be reflected in the Schedule Update by assuming no time extension will be granted, and by showing the effects to follow-on activities necessary to substantially and physically complete the project within the currently authorized time for completion.

- e. The original Progress Schedule and all Schedule Updates shall not conflict with any time and order-of-work requirement in the Contract.
- f. If the Engineer deems that the original or any necessary supplemental progress schedule does not provide the information required in this section, the Owner may withhold progress payments until a schedule containing the required information has been submitted by the Contractor and accepted by the Engineer.
- g. The Contractor shall comply with other progress schedule requirements that are further defined in the Technical Specifications.
- h. The Engineer's approval of any schedule shall not transfer any of the Contractor's responsibilities to the Owner. The Contractor alone shall remain responsible for adjusting forces, equipment, and work schedules to ensure completion of the Work within the time(s) specified in the Contract.

3.04.15(2) Extensions of the Contract Time

- a. The Contractor specifically waives claims for damages for any hindrance or delay, excepting unreasonable delays caused by the Owner. In lieu thereof, the Contractor will be granted equitable extensions of the Contract Time for which liquidated damages will not otherwise be claimed by the Owner under the following circumstances:
 - i. A delay caused by any suit or other legal action against the Owner will entitle the Contractor to an equivalent extension of time, unless the period of such delay exceeds 90 calendar days. When such period is exceeded, the Owner will, upon written request of the Contractor, either negotiate a termination of the Contract or grant a further extension of the Contract Time, whichever is in the best interests of the Owner.
 - ii. Should any other unforeseen condition occur that is beyond the reasonable control of Contractor, requires more time for the Contractor to complete the

performance of the Work by the Substantial Completion Date, the Contractor shall notify the Owner and the Engineer in writing prior to the performance of such Work, and in any event within 10 calendar days after the occurrence of the unforeseen condition. The notice shall set forth in detail the Contractor's estimate of the required time extension. The Owner will allow such equitable extension of the Contract Time that the Engineer determines to be appropriate. Failure to comply with the notice provisions required by the Contract shall be deemed a complete waiver of any entitlement to adjustment of the Contract Time.

3.04.15(3) Liquidated Damages

- a. The Contractor acknowledges that the Owner will suffer monetary damages in the event of an unexcused delay in the Substantial Completion Date and the Physical Completion Date of the Work. If the Contractor fails, without excuse under the Contract, to complete the Work within the Contract Time, or any proper extension thereof granted by the Owner, the Contractor agrees to pay to the Owner the amount specified in the Proposal form, not as a penalty, but as liquidated damages for such breach of the Contract, for each day that the Contractor shall be in default after the time stipulated for the Substantial Completion Date and the Physical Completion Date of the Work.
- b. The amount of liquidated damages is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amount is specifically agreed to be a reasonable approximation of damages that the Owner would sustain as a result of an unexcused delay in the Substantial Completion Date and the Physical Completion Date; said amount may be retained from time to time by the Owner from current progress payments.

3.04.16 COMPLETION AND ACCEPTANCE OF THE WORK

3.04.16(1) Substantial Completion Date

- a. When the Contractor considers the Work to be substantially complete and ready for its intended purpose, the Contractor shall notify the Engineer in writing and include an itemized list of remaining Work to be completed. On the Substantial Completion Date, the Owner shall have full and unrestricted use and benefit of all of the facilities that comprise the Work, both from an operational and safety standpoint, with only minor incidental work, replacement of temporary substitute facilities, or correction or repair of work remaining for the physical completion of the total Work.
- b. If the Engineer determines that the Work is not substantially complete, it will so notify the Contractor in writing identifying those items of the Work that shall be completed by the Contractor in order to achieve the Substantial Completion Date.

- c. If the Engineer believes that the Work is substantially complete, the Engineer will meet with the Contractor to: (1) prepare a list of incomplete or unsatisfactory items of the Work that shall be completed or corrected; (2) define the division of responsibility between Owner and Contractor with respect to security, operation, maintenance, heat, utilities, insurance, etc., for the facilities; and (3) describe any other issues related to approval of the substantially completed Work. Upon reaching agreement with the Contractor, the Engineer will notify the Owner that, in its opinion and based on the information supplied by the Contractor, the Work is substantially complete, listing the items of incomplete Work, defining the division of responsibilities for the facilities, and setting forth any other terms related to final completion and acceptance.
- d. The Owner, who has sole authority to make the determination of the Substantial Completion Date, will review the Engineer's recommendation that the Work is substantially complete and, if it concurs, will instruct the Engineer to notify the Contractor that the Work is accepted as being substantially complete. Except for any portion(s) of Work specified for early completion or required by the Owner for early possession, substantial completion will not occur for any portion of the Work until the entire Work is ready for possession and use. The approval notice will include a list of incomplete Work items, establish the Substantial Completion Date, and describe any other terms relating to such approval. The Contractor shall acknowledge receipt of the approval notice in writing, indicating acceptance of all of its terms and provisions.
- e. The date of Substantial Completion, as determined by the Engineer and agreed to by the Owner, shall be the date for the beginning of the warranty period.
- f. Subsequent to the Substantial Completion Date, the Owner may exclude the Contractor from the Work during such periods when construction activities might interfere with the operation of the project. The Owner, however, shall allow the Contractor reasonable access for completion of incomplete punch list items.

3.04.16(2) Physical Completion Date

- a. The Contractor shall complete all physical Work within the Contract Time.
- b. Upon physical completion of the Work, including completion of all corrective Work described in Section 3.04.16(1) above and the submission of all required record drawings, operation and maintenance manuals, manufacturers' affidavits, software and programming, and other items required by the Contract, the Contractor shall notify the Engineer in writing that the Work is physically complete. Upon receipt of the notification, the Engineer will determine if the Work is physically complete in accordance with the Contract. If the Engineer determines that any materials, equipment, or workmanship do not meet the requirements of the Contract, the Engineer will prepare a list of such items and submit it to the Contractor. Following the satisfactory completion of the corrective Work by the

Contractor, the Engineer will notify the Owner that the Work is physically complete in accordance with the requirements of the Contract.

- c. The Engineer, with the concurrence of the Owner, will give the Contractor written notice of the Physical Completion Date for all of the Work. The Physical Completion Date shall not constitute the Owner's acceptance of the Work.

3.04.16(3) Contract Completion Date (Acceptance of the Project)

- a. When all of the Contractor's obligations under the Contract have been performed satisfactorily, the Owner will provide the Contractor with written notice of the Contract Completion Date. The following events shall occur in order for the Contractor to achieve the Contract Completion Date:
 - 1. The Contractor shall have achieved the Substantial Completion Date and the Physical Completion Date for the Work; and
 - 2. The Contractor shall furnish all documentation required by the Contract and required by law. The documents shall include, but are not limited to, the following:
 - i. Complete and legally effective releases and/or waivers of liens or bond or retainage claims in a form acceptable to the Owner. Subject to prior approval of the Owner, the Contractor may, if approved by the Owner, submit in lieu of the lien or claims releases and waivers: (1) receipts showing payment of all accounts in full; (2) an affidavit that the release and receipts cover all labor, services, materials, and equipment for which a lien or other claim could be filed and that all payrolls, material, and equipment bills and other indebtedness connected with the Work for which the Owner or the Owner's property might in any way be responsible, have been paid; and (3) the consent of the surety, if any, to final payment. If any Subcontractor or supplier fails to furnish a release waiver or receipt in a form satisfactory to the Owner, the Contractor may be permitted by the Owner to furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any lien or similar claim;
 - ii. Certified Payrolls (Federal Aid projects or if requested);
 - iii. Final Contract Voucher Certification.
 - iv. Affidavits of Wages Paid for the Contractor and all Subcontractors must be submitted to the Owner.
- b. The Contractor agrees that neither completion nor final acceptance shall relieve the Contractor of the responsibility to indemnify, defend, and protect the Owner against any claim or loss resulting from the failure of the Contractor (or the Subcontractors

or lower tier Subcontractors) to pay all laborers, mechanics, Subcontractors, materialpersons, or any other person who provides labor, supplies, or provisions for carrying out the Work or for any payments required for unemployment compensation under Title 50 RCW or for industrial insurance and medical aid required under Title 51 RCW.

Final acceptance shall not constitute acceptance of any unauthorized or defective work or material. The Owner shall not be barred from requiring the Contractor to remove, replace, repair, or dispose of any unauthorized or defective work or material or from recovering damages for any such work or material.

3.04.16(4) Use of Completed Portions of the Work

The Owner reserves the right to use and occupy any portion of the Work which has been completed sufficiently to permit partial use and occupancy, and such partial use and occupancy shall not be construed as an acceptance of the Work as a whole or any part thereof. Any claims that the Owner may have against the Contractor shall not be deemed to have been waived by such partial use and occupancy.

3.04.16(5) Waiver of Claims by Contractor

The Contractor's acceptance of the final payment from the Owner constitutes an irrevocable and complete waiver of any and all claims against the Owner under the Contract or otherwise arising from the Work, except for those claims that have been properly identified in writing in advance of final payment, and for which timely and sufficient prior written notice has been given, all in accordance with the Contract.

3.04.17 CORRECTION OF FAULTY WORK AFTER FINAL PAYMENT

The Owner's final payment to the Contractor shall not relieve the Contractor of responsibility for faulty materials, equipment or workmanship. The Contractor shall promptly repair or replace any such defects discovered within the warranty or other applicable limitations period.

3.04.18 RETAINAGE

1. Pursuant to RCW 60.28, there will be retained from monies earned by the Contractor on progress estimates a sum not to exceed 5 percent of the monies earned by the Contractor. Such retainage shall be used as a trust fund for the protection and payment (1) to the State with respect to taxes imposed pursuant to RCW Title 82, which may be due from such Contractor, and (2) the claims of any other person or entity arising under the Contract or RCW 60.28.
2. Monies retained pursuant to RCW 60.28 shall, at the option of the Contractor, be:
 - a. Retained in a fund by the Owner;

- b. Deposited by the Owner in an interest-bearing account in a bank, mutual savings bank, or savings and loan association (interest on monies so retained may be paid to the Contractor);
- c. Deposited by the Owner in an escrow (interest-bearing) account in a bank, mutual saving bank, or savings and loan association (interest on monies so retained shall be paid to the Contractor). Deposits are to be in the name of the Owner and are not to be allowed to be withdrawn without the Owner's written authorization. The Owner will issue a check representing the sum of the monies reserved, payable to the bank or trust company;
- d. In choosing option (b) or (c), the Contractor agrees to assume full responsibility to pay all costs which may accrue from escrow services, brokerage charges or both, and further agrees to assume all risks in connection with the investment of the retainage in securities.

At the time the Contract is executed the Contractor shall designate the option desired.

- 3. Release of retainage will be made within the statutory period following the last date for filing of claims pursuant to RCW Chapter 60.28, provided that the following conditions are met:
 - a. A release has been obtained from the Washington State Department of Revenue;
 - b. A "Certificate of Payment of Contributions Penalties and Interest on Public Works Contract" is received from the Washington State Employment Security Department;
 - c. The Washington State Department of Labor and Industries indicates the Contractor is current on the payment of industrial insurance and medical aid premiums;
 - d. All claims by the Owner against the Contractor have been resolved;
 - e. No claims have been filed against the retained percentage;
 - f. All required "Affidavits of Wages Paid" are on file with the Owner for the Contractor and all Subcontractors, regardless of tier;
- 4. In the event that claims are filed against the retainage, the Contractor will be paid the retained percentage less an amount sufficient to pay all such claims, together with a sum determined by the Owner to be sufficient to pay the costs of foreclosing on claims and to attorneys' fees, all in accordance with applicable law.

3.05 DISPUTES AND CLAIMS

3.05.1 DISPUTES

When disputes occur, the Contractor shall pursue resolution through the Engineer. The Contractor shall follow the notice and protest procedures outlined in Section 3.04. If negotiation using the procedures outlined in Section 3.04 fails to provide satisfactory resolution, the Contractor shall pursue the more formalized method set forth in Section 3.05.2 for submitting claims.

3.05.2 CLAIMS

If the Contractor contends that additional payment is due, has provided timely notices and protests as required by Section 3.04, and the Contractor has pursued and exhausted all of the means provided in that section to resolve the dispute, the Contractor may submit a claim as provided in this Section. Any claim for an increase in the Contract price or for an extension of the Contract Time by the Contractor is waived if the written notifications and protests required in Section 3.04 have been not provided, or if the Engineer is not afforded reasonable access to the Contractor's complete records relating to the claim, as required by Section 3.04.8, or if a claim is not submitted in accordance with the requirements of this Section. The fact that the Contractor has provided proper notification, properly submitted a claim, or provided the Engineer with access to records, shall not in any way be construed as proving or substantiating the validity of the claim. If, after consideration by the Owner, the claim is found to have merit, the Owner will make an equitable adjustment to either the Contract price, the Contract Time, or both. If the Owner finds the claim to be without merit, no adjustment will be made.

All claims submitted by the Contractor shall be in writing and in sufficient detail to enable the Engineer to ascertain the basis for and amount of the claim. All claims shall be submitted to the Engineer in the manner in Section 3.03.6. The following information shall accompany each claim submitted:

1. A detailed factual statement of the basis for the claim for additional compensation and/or extension of time, including all relevant dates, locations, and items of work relating to the claim.
2. The date on which the events occurred that give rise to the claim.
3. The name of each person involved in or having knowledge about the claim.
4. The specific provisions of the Contract which support the claim and a statement of the reasons why such provisions support the claim.
5. If the claim relates to a decision of the Engineer that the Contract leaves to the Engineer's discretion or as to which the Contract provides that the Engineer's decision is final, the Contractor shall set out in detail all facts supporting its position relating to the decision of the Engineer.

6. The identification of any documents and the substance of any oral communications that support the claim.
7. Copies of any identified documents, other than Owner documents and documents previously furnished to the Owner by the Contractor, that support the claim (manuals which are standard to the industry may be included by reference).
8. If an extension of the Contract Time is sought:
 - a. The specific days and dates for which the extension is sought;
 - b. The specific reasons why the Contractor believes a time extension should be granted;
 - c. The specific provisions of Section 3.04.15(2) under which the time extension is sought; and
 - d. An analysis of the Contractor's progress schedule, demonstrating the reasons why a time extension should be granted.
9. If additional compensation is sought, the exact amount sought and a breakdown of that amount into the following categories:
 - a. Labor;
 - b. Materials;
 - c. Direct equipment. The actual cost for each piece of equipment for which a claim is made, or, in the absence of actual cost, the rates established by the AGC/WSDOT Equipment Rental Agreement which was in effect when the Work was performed. The amounts claimed for any piece of equipment shall not exceed the rates established by the Equipment Rental Agreement, even if the actual cost for such equipment is higher. The Owner may audit the Contractor's cost records, as provided in Section 3.06, to determine actual equipment costs. The following information shall be provided for each piece of equipment:
 - i. Detailed description (e.g., make, model, year, diesel or gas, size of bucket);
 - ii. The hours of use or standby; and
 - iii. The specific day and dates of use or standby.
 - d. Subcontractor claims (in the same level of detail as specified herein); and
 - e. Other information as requested by the Engineer or the Owner.

10. A notarized statement containing the following language:

Under the penalty of law for perjury or falsification, the undersigned,

_____, _____
(name) (title)

of _____
(company)

hereby certifies that the claim for extra compensation and time, if any, made herein for work on this Contract is a true statement of the actual costs incurred and time sought, and is fully documented and supported under the Contract between the parties.

If the claim for extra time and/or compensation involves any work of a Subcontractor or lower tier Subcontractor, the undersigned duly authorized agent of the Contractor hereby swears that Contractor has investigated the basis for the Subcontractor's or lower tier Subcontractor's claims and has determined that all such claims are justified as to entitlement and amount of money and/or time requested, has reviewed and verified the adequacy of all back-up documentation and has no reason to believe and does not believe that the factual basis for the Subcontractor's or lower tier Subcontractor's claim is falsely represented.

Dated _____/s/_____

Subscribed and sworn before me this _____ day of _____

Notary Public

My Commission Expires:_____

It will be the responsibility of the Contractor to keep full and complete records of the costs and additional time incurred with respect to any claim. The Contractor shall permit the Engineer to have access to those records and any other records and documents as may be required by the Engineer to determine the facts or contentions involved in the claim. The Contractor shall retain all records and documents in any way relating to the Work for a period of not less than three years after the Contract Completion Date.

The Contractor shall in good faith attempt to reach a negotiated resolution of all claims with the Engineer or its designee.

The Contractor's failure to submit with the Final Contract Voucher Certification a list of all claims, together with the information and details required by this Section shall operate as a waiver of the claims by the Contractor, as provided in

Section 3.04.12(9).

If the Contractor submits a claim in full compliance with all the requirements of this Section, the Owner will respond in writing to the claim as follows:

1. Within 45 calendar days from the date the claim is received by the Owner, if the claim amount is less than \$100,000;
2. Within 90 calendar days from the date the claim is received by the Owner, if the claim amount is equal to or greater than \$100,000; or
3. If these time periods are unreasonable due to the complexity of the claim, the Contractor will be notified within 15 calendar days from the date the claim is received by the Owner of the amount of time which will be necessary for the Owner to evaluate the claim and issue a response.

Full compliance by the Contractor with the provisions of this Section is a condition precedent to the Contractor's right to commence a lawsuit or pursue other legal remedies.

3.05.3 TIMELINE AND JURISDICTION

For the convenience of the parties to the Contract it is mutually agreed by the parties that any claims or causes of action which the Contractor has against the Owner arising from the Contract shall be brought within 180 calendar days from the date of Physical Completion (Section 3.04.16(2)) of the Contract by the Owner; and it is further agreed that any such claims or causes of action shall be brought only in the Superior Court of the county where the Owner headquarters is located, provided that where an action is asserted against a county, RCW 36.01.05 shall control venue and jurisdiction. The parties understand and agree that the Contractor's failure to bring suit within the time period provided, shall be a complete bar to any such claims or causes of action. It is further mutually agreed by the parties that when any claims or causes of action which the Contractor asserts against the Owner arising from the Contract are filed with the Owner or initiated in court, the Contractor shall permit the Owner to have timely access to any records deemed necessary by the Owner to assist in evaluating the claims or action.

3.05.4 CONTINUATION OF WORK PENDING RESOLUTION OF DISPUTES

The Contractor shall expeditiously carry on the Work, adhere to the progress schedule, and comply with all written directives of the Owner or the Engineer regardless of any dispute or claim that may exist between the Owner and the Contractor. No Work shall be delayed or postponed pending resolution of any dispute or claim. Failure or refusal of the Contractor to comply with the written directives of the Owner or the Engineer shall constitute a material breach of the Contract and immediately constitute grounds for the Owner to withhold payments to the Contractor, suspend the Work or terminate the Contract. Notice under this Section shall be in accordance with other provisions of the Contract.

3.06 AUDITS

If the Contractor requests an equitable adjustment to either the Contract price or the Contract Time, the Owner shall have the right to audit the Contractor's books, records, other documents, and accounting practices and procedures, and to inspect the Contractor's plant, equipment and facilities to examine all facts and verify all direct and indirect costs of whatever nature claimed to have been incurred or are anticipated to be incurred. The right to audit encompasses all subcontracts and is binding upon Subcontractors. All subcontracts that the Contractor enters into shall contain a clause allowing the Owner to audit all Subcontractor books, records, other documents, and accounting practices and procedures, and to inspect the Subcontractor's plant, equipment and facilities. All audits shall be performed by auditors of the Owner during normal working hours at the Contractor's or Subcontractor's office or any other location mutually agreed upon. The Contractor, Subcontractor, or lower tier Subcontractor shall cooperate fully with the auditor and shall make available all required information. Failure to cooperate or provide requested information shall be grounds for denial of the claim.

3.07 SUSPENSION OF WORK AND TERMINATION OF CONTRACT

3.07.1 SUSPENSION OF WORK

1. The Owner or the Engineer may order suspension of all or any part of the Work if:
 - a. Unsuitable or other conditions that are beyond the reasonable control of the Contractor exist or arise that prevent satisfactory and timely performance of the Work; or
 - b. The Contractor does not comply with the Contract; or
 - c. It is in the public interest.
2. If the Engineer determines that the suspension is for reasons set forth in Subsection a. or c. above, an equitable adjustment will be made in the Contract Time but not the Contract price. If the Engineer determines that the suspension is for reasons set forth in Subsection b. above, no adjustment shall be made in the Contract Time or the Contract price.
3. If the Contract is suspended for reasons set forth in Subsection a. or c. above and the Contractor believes that the suspension of performance of all or part of the Work has continued for an unreasonable period of time, the Contractor shall give written notice to the Engineer of its intention to seek an equitable adjustment in the Contract Time or the Contract price. In the event that an equitable adjustment is allowed, no adjustment shall be allowed for any time lost or costs incurred more than 10 calendar days before delivery of the written notice to the Engineer. No profit of any kind will be allowed on any increase in costs due to the suspension, delay or interruption.

3.07.2 TERMINATION FOR DEFAULT

1. The Owner may terminate the Contract for default, effective seven days following delivery of written notice of default to the Contractor, if the Contractor:
 - a. Refuses or fails to supply enough properly skilled laborers or conforming materials to complete the Work in a timely manner;
 - b. Refuses or fails to prosecute the Work with such diligence as will ensure its physical completion by the Physical Completion Date;
 - c. Performs work which deviates from the requirements of the Contract and refuses or fails to correct the non-conforming work;
 - d. Fails to make prompt payment to Subcontractors and/or suppliers for labor or materials;
 - e. Fails to comply with laws, ordinances, rules, regulations or orders of a public authority having jurisdiction; or
 - f. Otherwise fails to follow written directives of the Owner or the Engineer or is in default of a material provision of the Contract.
2. If the Contractor abandons the Work for any cause other than failure of the Owner to make monthly progress payments for Work properly performed, or if the Contractor refuses to comply with requirements of the Contract, the Owner has the additional right to notify the Contractor's performance bond surety and require the surety to complete the Work in accordance with the Contract.

3.07.3 TERMINATION FOR CONVENIENCE OF THE OWNER

The Owner may by written notice terminate the Contract at any time in whole or in part, without cause, and except where termination is due to the Contractor's default, the Owner shall pay the Contractor that portion of the Contract price corresponding to the acceptable Work completed to the Owner's satisfaction, together with reasonable costs, as determined in the sole discretion of the Owner, necessarily incurred by the Contractor in terminating the remaining portion of Work, less any payments made before termination. In no event shall the Owner be required to pay the Contractor any amount in excess of the completed portion Contract price. The Owner shall not be required to pay the Contractor any amount for consequential damages including but not by means of limitation lost or anticipated profits on Work that is not performed as a result of termination.

3.07.4 RESPONSIBILITY OF THE CONTRACTOR AND SURETY

Termination of the Contract shall not relieve the Contractor of any responsibilities under the Contract for Work performed. Nor shall termination of the Contract relieve the sureties of their obligations under the bonds required or permitted by the Contract or applicable law.

PART 4

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

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DIVISION 1

GENERAL TECHNICAL REQUIREMENTS

SECTION 01110

SUMMARY OF WORK

PART 1 GENERAL

1.1 SCOPE OF WORK

The work specified in this Section consists of furnishing all labor, materials, and equipment necessary for construction of the Wastewater Treatment Plant Generator, as shown on the Plans, and hereinafter specified, at the existing wastewater treatment plant site. Work shall include, but not be limited to, the following:

- A. Complete required site grading.
- B. Furnish and install emergency generator and all required electrical, instrumentation, and telemetry work required for a complete and workable system as shown on the Plans, and as specified herein.
- C. Restore all surfaces disturbed by construction activities.
- D. Provide testing, commissioning, and training as specified herein.

1.2 PROJECT INFORMATION

The Contract Documents show the location, arrangement, and type of work to be performed under the proposed project.

The Contractor shall be responsible for proper notification to and coordination with all utility districts, service districts, and all other persons and services that will be affected by this project at least one week in advance of beginning any construction that affects them.

It is the intent and purpose of these Contract Documents to have constructed complete facilities in good working order for the least practical cost to the Owner. Suggestions, recommendations, as well as inquiries from the Contractor that will serve this purpose are welcome and will be given consideration by the Owner and the Engineer.

Due to long lead times for some items of materials and equipment, it is anticipated that there will be a suspension or suspensions of the work and associated contract time during construction. The Contractor may request a suspension of contract time at any time after submittals for long-lead time items have been approved. The suspension will be granted provided that documentation

is submitted that long-lead time materials have been ordered. No on-site work may be completed during suspension of contract time. If a suspension is requested and granted after on-site work has commenced, the Contractor shall secure the uncompleted work so that it is not damaged during the suspension and shall clean up the site so that it is useable by the Owner during the suspension. Any suspensions of contract time will be at no additional cost to the Owner.”

1.3 CONTRACTOR USE OF SITE AND PREMISES

Construction operations shall be limited to the areas noted on the Plans and subject to the approval of the Engineer.

The Contractor shall allow representatives of the Owner, funding, and regulatory agencies access to the project site at all times.

1.4 ORDER OF WORK

The order of work will be at the option of the Contractor, except as noted below, in keeping with good construction practice, time restrictions, requirements of the permits applicable to this project, and the order of work as outlined herein, all costs of which shall be included in the various bid amounts. The Contractor shall conduct the order of work to allow the existing facilities to remain operational during the construction of the Project and shall coordinate all of their activities through the Engineer with the Owner’s operations and maintenance staff. The Contractor shall provide a written plan of activities to the Engineer and Owner each Thursday for the following week, for review and coordination with existing facility operations.

The implementation of any measure required to protect the environment shall supersede any order of work designated within these Specifications. The Contractor shall meet the conditions as outlined in any and all permits and requirements of the Federal, State, County, and City regulatory agencies.

The Contractor shall keep the disruption of the existing facility operations to a minimum. Any disruptions in electrical service to the treatment plant shall be coordinated with the Town of Cathlamet Public Works Staff and Wahkiakum County PUD.

Access to the existing operations areas shall be maintained. Disruption of this access shall be kept to a minimum and must be prearranged and scheduled through the Engineer with the Owner’s operations and maintenance staff.

***** END OF SECTION *****

SECTION 01160

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section contains information pertaining to permits and licenses, and use of private property.

1.2 PERMITS AND LICENSES

The Contractor shall be responsible for obtaining and paying all fees associated with all the necessary permits, licenses, approvals, and construction permits necessary for the execution of this Contract, whether they be City, County, State, or federal permits.

1.3 USE OF PRIVATE PROPERTY

The Contractor shall be responsible for all conditions of any arrangements the Contractor makes for the use of any privately owned property.

In the event any dispute occurs and claims for damages are filed by the property owners, the Owner will request that the Contractor give evidence that they have requested their insurance company to make personal contact with the claimants. Any settlement for insurance claims shall be strictly an act restricted to the claimant, the Contractor, and their insurance company.

The Contractor is advised that in the event of any property damage, the Owner reserves the right to withhold monies to protect the property owner.

1.4 PROPERTY RELEASE FORM

The Contractor shall be held responsible for acquiring signed property release forms, in the format provided on the following page, for all properties that have been disturbed or damaged by the Contractor's operations, or utilized by the Contractor for staging, storing, or stock piling of materials or equipment.

This work shall include submitting the form(s), as further shown herein, by certified mail to each property owner effected and further including therein a self addressed stamped envelope for the property owner's use. The enclosed self addressed envelope shall be addressed to: Town of Cathlamet, 375 2nd Street Cathlamet, Washington 98612. Contractor shall provide evidence of all certified mailings.

***** END OF SECTION *****

PROPERTY RELEASE

(Property Address)

DATE: _____

I, _____, owner of _____
(Property Owner's Name) (Property Description or

_____, hereby release
Address)

_____, from any property
(Contractor's Name)

damage or personal injury resulting from construction adjacent

to or on my property located at _____,
(Property Address)

during construction of the Water Treatment Plant Generator.

My signature below is my acknowledgment and acceptance that my property, as identified above, was returned to a satisfactory condition.

Name: _____

Signed: _____

Address: _____

Phone: _____

SECTION 01200

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SCOPE

This Section further defines Measurement and Payment for this project.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
GC Section 3.04.12	Measurement and Payment
01290	Schedule of Values
01300	Submittals

1.3 MEASUREMENT

Measurement for all items shall be as indicated in these Specifications for unit price and lump sum price bid items. Bid items are outlined in detail in this Specification Section and listed in the Proposal.

Measurement shall be in accordance with Section 1-09.1 of the WSDOT Standard Specifications. Volumes of gravel materials and concrete volumes shall be measured by the Engineer in the field and quantities will be limited to the relative neat line dimensions shown on the Plans or as approved by the Engineer in the field.

Weighing equipment, scale verification checks, load tickets for quarry spalls, rock riprap, cobbles, gravel materials, hot mix asphalt, bituminous construction materials, etc., shall conform to Section 1-09.2 of the WSDOT Standard Specifications. Load tickets shall include all gravel materials, cast-in-place concrete, cement grout, CDF, ATB, and reinforcing steel. The Owner will pay for no material received by weight unless they have been weighed as required in this Section or as required by another method the Engineer has approved in writing. All costs incidental to weighing shall be merged into the various unit prices bid.

1.4 INDIVIDUAL BID ITEMS

The following is a list of bid items for the project. The contract price for each item constitutes full compensation for furnishing all equipment, labor, materials, appurtenances, and incidentals and performing all operations necessary to construct and complete the various bid items in accordance with the Contract Documents. Payment for each item shall be considered as full compensation,

notwithstanding that minor features may not be mentioned herein. Work paid for under one item will not be paid for under any other item. If a particular item of work shown on the Plans or described in Specifications is not described in a specific bid item, this item of work shall be considered as incidental to the work and the costs for this work shall be merged into the various respective unit price and lump sum bid items.

1. Mobilization and Demobilization

- a. Measurement: Will be measured by lump sum.
- b. Payment: The lump sum contract price for MOBILIZATION AND DEMOBILIZATION shall include all costs for the labor, materials, and equipment required for mobilization, cleanup, and demobilization on the project as described in Section 01505.

Payment for MOBILIZATION AND DEMOBILIZATION shall be as follows:

35% Payment: When Contractor has mobilized on-site and temporary facilities are in place.

50% Payment: When 5 percent of the total pay items are completed (not including payment for materials on hand).

75% Payment: When 50 percent of the total pay items are completed (not including payment for materials on hand).

100% Payment: When Project is completed and recommended for acceptance.

2. Minor Change

- a. Measurement: Will be negotiated prior to commencing any such work under this pay item and shall be for work to remedy unforeseen conditions, utility conflicts, minor landscaping, minor drainage improvements, or special surface restoration.
- b. Payment: Payment or credits for changes amounting to \$10,000 or less may be made under the Bid Item MINOR CHANGE. At the discretion of the Owner, this procedure

for Minor Changes may be used in lieu of the more formal procedure as outlined in General Conditions Section 3.04.6. The Contractor will be provided a copy of the completed order for Minor Changes. The agreement for the Minor Changes will be documented by signature of the Contractor or notation of the verbal agreement. If the Contractor is in disagreement with anything required by the order for Minor Changes, the Contractor may protest the order as provided in General Conditions Section 3.04.8.

Payments or credits will be determined in accordance with General Conditions Section 3.04.6. All Minor Change work will be within the scope of the Contract Work and will not change Contract Time. For the purpose of providing a common Proposal for all Bidders, the Owner has entered an amount for MINOR CHANGE in the Proposal to become part of the total Bid by the Contractor.

3. Sitework
 - a. Measurement: Shall be measured by lump sum.
 - b. Payment: The lump sum price for SITEWORK shall include all costs for the labor, material, and equipment associated with prepping the site that is not associated with another bid item. This shall include trench excavation, unsuitable material removal, foundation gravel, backfill material, erosion control measures, site grading, and gravel restoration as shown on the Plans and as specified herein.

4. Concrete Equipment Pad
 - a. Measurement: Shall be measured by lump sum.
 - b. Payment: The unit price bid per ton for CONCRETE EQUIPMENT PAD shall include all costs for the labor, material, and equipment associated with the installation of the concrete pad including foundation gravel, concrete pad with rebar, and testing of the concrete equipment pad as shown on the Plans and as described in Sections 03200 and 03300. The lump sum item shall also include all costs for the labor, materials, and equipment to complete any site work and/or regrading associated with the installation of the generator pad.

5. Generator Assembly
 - a. Measurement: Shall be measured by lump sum.
 - b. Payment: The lump sum contract price for GENERATOR ASSEMBLY shall include all costs for labor, materials, and equipment to furnish and install a generator assembly and all associated appurtenances as shown on the Plans and as further described in Section 16230.

6. Electrical Work
 - a. Measurement: Shall be measured by lump sum.
 - b. Payment: The lump sum price for ELECTRICAL WORK shall include all costs for the labor, materials, and equipment to complete all the electrical work associated with this project including conduit, wiring, motor control centers, panel boards, receptacles, and all other electrical components as shown on the Plans and as described in Division 16 of these Specifications.

1.5 PROJECT MATERIALS ON HAND

See General Conditions Section 3.04.12(6).

1.6 PAYMENT

Payment for all work will be made at the contract unit price or lump sum price as indicated in the Proposal, payment of which shall constitute full compensation, for a complete installation.

For items of equipment, acceptable operating and maintenance information shall be delivered to the Engineer before the Contractor will be paid for more than 90 percent of the purchase value of that equipment. Purchase value shall be the net price for the equipment as given on the invoice.

Final operating and maintenance manuals per Section 01300 must be delivered to the Engineer prior to the Project being 90 percent complete. Progress payments for work in excess of 90 percent completion will not be made until the specified acceptable operating and maintenance information has been delivered to the Engineer.

***** END OF SECTION *****

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes requirements that apply to all equipment and materials supplied on the Project.

The Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment or method of work shall be as described in the submittal. The Contractor shall verify that all features of all products conform to the requirements of the Contract Documents. Submittal documents shall be clearly edited to indicate only those items, models, or series of equipment that are being submitted for review. All extraneous materials shall be crossed out or otherwise obliterated. The Contractor shall ensure that there is no conflict with other submittals and notify the Engineer in each case where their submittal may affect the work of another contractor or the Owner. The Contractor shall ensure coordination of submittals among the related crafts and subcontractors and shall verify such coordination on all submittals.

Where noted in the Contract Documents, the structural, mechanical, and electrical designs associated with the indicated equipment items are specific to the manufacturer and model number specified. Any structural, mechanical, or electrical modifications required to utilize an approved substitution to the specified equipment shall be made by the Contractor at no additional cost to the Owner. Where approved substitutions of specified equipment affect other materials or equipment, mechanical, structural, or electrical work, the Contractor shall note in the equipment submittal any necessary changes to accommodate the substituted equipment. It shall also be the responsibility of the Contractor to coordinate other mechanical, structural, or electrical equipment submittals to make sure that all changes necessary to accommodate the substituted equipment are addressed in these submittals as well. See General Condition 3.04.3.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01720	Record Drawings
01800	Testing, Commissioning, and Training
Division 16	Electrical

1.3 WORK INCLUDED

Submittals required for this work shall include any or all of the following as required by the particular specification section and the submittal schedule:

- A. Schedules and Plans
- B. **PRODUCT SUBMITTALS**
 - 1. Manufacturer's Literature
 - 2. Shop Drawings
 - 3. Color and Material Samples
 - 4. Test Reports
- C. Equipment Operation and Maintenance Manuals
- D. Record Drawings

1.4 SUBMITTAL INFORMATION

Shop, catalog, and other appropriate drawings and information shall be submitted to the Engineer for review prior to fabrication or ordering of all equipment and materials specified. The number of copies of submittal information to be submitted shall be as indicated below.

All submittal information shall be sent to the Engineer through the Contractor. The Contractor shall assign a separate submittal number to each item or group of items that relate to each specification section. Submittal numbers shall be assigned in consecutive ascending order, with the first project submittal assigned the number "1." Resubmittals shall be numbered using the same number followed by an alphabetical suffix. All submittals shall bear the Contractor's certification that they have reviewed, checked, and approved the submittal information prior to transmitting to the Engineer. The submittal number and related specification section shall be marked on each submittal.

PART 2 PRODUCTS

2.1 GENERAL

When the Contract Documents require a submittal the contractor shall submit the following number of documents.

Type of Submittal	Number of Copies
Schedules or Plans	3
Product Submittal	3
Test Reports	3
Preliminary Equipment Manuals	2
Final Equipment Manuals	3

If requested by the Contractor and approved by the Engineer and Owner, the Contractor may submit one copy of submittals electronically in lieu of submitting hard copies for all submittals except Equipment Manuals. Hard copies of Equipment Manuals must be submitted. If submittals are provided electronically, only one reviewed copy will be returned to the Contractor.

Electronic submittals shall be provided in tabbable, searchable, pdf format and should include a table of contents bookmarked to provide a navigation link to each section of the submittal. Information should be clear and legible. Information pertaining to the specific materials proposed for use on the project shall be highlighted.

2.2 PRODUCT SUBMITTALS

A. GENERAL

When indicated in the Contract Documents the contractor shall submit product data for review by the Engineer. Unless otherwise specified, within 15 calendar days after receipt of the submittal, the Engineer shall review the submittal and return three copies of the marked-up submittal. The reproducible original will be retained by the Engineer. The returned submittal shall indicate one of the following actions:

1. If the review indicates that the material, equipment, or work method complies with the project Specifications, submittal copies will be marked "NO EXCEPTIONS TAKEN." In this event, the Contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal.

2. If the review indicates limited corrections are required, copies will be marked “MAKE CORRECTIONS NOTED.” The Contractor may begin implementing the work method or incorporating the material and equipment covered by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in operation and maintenance data, a corrected copy shall be provided.
3. If the review reveals that the submittal is insufficient or contains incorrect data, copies will be marked “AMEND AND RESUBMIT.” Except at their own risk, the Contractor shall not undertake work covered by this submittal until it has been revised, resubmitted, and returned marked either “NO EXCEPTIONS TAKEN” or “MAKE CORRECTIONS NOTED.”
4. If the review indicates that the material, equipment, or work method does not comply with the project Specifications, copies of the submittal will be marked “REJECTED - SEE REMARKS.” Submittals with deviations that have not been identified clearly may be rejected. Except at their own risk, the Contractor shall not undertake the work covered by such submittals until a new submittal is made and returned marked either “NO EXCEPTIONS TAKEN” or “MAKE CORRECTIONS NOTED.”

B. MANUFACTURER’S LITERATURE

Where the contents of submitted literature include data not pertinent to the submittal, the portion(s) of the contents being submitted for the Engineer’s review shall be clearly indicated.

C. SHOP DRAWINGS

Shop drawings shall be submitted in the form of blue-line or black-line prints of each sheet. Blueprint submittals will not be acceptable.

All shop drawings shall be accurately drawn to a scale sufficiently large enough to show pertinent features and method of connection or joining. On all shop drawings, figure dimensions shall be used as opposed to scaled dimensions.

D. COLOR AND MATERIAL SAMPLES

All material samples shall be of the exact article proposed to be furnished for the work and shall be submitted in the quantity required. Samples shall be returned to the Contractor, with one retained by the Engineer.

Unless the precise color is specifically described in the Contract Documents, or whenever a choice of color or pattern is available in a specified product, accurate color charts shall be submitted to the Engineer for their review and selection.

E. TEST REPORTS

Copies of all test reports shall be submitted to the Engineer.

2.3 EQUIPMENT MANUALS

A. GENERAL

For all items of equipment, manufacturer's equipment operation and maintenance manuals shall be submitted to the Engineer for review. One copy will be returned to the Contractor with comments.

The following information shall be furnished for all items of equipment installed on the project requiring operational and/or maintenance procedures, and for any additional items indicated by the Engineer.

1. Lubrication Information

This shall consist of the manufacturer's recommendations regarding the lubricants to be used and the lubrication schedule to be followed.

2. Electrical and Control Diagrams

Diagrams shall show internal and connection wiring.

3. Startup Procedures

These instructions consist of equipment manufacturer's recommendations for installation, adjustment, calibration, and troubleshooting.

4. Operating Procedures

These instructions consist of the equipment manufacturer's recommended step-by-step procedures for starting, operating, and stopping the equipment under specified modes of operation.

5. Preventive Maintenance Procedures

These instructions consist of the equipment manufacturer's recommended steps and schedules for maintaining the equipment.

6. Overhaul Instructions

These instructions consist of the manufacturer's directions for the disassembly, repair, and reassembly of the equipment and any safety precautions that must be observed while performing the work.

7. Parts List

This list consists of the generic title and identification number of each component part of the equipment.

8. Spare Parts List

This list consists of the manufacturer's recommendations of number of parts, which should be stored by the Owner and any special storage precautions, which may be required.

9. Exploded View

Exploded or cut views of equipment shall be provided if available as a standard item of the manufacturer's information. When exploded or cut views are not available, plan and section views shall be provided with detailed callouts.

10. Test Documentation

Reports, records, data and forms documenting the results of equipment factory tests, including pump and blower performance curves, shall be provided, with the operating points for the specific equipment designated. When a special factory test of the supplied equipment is not performed, the manufacturer's standard performance reports and curves, with specified operating points, shall be provided for the supplied equipment.

11. Specific Information

Where items of information not included in the above list are required, they will be provided as described in the specifications for the equipment.

12. Warranty Information
13. Maintenance Information Summaries

Maintenance information summaries shall be prepared on 8-1/2-inch x 11-inch paper only and shall contain the following information compiled from manufacturer's recommendations in the order shown.

1. Description or name of item of equipment.
2. Manufacturer.
3. Name, address, and telephone number of local manufacturer's representative.
4. Serial number (where applicable). The Contractor shall verify that it matches the equipment installed on the project.
5. Equipment nameplate data including model number.
6. Recommended maintenance procedures:
 - a. Description of procedures.
 - b. Maintenance frequency required.
 - c. Lubricant(s) or other materials required (where applicable), including type of lubricant, lubricant manufacturer, and specific compound.
 - d. Additional information as required for proper maintenance.
7. Recommended spare parts.

The maintenance information summary shall be placed at the beginning of the manual.

All operation and maintenance information shall be comprehensive and detailed, and shall contain information adequately covering all normal operation and maintenance procedures.

For ease of identification, each manufacturer's brochure and manual shall be appropriately labeled with the equipment name and equipment specification number as it appears in the project Specifications. The information shall be organized in binders. The binders shall be provided with a table of contents and tab sheets to permit easy location of desired information.

Lubricants shall be described in detail, including type, recommended manufacturer, and manufacturer's specific compound to be used.

It shall be the responsibility of the Contractor to ensure that all operation and maintenance materials are obtained. Material submitted must meet the approval of the Engineer prior to project acceptance.

B. EXTRANEOUS DATA

Where the contents of the manuals include manufacturers' standard brochures or catalog pages, the exact item(s) used in this installation shall be clearly indicated and all manufacturers' data which is extraneous shall be clearly deleted.

C. FINAL EQUIPMENT MANUALS

The Contractor shall be responsible for tracking and coordinating each separate manufacturer's equipment operation and maintenance manual submittal and shall resubmit, as necessary, until the Engineer's review indicates that the submittal is acceptable. The Contractor shall maintain equipment manual files until final approval copies are delivered to the Engineer. The Contractor shall be responsible for collating the approved operation and maintenance submittal sections into complete final manufacturers' equipment operation and maintenance manuals bound in post binders which are indexed to the Specifications. The Contractor shall deliver the complete final operation and maintenance manuals to the Engineer prior to project completion. All copies final manufacturers' equipment manuals submitted will be retained by the Engineer or Owner.

The Contractor shall also supply three CD-Rom or USB copies of the final equipment manuals in a tabbed, searchable, .pdf format, with a table of contents bookmarked to provide a navigation link to each section of the manual.

PART 3 EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

A. GENERAL

Each submittal shall be accompanied by a letter of transmittal showing the date of transmittal, specification section, or drawing number to which the submittal pertains, submittal number, and a brief description of the material submitted.

B. RESUBMITTALS

When material is resubmitted for any reason, it shall be submitted under a new letter of transmittal and referenced to the previous submittal.

3.2 REVIEW OF SUBMITTALS

The Engineer will review all submittals for general conformance with the design and other requirements of the Contract Documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the Contract Documents. Submittals may be rejected based on inadequate information and/or not meeting the requirements of the Contract Documents. Rejection of submittals requires action on the part of the Contractor to correct the reason for the rejection. The Contractor remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, and for techniques of assembly and installation.

3.3 COORDINATION OF PRODUCT SUBMITTALS

A. GENERAL

Prior to submittal for review by the Engineer, all data shall be fully coordinated, including the following:

1. All field dimensions and conditions.
2. All trades and public agencies involved, including necessary approvals.
3. All deviations from the Contract Documents.

B. GROUPING OF SUBMITTALS

1. All submittals shall be grouped with associated items, unless otherwise specifically permitted by the Engineer.
2. The Engineer may reject the submittals in their entirety or any part thereof, if not in accordance with the Contract Documents.

C. CERTIFICATION

Submittals shall bear the Contractor's certification that they has reviewed, checked, and approved the shop drawings prior to forwarding them to the Engineer.

3.4 TIMING OF PRODUCT SUBMITTALS

A. GENERAL

1. All submittals shall be made far enough in advance of installation to provide all required time for reviews and securing necessary approvals.
2. In scheduling, the Contractor shall allow for the time indicated in Part 2.2A for the Engineer's review following their receipt of the submittal.

B. DELAYS

No additional or separate payment will be made for costs of delays occasioned by tardiness of submittals on the part of the Contractor.

3.5 EQUIPMENT MANUALS

The preliminary copies of the manufacturer's equipment manuals shall be delivered to the Engineer for review not later than the time of equipment delivery to the project site.

Final copies of the manufacturer's equipment manuals shall be delivered to the Engineer at least 14 calendar days prior to requesting payment in excess of 90 percent completion for the project. Prior to submittal of the final equipment manuals, the Contractor shall check the manuals for accuracy and completeness and shall verify that prior review comments have been addressed.

***** END OF SECTION *****

SECTION 01310

PROJECT MEETINGS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes information pertaining to the various meetings that will be held during the course of constructing this project.

1.2 PRECONSTRUCTION CONFERENCE

As soon as possible following the award of the Contract, a preconstruction conference shall be scheduled for representatives of the Owner, the Contractor, the Engineer, funding agencies, regulatory agencies, and affected utilities.

1.3 PROJECT PROGRESS MEETINGS

The Owner and the Engineer will schedule and attend regular weekly meetings with the Contractor for coordination, administrative, and procedural requirements of the project.

1.4 CONSTRUCTION MEETINGS

The Contractor shall schedule and hold regular meetings during the project:

- A. Safety Meetings (Contractor's subcontractors shall attend if they are working onsite.)
- B. Project Progress Meetings
- C. Equipment Installation Meetings
- D. Coordination Meetings
- E. Startup and Testing Meetings

The Contractor shall notify the Owner and Engineer in advance of all meetings. The meetings may or may not be attended by the Owner and Engineer.

***** END OF SECTION *****

SECTION 01385

DOCUMENTATION OF EXISTING CONDITIONS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes all photography requirements for the project.

The Contractor shall provide comprehensive preconstruction photographs of the entire construction area and adjacent properties. The photographs shall provide complete coverage of all features in the project area, and in no event shall photographs be more than 50 feet apart.

Prior to construction, photographs shall be taken in the project area where work is to be done. Special attention shall be given to depict existing roadway and property conditions, fences, buildings, trees, ditches, culverts, meter boxes, etc. The photographs shall be of commercial quality and must be submitted to the Engineer prior to the initiation of construction.

Photographs may be submitted to the Engineer in either of the following formats:

A. HARD COPY FORMAT

Contractor shall submit two 5-inch by 7-inch color glossy prints of each exposure, together with the associated negative. The photographs shall be delivered to the Engineer in a suitable, durable plastic 2-inch, three-ring binder equipped with plastic inserts specifically designed and manufactured for preserving photographs. The binder shall be sufficiently labeled, and shall, at a minimum include the name of the Owner, name of the Contractor, Date, Project Name, and the title, "Pre-Construction Photographs" in sufficiently legible text.

B. ELECTRONIC FORMAT

The Contractor shall submit digital photographs on an electronic storage device (flash/thumb drive). Three copies of each storage device shall be submitted to the Engineer. Each photograph shall be of good quality, sufficiently large to distinguish unique features captured in the photograph, and should be at least 4 MB in size. Each electronic storage device shall be labeled, and shall, at a minimum include the name of the Owner, name of the Contractor, Date, Project Name, and the title, "Pre-Construction Photographs" in sufficiently legible text.

The photographs shall be arranged in a continuous fashion indicating topographical features from one end of the project to the other. The Contractor shall invite the Engineer to the site while collecting these photographs.

Photographs shall be taken during a period of good visibility. Unless otherwise directed by the Engineer, photographs will not be allowed during times of precipitation or poor visibility.

Following construction, the Contractor shall provide post-construction photographs of the entire construction area and adjacent properties in a similar format to the preconstruction photographs.

***** END OF SECTION *****

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the control tests, test sample collection, required field-testing, and special inspections as specified herein, and indicated on the Plans.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
02300	Earthwork
02700	Gravel Materials
03300	Reinforced Concrete

1.3 PAYMENT

All testing as required by this Section shall be paid for by the Contractor. All costs to prepare and implement the sample and testing program shall be included in the bid prices for the various items associated with the sampling and testing program.

Retesting and reinspection required because of defective work and testing performed for the convenience of the Contractor shall also be paid for by the Contractor.

Testing requirements shall not be cause for claims of delay by the Contractor and all expenses accruing therefrom shall be deemed incidental to the performance of the Contract.

PART 2 PRODUCTS

2.1 GENERAL

The Contractor shall be responsible for all material testing specified in the Contract Documents and any applicable permits and codes. The materials testing laboratory shall be accredited for performing the various testing methods either by AASHTO R18, AASHTO 150/IEC 17025 or the American Association for Laboratory Accreditation and further approved by the Owner. The materials testing laboratory shall send test results directly to the Engineer.

2.2 EARTHWORK AND GRANULAR MATERIALS

A. COMPACTION CONTROL

Optimum moisture content and maximum density tests shall be determined by the following method:

ASTM D1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort

B. IN-PLACE TESTS

In-place density and moisture content tests shall be made by an independent testing laboratory according to the following methods:

ASTM D6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

2.3 AGGREGATES

All aggregates shall be tested in accordance with applicable WSDOT test methods:

<u>Title</u>	<u>Test Method</u>
Sampling	AASHTO T2
Sieve Analysis of Fine and Coarse Aggregates	104A
Material Finer than No. 200 Sieve in Aggregates	102A
Percentage of Particles Smaller than 0.025 mm and 0.005 mm	603A
Organic Impurities	111A
Abrasion of Coarse Aggregates by Use of the Los Angeles Machine	101A
Sand Equivalent	109A

2.4 CAST-IN-PLACE CONCRETE

Cast-in-place concrete shall be tested in accordance with applicable parts of Chapter 16 of ACI 301. Concrete reinforcement and concrete special inspections

shall be performed in accordance with local Building Official and WABO requirements.

PART 3 EXECUTION

3.1 SAMPLING AND TESTING FREQUENCY

A. GENERAL

The Contractor shall provide the following quality control tests at the number and frequency described herein. On-site testing technicians and testing laboratories shall be WABO-certified. The precise location of the tests shall be designated by the Engineer. The Contractor shall cooperate with laboratory personnel employed to conduct the density testing, sampling of material(s), and special inspections. The Contractor shall provide safe access within the work site for laboratory personnel such that density testing and visual inspection can be performed. The Contractor shall provide samples of materials to be tested in the quantities required and herein specified to the appropriate laboratory personnel. The Contractor shall furnish all labor, equipment, tools, and materials necessary to obtain and deliver samples as herein designated. They shall also provide and repair any test holes required in order to facilitate the testing and sampling and to provide for the testing laboratory's exclusive use for storage and curing of test samples until removed to the laboratory.

Any areas tested and further failing compliance with the Specifications shall be recompacted and retested at the Contractor's expense, until a successful density test indicating compliance with these Specifications has been achieved.

B. SOIL TESTING

The following soil quality control tests shall be completed at the given frequency:

<u>Material</u>	<u>Test</u>	<u>Minimum Sampling & Testing Frequency</u>
Backfill for foundations, walls, trenches and roads	Gradation ¹	One every 500 cy or one per day for quantities exceeding 25 cy. For trenches, one every 750 feet of trench.

<u>Material</u>	<u>Test</u>	<u>Minimum Sampling & Testing Frequency</u>
	In-Place Density ^{2,3,4}	One every 500 cy or one per day for each type of soil or fill material with quantities exceeding 25 cy. For trenches, one per day and one every 250 feet of trench.
	Moisture-Density Relationship ³	One prior to start of backfilling operation, one every 20 densities and any time material type changes.
Pipe Bedding	Gradation ¹	One every 750 feet of trench.
Subgrade and Fills	In-Place Density ^{2,3}	One every 500 cy of each type material.
	Moisture-Density Relationship	One for every 20 densities for each material.
	Gradation	One for every moisture-density.

1. All acceptance tests shall be conducted from in-place samples.
2. Additional tests shall be conducted when variations occur due to the Contractors, operations, weather conditions, site conditions, etc.
3. The nuclear densometer, if properly calibrated, may be used but only to supplement the required testing frequency and procedures. The densometer shall be calibrated and is recommended for use when the time for complete results becomes critical.
4. Depending on soil conditions, it is anticipated that compaction tests shall be required at depths of 2 feet above the pipe and at each additional 15 feet to the existing surface plus a test at the surface.

C. CONCRETE TESTING

All testing shall conform to applicable portions of ACI. Special inspections of concrete and concrete reinforcement shall comply with WABO requirements.

All concrete must meet the specified requirements for minimum 28-day compressive strength.

All concrete cylinders shall be molded and tested for strength by an independent testing laboratory employed by the Contractor.

The Contractor shall furnish all concrete required for molding of the cylinders. In cases where cylinders are stored at the project site, the Contractor shall provide storage and protection for the cylinders in accordance with ACI requirements.

Concrete tests and testing frequency shall be in accordance with the more stringent of the testing requirements specified in Section 03300-3.17 of these Specifications, and the following table:

<u>Material</u>	<u>Test</u>	<u>Minimum Sampling & Testing Frequency</u>
Coarse Aggregate (for each grading size) ¹	Gradation	One test every 500 cy of concrete.
	Deleterious Substances	One test initially and thereafter when appearance makes the material suspect.
	L.A. Abrasion	One every 2,000 tons of aggregate.
	Moisture specific gravity and absorption ¹	One initially and every 250 cy thereafter. One moisture to be conducted prior to any batching and more frequently if hauling and storage does not provide a consistent moisture content.
Fine Aggregate ¹	Gradation and fineness modules	One every 250 cy of concrete.
	Deleterious Substances	(same as coarse aggregate).
	Moisture, specific gravity and absorption ¹	(same as coarse aggregate).
Concrete	Slump	Conduct one test every day of placement and one additional test for every 50 cy placed and more frequently if batching appears inconsistent. Conduct in conjunction with taking concrete cylinders.
	Entrained Air	Conduct with each slump test.
	Ambient and concrete temperatures	Conduct with each slump test.

<u>Material</u>	<u>Test</u>	<u>Minimum Sampling & Testing Frequency</u>
Concrete	Compressive strength and evaluation of results per ACI 214. (includes unit weight of each cylinder)	For all concrete placement, take one set of four cylinders per day and one additional set of cylinders for every 50 cy of each class of structural concrete. Cylinders shall be 4 inch by 8 inch. Test one cylinder at 7 days and two at 28 days. Fourth cylinder shall be held in reserve. A plot and statistical evaluation shall be maintained in accordance with ACI 214 for compressive strength results. Field cure cylinders shall be made when insitu strengths are required to be known.

1. Aggregate moisture tests are to be conducted in conjunction with concrete strength tests for water/cement (w/c) calculations.

D. SPECIAL INSPECTIONS

Contractor shall perform all required Special Inspections per WABO requirements (Chapter 17 of the IBC). Special inspections include, but are not limited to, cast-in-place concrete, concrete reinforcement.

***** END OF SECTION *****

SECTION 01500

TEMPORARY FACILITIES

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the temporary facilities required for this project, but not necessarily limited to:

- A. Temporary utilities such as water, electricity, telephone, off-site staging, and off-site parking.
- B. Sanitary facilities.
- C. Temporary enclosures such as fences, tarpaulins, barricades, and canopies.

PART 2 PRODUCTS

2.1 UTILITIES

A. TEMPORARY ELECTRICITY

The Contractor shall provide temporary power for construction at the project site. They shall make arrangements with the electrical utility (to obtain temporary power) and shall pay all costs and fees charged by the utility associated with connection of temporary power. The Contractor shall provide all special connections, receptacles, panelboards, etc., which are required for temporary service, and are not provided by the utility.

The Contractor shall furnish and install all temporary wiring and associated equipment required to keep all portions of the existing facilities in operation at all times.

Area distribution boxes shall be furnished, installed, and so located that the individual trades may use their own construction-type extension cords to obtain proper power and artificial lighting at all points where required. The Contractor shall provide a main disconnect on all temporary wiring panels, labeled "MAIN DISCONNECT," to ensure the safety of personnel using extension cords and hand tools. Panels shall also be properly grounded and equipped with GFCI breakers in accordance with WISHA requirements.

The Contractor shall provide the Engineer single line diagrams of the temporary wiring showing all circuit breakers. These diagrams shall be provided prior to installation of this wiring. These diagrams are necessary to provide information to Owner personnel for off-hours operation.

The Contractor shall pay all demand, consumption, taxes, and fees associated with the temporary electrical service.

B. WATER

The Contractor shall be responsible for providing water necessary for construction. Water is available from the Owner free of charge, provided that it is used responsibly. The Contractor shall install a meter with backflow prevention device prior to obtaining water from the Owner.

2.2 SANITARY FACILITIES

The Contractor shall provide toilet and wash-up facilities for their workforce and the Engineer at the site of work. They shall comply with applicable laws, ordinances, and regulations pertaining to the public health and sanitation of dwellings and camps.

2.3 OFF-SITE STAGING AND PARKING

The Contractor shall note that space is limited throughout the construction site. Employees of the Contractor, all subcontractors, vendors, suppliers, and associated personnel shall not be allowed to park onsite during the course of construction without prior approval from the Owner. It shall be the responsibility of the Contractor to provide sufficient parking facilities in authorized area(s) other than the construction site for the above-mentioned personnel.

The Contractor shall not be allowed to stockpile and store equipment and materials throughout the construction site. The Contractor shall coordinate their schedule so that all equipment and materials shall be brought to the construction site only when they are to be installed/utilized.

The Contractor shall provide storage of equipment and materials at an offsite, bonded warehouse, to be approved by the Engineer. The Contractor shall pay all costs associated with off-site delivery, storage, and transfer to the construction site.

2.4 ENCLOSURES

The Contractor shall furnish, install, and maintain during the project time all required scaffolds, tarpaulins, barricades, canopies, warning signs, steps, bridges,

platforms, and other temporary construction necessary for proper completion of the work in compliance with all pertinent safety and other regulations.

PART 3 EXECUTION

All temporary facilities and controls shall be maintained as long as required for the safe and proper completion of the work. The Contractor shall remove such temporary facilities and controls as rapidly as progress of the work will permit or as directed by the Owner.

***** END OF SECTION *****

SECTION 01505

MOBILIZATION AND DEMOBILIZATION

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section consists of mobilization and demobilization. Mobilization consists of preconstruction activities and preparatory work for the project necessary to mobilize labor, materials, and equipment to the project site. Demobilization consists of activities to remove materials and equipment from the project site upon project completion, including final cleanup. Items which are not considered mobilization or demobilization include but are not limited to:

- A. On-going activities throughout the duration of construction.
- B. Profit, interest on borrowed money, overhead, or management costs.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
Division 1	General Technical Requirements

PART 2 PRODUCTS

Products and materials required for mobilization and demobilization are described in the various sections of Division 1 and in other parts of the Contract Documents.

PART 3 EXECUTION

Complete mobilization and demobilization as required by the various sections of Division 1 and other parts of the Contract Documents.

***** END OF SECTION *****

SECTION 01720

RECORD DRAWINGS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the record drawings, which shall be maintained and annotated by the Contractor during construction.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01300	Submittals

1.3 INFORMATION PROVIDED BY THE OWNER

The Contractor will be provided with the following items to maintain record drawings for the project:

- A. One full size paper set of Plans.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall maintain the following record drawings for the project:

- A. A neat and legibly marked set of Contract Plans showing the final location of piping, equipment, electrical conduits, outlet boxes and cables;
- B. Additional documents such as schedules, lists, drawings, and electrical and instrumentation diagrams included in the Contract Documents; and
- C. Contractor layout and installation drawings.

Unless otherwise specified, record drawings shall be full size and maintained in a clean, dry, and legible condition. Record documents shall not be used for construction purposes and shall be available for review by the Engineer during normal working hours at the Contractor's field office. At the completion of the

work, prior to final payment, all record drawings shall be submitted to the Engineer.

Marking of the drawings shall be kept current and shall be done at the time the material and equipment are installed. Annotations to the record documents shall be made with an erasable colored pencil conforming to the following color code:

- A. Additions - Red
- B. Deletions - Green
- C. Comments - Blue
- D. Dimensions - Graphite

Legibly mark drawings to record actual depths, horizontal and vertical location of underground raceways, cables, and appurtenances referenced to permanent surface improvements.

The Contractor's record drawings (full-size hard-copy) will be reviewed monthly for completeness by the Engineer prior to preparing the progress estimate for payment. If the record drawings do not reflect the work performed, payment for that item of work will not be included in the progress estimate.

***** END OF SECTION *****

SECTION 01740

CLEANUP

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the maintenance of the building, structures, and site(s) in a standard of cleanliness throughout the construction period as described herein.

Throughout the construction period, the Contractor shall maintain the cleanliness of the site and structures as described herein. The Contractor is also to maintain access to all existing, operating equipment such that the equipment may be serviced and operated.

Dust of all kinds, including concrete dust produced by construction activities, shall be controlled to avoid damage to existing, operating equipment. Enclosures, ventilation, and air scrubbing may be required where significant potential for damage is determined by the Engineer.

1.2 RELATED WORK SPECIFIED ELSEWHERE

In addition to standards described in this Section, comply with all requirements for cleaning up when described in other sections of these Contract Documents.

1.3 QUALITY ASSURANCE

A. INSPECTION

The Contractor shall conduct daily site inspections, and more often if necessary, to verify that requirements are being met.

B. CODES AND STANDARDS

In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

Provide all required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the Engineer.

PART 3 EXECUTION

3.1 PROGRESS CLEANING

A. GENERAL

Retain all stored materials and equipment in an orderly fashion allowing maximum access, not impeding drainage or traffic, and providing protection.

Do not allow the accumulation of scrap, debris, waste material, and other items not required for this work.

At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the project site.

Provide adequate storage for all materials awaiting removal from the project site, observing all requirements for fire protection and protection of the environment.

B. SITE

Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Move these items into a place designated for their storage until disposal becomes available.

Weekly, and more often if necessary, inspect all arrangements of materials stored on the site, restack, arrange, or otherwise service all arrangements to meet the requirements above.

Maintain the site in a neat and orderly condition at all times so as to meet the approval of the Engineer.

C. STRUCTURES

Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris and waste material. Move these items into a place designated for their storage until disposal becomes available.

Weekly, and more often if necessary, sweep clean all interior spaces. "Clean" shall be interpreted to mean free from dust and other materials that can be swept with a broom using reasonable diligence.

In preparing to install succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material. Use all equipment and materials required to achieve the required cleanliness.

3.2 FINAL CLEANING

A. DEFINITION

Except as otherwise specifically provided, "clean" shall be interpreted as meaning the level of cleanliness generally provided by commercial building maintenance equipment and materials.

B. GENERAL

Prior to final inspection, remove from the jobsite all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final project cleaning as described below.

C. STRUCTURES

1. Exterior

Visually inspect all exterior surfaces and remove all traces of soil, waste, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, the Engineer may require light sandblasting or other cleaning at no additional cost to the Owner.

2. Interior

Visually inspect all interior surfaces and remove all traces of soil, waste, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. Remove all paint droppings, spots, stains, and dirt from finished surfaces. Use only appropriate cleaning materials and equipment.

D. TIMING

Schedule final cleaning as approved by the Engineer to enable the Owner to accept a completely clean project, ready for occupancy.

***** END OF SECTION *****

SECTION 01800

TESTING, COMMISSIONING, AND TRAINING

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the installation, testing, commissioning, and training for all mechanical, electrical, and instrumentation systems and completed portions of the work.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01110	Scope of Work
01300	Submittals
01400	Quality Control
01500	Temporary Facilities
16050	Basic Electrical Materials and Methods

1.3 QUALITY ASSURANCE

A. INSTALLATION

All mechanical, electrical, and instrumentation equipment provided under this Contract shall be installed in conformity with the Contract Documents, including the manufacturer's requirements. Should a manufacturer's installation recommendation conflict with specific requirements of this Contract Document, the Contractor shall bring the matter to the attention of the Engineer. Any additional costs arising out of changes authorized by the Engineer to accommodate manufacturer's installation recommendations will be considered extra work. Any costs incurred by the Contractor through failure to timely notify the Engineer of a difference between Contract Document and manufacturer's installation requirements shall be borne by the Contractor.

B. TESTING

1. General Requirements

All equipment and partially complete or fully completed portions of the work included in this Contract shall be tested and inspected to prove compliance with the Contract requirements. Unless otherwise specified, all costs of testing, including temporary

facilities and connections, shall be borne by the Contractor. For the purpose of this Section, equipment shall mean any mechanical, electrical, instrumentation, or other device with one or more moving parts or devices requiring an electrical, pneumatic, or hydraulic connection. Installed tests for electrical and instrumentation devices and systems shall be in accordance with Division 16.

No tests specified herein shall be applied until the item to be tested has been inspected and approval given for the application of such test.

Tests and inspections, unless otherwise specified or accepted, shall be in accordance with the recognized standards of the industry. The Contractor shall see that scheduling and performance of all tests are coordinated with involved subcontractors and suppliers. The Contractor shall allow for up to two additional setpoint changes during testing. No extra costs or time allowances shall be provided as long as this setpoint allowance is not exceeded.

The form of evidence of satisfactory fulfillment of delivery acceptance test and inspection requirements shall be, at the discretion of the Engineer, either by tests and inspections carried out in their presence or by certificates or reports of tests and inspections carried out by approved persons or organizations. The Contractor shall provide and use forms that include all test information, including specified operational parameters. The content of the forms used shall be acceptable to the Engineer.

A master test log book shall be maintained by the Contractor, which shall cover all tests including piping, equipment, electrical, and instrumentation. The master test log book shall be provided with loose-leaf pages that shall be copied weekly after updating for transmittal to the Engineer. The master test log book shall be transmitted to the Engineer upon completion of the project.

2. Delivery Acceptance Tests and Inspections

The delivery acceptance tests and inspections shall be at the Contractor's expense for any equipment specified herein and shall include the following:

- a. Test of items at the place of manufacture during and/or on completion of manufacture, comprising hydraulic pressure tests, electric and instrumentation subsystems tests,

performance and operating tests and inspections in accordance with the relevant standards of the industry and more particularly as detailed in individual clauses of these Specifications to satisfy the Engineer that the items tested and inspected comply with the requirements of this Contract. Tests other than those specified shall be in accordance with Section 01400.

- b. Inspection of all items delivered at the site or to any authorized place of storage so that the Engineer may be satisfied that such items are of the specified quality and workmanship and are in good order and condition at the time of delivery. The Contractor shall be prepared to remove all coverings, containers, or crates to permit the Engineer to conduct their inspection. Should the Engineer find, in their opinion, indication of damage or deficient quality of workmanship, the Contractor shall provide the necessary documentation or conduct such tests deemed necessary by the Engineer to demonstrate compliance.

3. Installed Tests and Inspections

a. General

All equipment shall be tested by the Contractor to the satisfaction of the Engineer before any facility is put into operation. Tests shall be as specified herein and shall be made to determine whether the equipment has been properly assembled, aligned, adjusted and connected. Any changes, adjustments, or replacements required to make the equipment operate as specified shall be carried out by the Contractor as part of the work.

b. Procedures

i. General

Testing procedures shall be designed to duplicate, as nearly as possible, all conditions of operation and shall be carefully selected to ensure that the equipment is not damaged. Once the testing procedures have been reviewed and approved by the Engineer, the Contractor shall produce checkout, alignment, adjustment and calibration sign-off forms for each item of equipment to be used in the

field by the Contractor and the Engineer jointly to ensure that each item of electrical, mechanical and instrumentation equipment has been properly installed and tested. The Contractor is advised that failure to observe these precautions may place the acceptability of the subject equipment in question.

ii. Preoperation Checkout

The installed tests and inspection procedures shall incorporate all requirements of these Specifications and shall proceed in a logical, step-wise sequence to ensure that all equipment has been properly serviced, aligned, connected, calibrated, and adjusted prior to operation. Preoperation checkout procedures shall include, but not necessarily be limited to:

- (1) Electrical system testing as specified in Division 16.
- (2) Alignment of equipment.
- (3) Preoperation lubrication.

iii. Working Test

Once all affected equipment has been subjected to the required preoperational checkout procedures and the Engineer has witnessed and has not found deficiencies in that portion of the work, individual systems may be started and operated under simulated operating conditions to determine as nearly as possible whether the equipment and systems meet the requirements of these Specifications. The equipment shall be operated a sufficient period of time to determine machine operating characteristics, including performance throughout the specified range, and to permit initial adjustment of operating controls.

If under test, any portion of the work should fail to fulfill the Contract requirements and is adjusted, altered, renewed or replaced, tests on that portion when so adjusted, altered, removed or replaced,

together with all other portions of the work as are affected thereby, shall, if so required by the Engineer, be repeated within reasonable time and in accordance with the specified conditions. The Contractor shall pay to the Owner all reasonable expenses incurred by the Owner as a result of repeating such tests.

Once simulated operation has been completed, all machines shall be rechecked for proper alignment, realigned, if necessary, and doweled in place. All equipment shall be checked for loose connections, unusual movement, excessive temperature, noise, and/or vibration or other indications of improper operating characteristics. Any deficiencies shall be corrected to the satisfaction of the Engineer. All machines or devices, which exhibit unusual or unacceptable operating characteristics shall be disassembled and inspected. They shall then be repaired or removed from the site and replaced at no cost to the Owner.

Test results shall be within the tolerances set forth in the detailed Specification sections of the Contract Documents. If no tolerances have been specified, test results shall conform to tolerances established by recognized industry practice. Where, in the case of an otherwise satisfactory installed test, any doubt, dispute, or difference should arise between the Engineer, and the Contractor regarding the test results or the methods or equipment used in the performance of such test, then, the Engineer may order the test to be repeated. If the repeat test, using such modified methods or equipment as the Engineer may require, substantially confirms the previous test, then all costs in connection with the repeat test will be paid by the Owner otherwise the costs shall be borne by the Contractor. Where the results of any installed test fail to comply with the Contract requirements for such test, then such repeat tests as may be necessary to achieve the Contract requirements shall be conducted by the Contractor at their expense.

Unless otherwise specified, the Contractor shall provide at no expense to the Owner, all water, power, fuel, labor and all other necessary items and work required to complete all tests and inspection specified herein.

4. Operational Testing

After completion of all installed testing and review by the Engineer that all equipment complies with the requirements of the Specifications, the Contractor shall conduct operational testing. All domestic water, oil, fuel, and chemical systems shall be filled with the specified fluid.

The Contractor shall operate the completed facility for a period of not less than that specified in Part 3.4 of this Section during which all systems shall be operated as a complete facility at various loading conditions, as directed by the Engineer. Should the operational testing period be halted for any reason related to the facilities constructed or the equipment furnished under this Contract, or the Contractor's temporary testing systems, the operational testing program shall be repeated until the specified continuous period has been accomplished without interruption. All process units shall be brought to full operating conditions, including temperature, pressure, and flow.

Record drawings of facilities involved must be accepted and ready for turnover to the Owner at the time of operational testing.

All costs for water, fuel, power, and chemicals required during operational testing shall be borne by the Owner.

5. Commissioning

After completion of the operational testing and certifications by the Engineer that the systems meet all performance requirements, commissioning will begin. The commissioning period for all systems shall be 30 days. The Contractor shall remove all temporary facilities that may have been in use during the operational testing and shall assist the Owner with the placement of the facility into its fully operational mode. The Owner's operations and maintenance personnel will be responsible for operation of the facility or portion of the facility during this period of time. The facility or portion thereof shall be fully and

continuously operational, accepting all normal flow called for in design and performing all functions as designed.

The Contractor shall be available, with all appropriate subcontractors and trades, at all times during commissioning periods to provide immediate assistance in case of failure of any portion of the system being tested. This assistance shall be available, if needed, on a 24-hour basis. The Engineer will not issue a certificate of Substantial Completion until the end of the commissioning period (including training) and then only when all corrections required to assure a reliable and completely operational facility have been complete. The Contractor shall be responsible for all costs in excess of the Owner's normal expected costs of operations during the commissioning period. The Contractor shall bear the costs of all necessary repairs or replacements, including labor and materials, required to keep the portion of the plant being commissioned operational.

The commissioning period will be considered completed when the facility has been continuously operated without major interruption, equipment failure, or system breakdown for the specified commissioning period. A major interruption, failure or breakdown shall be a condition or event that prevents the facility from continuously and adequately handling normal flow, cannot be repaired or corrected immediately by the Contractor, and is not caused by improper operation and maintenance of the facilities by the Owner. An interruption of the commissioning period under these circumstances will require a re-start of commissioning once required repairs and corrections are made by the Contractor. Should the commissioning period be halted for any reason related to the facilities constructed or the equipment furnished under this Contract, the commissioning shall be repeated until the specified continuous period has been accomplished without interruption.

Final O&M manuals for the facilities must be accepted and ready for turnover to the Owner before the start of commissioning.

C. TRAINING

During the phase of water testing of equipment, the Contractor shall make available experienced factory-trained representatives of the manufacturers of all the various pieces of equipment, to train the Owner's personnel in the operation and maintenance thereof. The time required for this training shall be as covered in the specifications for the specific piece of

equipment. The Contractor shall notify the Engineer of the time of the training at least 10 days prior to the start time of the training.

1.4 SUBMITTALS

A. STARTUP AND TESTING PLAN

Prior to receipt of any progress payments in excess of 60 percent of the Contractor's total bid for the work, the Contractor shall submit to the Engineer five copies of a startup and testing plan with details of the installed tests and inspection procedures he proposes to adopt for testing and startup of all equipment to be operated singly and together.

B. TRAINING OUTLINE

The Contractor shall submit five copies of a detailed outline of training activities to be performed by each manufacturer's representative 10 days prior to the start time of the training. This outline shall indicate how the manufacturer's representative is going to allocate the required specified number of training hours to fulfill these contractual obligations.

PART 2 PRODUCTS

2.1 INSTALLATION

Materials employed in the installation shall conform to the requirements of the Contract Documents and the recommendations of the equipment manufacturers.

2.2 TESTING

A. GAUGES, METERS, RECORDERS, AND MONITORS

Gauges, meters, recorders, and monitors shall be provided by the Contractor as required to supplement or augment the instrumentation system provided under this Contract to properly demonstrate that all equipment fully satisfies the requirements of the Specifications. All devices employed for the purpose of measuring the performance of the facility's equipment and systems shall be specifically selected to be consistent with the variables to be monitored. All instruments shall be recently calibrated, and the Contractor shall be prepared at all times to demonstrate, through recalibration, the accuracy of all instruments employed for testing purposes. Calibration procedures shall be in accordance with applicable standards of ASTM, ISA, and IEEE. The adequacy of all gauges, meters, recorders and monitors shall be subject to review by the Engineer.

B. RECORDS

The Contractor shall provide sign-off forms for all installed and operational testing to be accomplished under this Contract. Sign-off forms shall be provided for each item of mechanical, electrical and instrumentation equipment provided or installed under this Contract and shall contain provisions for recording relevant performance data for original testing and not less than three retests. Separate sections shall be provided to record values for the preoperation checkout, as well as signatures of representatives of the equipment manufacturers, the Contractor, and the Engineer.

C. TEMPORARY TEST FACILITIES AND MODIFICATIONS

The Contractor shall provide and install all necessary temporary equipment, and other facilities and modifications to enable the operational testing of the permanent facility components. Operational testing requiring the recirculation of water or process fluids within the facility shall be performed by the Contractor using temporary facilities, if needed, provided and installed by the Contractor. Temporary facilities shall be removed by the Contractor once the required testing is completed.

PART 3 EXECUTION

3.1 INSTALLATION

All equipment and apparatus used in testing shall be installed by specialists properly skilled in the trades and professions required to assure first-class workmanship. Where required by detailed Specifications, the Contractor shall cause the installation of specific equipment testing items to be accomplished under the supervision of factory-trained installation specialists furnished by the equipment manufacturers. The Contractor shall be prepared to document the skills and training of all workmen engaged in the installation of all testing equipment furnished either by the Contractor or the Owner.

3.2 TESTING

Testing shall proceed on a step-by-step basis in accordance with the Contractor's written testing procedures. The Contractor's testing work shall be accomplished by a skilled team of specialists under the direction of a coordinator whose sole responsibility shall be the orderly, systematic testing of all equipment, systems, structures, and the complete facility as a unit. Each individual step in the procedures shall be witnessed by a representative of the Engineer.

During the facility operational testing period, all equipment and systems in operation shall be operated to the greatest extent practicable, at conditions, which represent the full range of operating parameters as defined by the Contract Documents.

3.3 TRAINING

Training of the Owner's personnel shall be done by experienced technical manufacturers' representatives. Training shall be provided during a scheduled, dedicated session and shall not be combined with other field services such as equipment testing, startup and check-out. When required by these specifications, the training sessions shall be video and audio-taped by the Contractor and the final DVD delivered to the Owner. These manufacturers' representatives shall follow the outline presented here:

GENERAL OUTLINE FOR MANUFACTURER PRESENTATIONS

A. FAMILIARIZATION

1. Overview explaining theory of operation.
2. Show catalog, parts lists, drawings, etc., in the shop drawings and O&M manuals. Clearly identify the model or identification number of the equipment for which training is being provided.
3. Check out the installation of the specific equipment items.
4. Demonstrate the unit and show that all parts of the Specifications are met.
5. Answer questions.

B. SAFETY

1. Point out safety references.
2. Discuss proper precautions around equipment.

C. OPERATION

1. Point out reference literature.
2. Explain all modes of operation (including emergency).

3. Check out Owner's personnel on proper use of the equipment.
(Let them do it).

D. PREVENTIVE MAINTENANCE (PM)

1. Pass out PM list including:
 - a. Reference material.
 - b. Daily, weekly, monthly, quarterly, semi-annual, and annual jobs.
2. Show how to perform PM jobs.
3. Show Owner's personnel what to look for as indicators of equipment problems.

E. CORRECTIVE MAINTENANCE

1. List possible problems.
2. Discuss repairs - point out special problems.
3. Open up equipment and demonstrate procedures, where practical.

F. PARTS

1. Show how to use parts list and order parts.
2. Check over spare parts on hand. Make recommendations.

G. LOCAL REPRESENTATIVES

1. Where to order parts: Name, address, telephone, fax, e-mail.
2. Service problems:
 - a. Who to call.
 - b. How to get emergency help.

3.4 FACILITY OPERATIONAL TESTING

The systems described below shall be tested to demonstrate the performance of mechanical, electrical, instrumentation and control subsystems together as an integrated system. Where the testing described in this Section conflicts with the testing requirements specified for individual equipment, or the manufacturer's recommended testing procedure, those requirements and procedures shall prevail.

Facility operational testing shall be sequenced in coordination with the work sequence specified in Section 01110.

***** END OF SECTION *****

DIVISION 2

SITework

SECTION 02050

LOCATE EXISTING UTILITIES

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the anticipated conflicts, which may exist with existing utilities. A reasonable attempt has been made to locate the existing utilities; however, the exact location, and/or depth are unknown in most instances. Locations and dimensions shown in the Plans for existing facilities are in accordance with available information obtained without uncovering, measuring, or other verification. It shall be the responsibility of the Contractor to locate existing utilities and their depth.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01200	Measurement and Payment
02250	Temporary Shoring and Bracing
02300	Earthwork

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall determine the difficulties to be encountered in constructing the Project and his locate effort based upon the information provided on the Plans, field investigation, and the Contractor's contacts with the existing utility companies. The Contractor shall determine the extent of exploration required to first prevent damage to those existing utilities, and secondly to determine if the proposed improvements are in conflict with existing utilities.

The Contractor shall locate existing utilities sufficiently ahead of construction so that the Engineer can modify the alignment, or grade prior to construction. Where underground utilities are found to be in the way of construction, such condition shall not be deemed to be a changed or differing site condition. If necessary, pipe alignment or grade shall be modified at the Contractor's expense.

The Contractor shall call the Utility Location Request Center (One Call Center), for field location, not less than 2 nor more than 10 business days before the scheduled date for commencement of excavation that may affect underground utility facilities, unless otherwise agreed upon by the parties involved. A business day is defined as any day other than Saturday, Sunday, or a legal local, State, or Federal holiday. The telephone number for the One Call Center for this project is (800) 424-5555. If no one-number locator service is available, notice shall be provided individually to those owners known to or suspected of having underground facilities within the area of the proposed excavation.

The Contractor is alerted to the existence of Chapter 19.122 RCW, a law relating to underground utilities. Any cost to the Contractor incurred as a result of this law shall be at the Contractor's expense.

No excavation shall begin until all know facilities in the vicinity of the excavation area have been located and marked.

***** END OF SECTION *****

SECTION 02240

DEWATERING

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes dewatering excavations of any kind and location, including but not limited to groundwater, surface water, and precipitation, until backfilling has been completed to finished grade.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01160	Regulatory Requirements
01200	Measurement and Payment
01300	Submittals
02300	Earthwork
02370	Erosion Control

1.3 SUBMITTALS

Prior to the start of construction, the Contractor shall submit a dewatering plan in accordance with Section 01300 containing both a graphical and narrative presentation identifying proposed methods, equipment sizes and contingency plans should dewatering cause settlement of any adjacent facilities. The dewatering plan shall show specific locations, in plan and section, where dewatering is expected as well as a general discussion of methods to be employed should water be encountered in other locations. The plan shall detail the depth, diameter and anticipated flow for dewatering wells, well points or sumps.

Acceptance by the Owner of the method, installation, and operation and maintenance details submitted by the Contractor shall not in any way be considered to relieve the Contractor from full responsibility for errors therein or from the entire responsibility for complete and adequate design and performance of the system in controlling the water level in the excavated areas, and for control of the hydrostatic pressures to the depths specified herein. The Contractor shall be solely responsible for the proper design, installation, proper operation, maintenance, and any failure of any component of the dewatering system.

1.4 REFERENCES

“Rossum J.R., 1954, *Control of Sand in Water Systems*, Journal American Water Works Association, Volume 46, pp. 123-132”

1.5 QUALITY CONTROL

It shall be the sole responsibility of the Contractor to control the rate and effect of the dewatering efforts to avoid all objectionable settlement and subsidence. The Contractor shall comply with local codes and ordinances of governing authorities with regard to disposal of water pumped from dewatering operations.

Proposed discharge points shall be approved by the Owner prior to implementation of dewatering. The Contractor shall be responsible for taking all reasonable precautions necessary to ensure continuous, successful operation of the system.

PART 2 PRODUCTS

The Contractor shall have sufficient pumping equipment and/or other machinery available onsite before operations begin to assure that the operation of the dewatering system can be maintained.

PART 3 EXECUTION

3.1 INSTALLATION AND APPLICATION

During excavation, the installation of piping, conduits and structures and during the placing of backfill, excavations shall be kept free of water, subsurface or otherwise. The Contractor shall furnish all equipment necessary to dewater the excavations and shall dispose of the water so as not to cause a nuisance or menace to the public. The dewatering system shall be installed and operated by the Contractor so that the groundwater level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property. The release of groundwater to its static levels shall be performed so as to maintain the undisturbed state of the foundation soils, prevent disturbance of backfill and prevent movement of all structures and pipelines.

Design implementation and maintenance of any dewatering system shall be the responsibility of the Contractor.

The Contractor shall construct all dewatering wells in accordance with WAC 173-160. The dewatering system shall be sufficient to maintain the groundwater level at an elevation to protect the surface of the trench bottoms, the base of the bedding course or other foundation, and shall be accomplished prior to pipe laying and jointing or placement of reinforcing steel for concrete.

If well points or wells are used, they shall be adequately spaced to provide the necessary dewatering. The dewatering operation, however accomplished, shall be

carried out so that it does not destroy or weaken the strength of the soil under or alongside the excavations.

The Contractor shall design filters and screen slot sizes for all sumps, wells and well points which prevents the movement of fines during pumping. The Contractor shall develop the wells such that they produce no more than 10-ppm silica as measured with a Rossum Sand Tester (Rossum, 1954) or equivalent.

3.2 FIELD QUALITY CONTROL

A continual check by the Contractor shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation. The Contractor shall test all dewatering discharge using a Rossum Sand Tester or equivalent to determine the silica content of the discharge. The Contractor shall notify the Owner at least 24 hours prior to testing. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, reference points shall be established and observed at frequent intervals to detect any settlement that could develop.

Should settlement be observed, the Contractor shall cease dewatering operations and implement contingency plans as outlined in the Contractor's approved dewatering plan. The responsibility for conducting the dewatering operation in a manner that protects adjacent structures and facilities rests solely on the Contractor. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the Contractor. Permanent piping systems, existing or new, shall not be incorporated into the Contractor's dewatering system.

***** END OF SECTION *****

SECTION 02300

EARTHWORK

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the earthwork, including trench excavation and backfill for piping, excavation and backfill for structures, and finish grading.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01200	Measurement and Payment
01300	Submittals
01500	Temporary Facilities
02240	Dewatering
02250	Temporary Shoring and Bracing
02305	Wet Weather Earthwork
02370	Erosion Control
02700	Gravel Materials

PART 2 PRODUCTS

2.1 GRAVEL MATERIALS

All gravel materials shall conform to Section 02700.

PART 3 EXECUTION

3.1 PREPARATION

Excavation may commence once all erosion control measures are in place in accordance with the Plans and Section 02370 and to the satisfaction of the Owner.

3.2 GENERAL REQUIREMENTS

Excavation, compaction and backfill for structures, pipelines and the final site contours shall be formed by either excavating or compacting fill, as required, to provide the cross-sections as shown on the Plans.

All excavation performed on this Project shall be considered unclassified.
Excavation shall consist of the removal of any and all material encountered,

including debris, rubble, concrete, metal, topsoil, cutting and removal of existing surfacing, tree stumps, trees, logs, abandoned rail ties, abandoned piping, piling, riprap, etc.

Excavations shall be kept free of water, both surface water and groundwater, during the excavation, installation of pipelines and structures, and the placement of backfill. For additional requirements see Section 02240.

The Contractor's attention is also called to the depth of the structures and piping; for this reason, special shoring and bracing may be required. All shoring and bracing or sheeting required to perform and protect the excavation and to safeguard the employees, shall be furnished by the Contractor. For additional requirements see Section 02250.

No timber bracing, lagging, sheathing or other lumber shall be left in any excavation except with permission of the Engineer and in the event such permission is granted, no separate payment shall be allowed for burying such material.

All stockpiles shall be covered with plastic and no stockpile shall be higher than 6 feet above existing grade.

3.3 EXCAVATION AND BACKFILL FOR STRUCTURES

Excavation and backfill for structures shall be in conformance with Section 2-09 of the WSDOT Standard Specifications, and as further described herein. All excavation for structures shall be done to the dimensions and levels indicated on the Plans or specified herein. Excavation shall be made to such width outside the lines of the structures to be constructed as may be required for proper working methods, the erection of forms and the protection of the work.

Excavation shall consist of the removal of any and all material encountered to the elevations shown on the Plans. Excavations for structures shall be continued down to the subgrade which is defined as 12 inches below concrete mat foundations, concrete footings, and slab on grade floors for the installation of foundation gravel material, unless otherwise noted on the Plans.

Fill material placed under structures, including footings and floor slabs, shall be foundation gravel free from debris and organics, as specified in Section 02700.

The Contractor shall notify the Engineer when excavation for compacted fill or structures is complete. No forms, reinforcing steel, or concrete shall be placed until the excavation has been inspected by the Engineer.

Backfill for structures shall be suitable native material, free of organics and particles greater than 4 inches or Gravel Backfill for Walls as specified in Section 02700.

There is no warranty that the native material is suitable for backfill or is suitable, as excavated, for placement and compaction as required by these Specifications. In the event that the Contractor is unable to find onsite, sufficient native material to accomplish the structure backfilling, the select material that he shall furnish, and install shall be Bank Run Gravel for Trench Backfill, as specified in Section 02700.

3.4 PROTECTION OF FOUNDATION SURFACES

Care shall be taken to preserve the foundation surfaces shown on the Plans in an undisturbed condition. If the Contractor unnecessarily over excavates or disturbs the foundation surfaces shown on the Plans or specified herein without written authorization of the Engineer the Contractor shall replace such foundations with concrete fill or other suitable material approved by the Owner in a manner which will show by test an equal bearing capacity with the undisturbed foundation material. No additional payment shall be made for the added quantity of concrete fill or other suitable material used because of unnecessary over excavation caused by the Contractor or their operations.

3.5 EXCAVATION AND BACKFILL FOR TRENCHES

Excavation and backfill for trenches shall be in conformance with Sections 7-08 and 7-09 of the WSDOT Standard Specifications, and as further described herein. The following pipe materials shall be considered flexible:

- PVC
- Polyethylene Tubing
- FRP
- HDPE
- Polyethylene
- Corrugated Polyethylene

All other pipe materials shall be considered rigid.

Upon completion of work each day, all pipeline open trenches shall be completely backfilled, leveled, and temporarily patched or graveled, as herein specified. Under certain conditions, the trench may be left open at the last length of pipe laid during the day to avoid re-excavation the following morning, provided that the opening is adequately plated or covered for vehicle traffic. Special attention shall be given to barricading to keep vehicular traffic away from newly-backfilled trench areas until restored for traffic.

The Engineer reserves the right to restrict the Contractor in the amount of trench for pipeline that can be opened during the working day. Should the Contractor, in the Engineer's opinion, fail to diligently pursue backfilling, an allowable limit of open trench shall be 100 lineal feet and shall be strictly enforced.

The width of the trench at or below a point 12 inches above the top of the outside diameter of the pipe shall be carefully controlled and maintained to ensure the strength of the pipe and prevent pipe failures. Backfilling shall proceed as follows:

A. SUBGRADE PREPARATION

The subgrade for piping is defined as the elevation of the bottom of the pipe bedding material as shown on the Plans.

In the event unsuitable material is encountered below the subgrade shown on the Plans and described herein, the Contractor, as required by the Engineer, shall over-excavate until a suitable foundation is reached. If over-excavation of unsuitable material is required by the Engineer, it will be paid for under the unit price bid item entitled "UNSUITABLE EXCAVATION," as found in the Proposal. The Contractor shall then replace the material with compacted foundation gravel, as specified in Section 02700. Imported foundation gravel is required, it will be paid under the unit price bid item titled "FOUNDATION GRAVEL."

Quantities, if any, shall be calculated by neat line measurement to the depth agreed to in the field by the Engineer.

B. BEDDING FOR RIGID PIPE

Above the foundation material, if any, the bedding material shall be suitable native or Gravel Backfill for Pipe Bedding, as specified in Section 02700. This material shall be placed in lifts of approximately 8 inches up to a point 12 inches above the pipe. This material shall be hand shoveled in place and carefully worked under and around the pipe.

C. BEDDING FOR FLEXIBLE PIPE

Above the foundation material, if any, Gravel Backfill for pipe bedding, as specified in Section 02700, shall be placed in lifts of approximately 8 inches up to a point 12 inches above the pipe. This material shall be hand shoveled in place and carefully worked under and around the pipe.

D. BACKFILL FOR TRENCHES

Partial backfill to protect the pipe will be permitted immediately after the pipe has been properly laid in accordance with the Plans and these Specifications. Complete backfilling of trenches will not be permitted until the section of pipe installed has been inspected by the Engineer.

From the point 12 inches above the top of the pipe barrel, the backfill material to be used in the trench section shall be suitable native material or Bank Run Gravel for Trench Backfill, as specified in Section 02700, except where required or shown on the Plans to use other material. The Contractor shall place backfill in horizontal lifts not to exceed 8 inches in thickness. All backfill shall be free of large rocks, organic matter, stumps, trees, pieces of pavement, broken concrete and other deleterious substances.

The Contractor shall remedy, at their expense, any defects that appear in the backfill prior to final acceptance of the work. Cleanup operations shall progress immediately behind backfilling to accommodate the return to normal use of the trench area.

During placement of the initial lifts, the backfill material shall not be bulldozed into the trench or dropped directly over the pipe with less than 3 feet of backfill material above the top of the pipe.

3.6 REUSE AND DISPOSAL OF EXCAVATED MATERIAL

Excavated materials shall be properly protected and reused where possible. Excavated materials not used for fill shall be hauled to an approved waste site(s), as selected by the Contractor. The Contractor shall submit a list of approved waste haul site(s) to the Owner prior to the commencement of hauling of waste materials. Any permits required for waste haul and disposal shall be the responsibility of the Contractor.

3.7 FINAL SITE GRADING

The site shall be graded consistent with the elevations shown on the Plans. The slopes between elevations shall be uniform or as shown on the Plans. Excavations and backfill shall be to the elevations required for the placement of all surface restorations, such as asphalt, concrete, gravel surfacing, or landscaping. All areas shall be graded to provide proper drainage. The final ground surface shall be smooth, raked free of debris and stones, and prepared for restoration as specified in Section 02900.

3.8 STRUCTURE COMPACTION

The foundation gravel material placed underneath all structures shall be moisture conditioned to within 3 percent of optimum moisture content and shall be placed in loose, horizontal layers. The thickness of layers placed before compaction shall not exceed 8 inches for heavy equipment compactors and shall not exceed 4 inches for hand-operated mechanical compactors. Water settlement is not allowed for compaction.

Layers shall be compacted to a dense state equaling at least 95 percent of the maximum dry density, using the Modified Proctor, per ASTM D1557. Prior to the placement of fill below structures, any and all groundwater and surface water shall be drained or pumped from areas to be filled.

Wall backfill material shall be compacted to at least 90 percent of the maximum dry density, using the Modified Proctor, per ASTM D1557 within 5 feet of all walls and shall be compacted to at least 95 percent of the maximum dry density, using the Modified Proctor, per ASTM D1557 beyond 5 feet of all walls. Any and all compaction within 5 feet of all walls shall be accomplished by means of hand-operated mechanical equipment rather than heavy equipment compactors.

3.9 TRENCH COMPACTION

Trench backfill materials shall be moisture conditions to within three percent of optimum moisture content. Water settlement is not allowed for compaction.

Pipe bedding materials, for both rigid and flexible pipes, shall be compacted to at least 95 percent of the maximum dry density, using the Modified Proctor, per ASTM D1557.

Compaction of the backfill above the bedding material in all trenches in non-structural and non-paved areas shall be performed by using mechanical equipment to at least 90 percent of the maximum dry density, using the Modified Proctor, per ASTM D1557.

Compaction of the backfill above the bedding material in all trenches in structural or paved areas shall be performed by using mechanical equipment to at least 95 percent of the maximum dry density, using the Modified Proctor, per ASTM D1557.

***** END OF SECTION *****

SECTION 02305

WET WEATHER EARTHWORK

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the procedures to be followed if earthwork is to be accomplished in wet weather or in wet conditions where control of soil moisture is difficult.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01200	Measurement and Payment
01300	Submittals
02300	Earthwork
02370	Erosion Control
02700	Gravel Materials

PART 2 PRODUCTS

The size or type of construction equipment shall be selected as required to prevent soil disturbance. In some instances, it may be necessary to limit equipment size or to excavate soils with a backhoe, Gradall, or equivalent type of equipment to minimize subgrade disturbance caused by construction traffic.

Material used as structural fill during wet weather earthwork shall generally consist of clean granular material containing less than 5 percent fines (material passing the U.S. Standard No. 200 sieve), based on wet sieving the fraction passing the 3/4-inch sieve. The fines shall be non-plastic.

PART 3 EXECUTION

3.1 WET WEATHER EXCAVATION AND FILL PLACEMENT QUALITY CONTROL

Excavation and placement of fill or backfill material will be observed on a full-time basis by the Owner, to determine that all work is being accomplished in accordance with these Specifications.

3.2 WET WEATHER EARTHWORK PROTECTION

The ground surface shall be sloped away from construction areas to promote the rapid runoff of precipitation and prevent ponding of water.

Earthwork shall be accomplished in small sections to minimize exposure to wet weather. Excavation or the removal of unsuitable soil shall be followed immediately by the placement and compaction of a suitable thickness (generally 8 inches or more if approved by the Owner) of clean foundation gravel.

No soil shall be left uncompacted and exposed to moisture. A smooth drum vibratory roller, or equivalent, shall be used to seal the ground surface after placement of fill or backfill materials.

All wet weather work shall meet local, state and federal codes as specified herein and as indicated on the Plans.

***** END OF SECTION *****

SECTION 02370

EROSION CONTROL

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the temporary erosion and sedimentation control (TESC) in and around the site caused by the actions of the Contractor as shown on the Plans and as specified herein.

Work under this Section shall be directed towards site areas disturbed during construction as well as all off-site storage and parking areas maintained by the Contractor.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01160	Regulatory Requirements
01200	Measurement and Payment
01300	Submittals
02240	Dewatering
02300	Earthwork

1.3 SUBMITTALS

The Contractor shall submit a TESC plan to the Contracting Agency for approval prior to starting any work.

1.4 CERTIFIED EROSION AND SEDIMENT CONTROL LEAD (CESCL)

The Contractor shall designate a Certified Erosion and Sediment Control Lead (CESCL) for this project. The CESCL shall have, for the life of this Contract, a current Certificate of Training in Construction Site Erosion and Spill Control signed by the WSDOT Water Quality Program Manager.

Duties of the CESCL shall include, but are not limited to:

- A. Inspecting temporary erosion and spill control Best Management Practice (BMPs) for proper location, installation, maintenance, and repair. Inspections shall be made as noted on the Plans and after each significant precipitation event, including those that occur during weekends and after working hours. A Temporary Erosion and Spill Control Inspection Report shall be prepared for each inspection and shall be included in the

Temporary Erosion and Spill Control file. The inspection report shall include, but not be limited to:

1. When BMPs are installed, removed or changed;
 2. Repairs needed or made;
 3. Turbidity monitoring results;
 4. Observations of BMP effectiveness and proper placement;
 5. Recommendations for improving performance of BMPs.
- B. Prepare and maintain a Temporary Erosion and Spill Control file on site that includes but is not limited to:
1. Temporary Erosion and Spill Control Inspection Reports;
 2. Contractor's Stormwater Pollution Prevention Plan (SWPPP);
 3. Spill Prevention, Control, and Countermeasures (SPCC) Plan;
 4. All project permits, including but not limited to grading permits and Hydraulics Project Approval;
 5. Manufacturer instructions for all products used for TESC BMPs;
 6. Washington State Department of Ecology's Stormwater Management Manual for Western Washington, Chapter 4, Volume II, current edition.

PART 2 PRODUCTS

2.1 SILT FENCES

Silt fences shall conform to the details shown on the Plans and the fabric shall conform meet the requirements of Geotextile for Temporary Silt Fence of Section 9-33 of the WSDOT Standard Specifications.

2.2 EROSION CONTROL BLANKET

On all disturbed slopes steeper than 2H:1V, an erosion control blanket shall be placed and secured per manufacturer's recommendation with a biodegradable means.

The erosion control blanket shall be temporary, biodegradable and is to remain in place.

The erosion control blanket shall be "Biomac C" as manufactured by MacCaferri, Inc. or "Curlex II," as manufactured by American Excelsior Co., or Equal.

PART 3 EXECUTION

3.1 PREPARATION

Site preparation work shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture or other unsatisfactory conditions prevail, the work shall be stopped.

3.2 BEST MANAGEMENT PRACTICES (BMPS)

Silt fences shall be constructed to control erosion and migration of soils disturbed during construction. The fences and dams shall provide temporary protection and shall be removed only upon approval of the Owner.

All areas or drainage ways downstream of the construction site shall have Best Management Practices (BMPs) installed prior to the beginning of any clearing activities. Runoff from cleared or disturbed area shall be directed through the BMPs. Disturbed ground shall be stabilized at the end of each work day. Permanent soil stabilization and erosion and sedimentation control shall be implemented upon reaching finish grade. Slope protection shall be immediately implemented upon any soils showing signs of erosion. This shall be done in a manner approved by the Owner.

All BMPs shall be inspected, maintained and kept in a condition sufficient to provide effective erosion and sedimentation control at all times. The site shall be inspected to ensure the BMPs are properly located, constructed and operating as designed during the first storm. Any necessary adjustments or repairs shall be made immediately and be approved by the Owner. The BMPs shall be inspected thereafter and after all significant storm events. Turbidity monitoring will be held on a weekly basis at a minimum, or more frequently if necessary as determined by the CESCL.

All BMPs shall be removed no later than 30 consecutive calendar days after final site stabilization has been achieved as determined by the Owner. BMPs such as storm drain inlet protection, straw bales, silt fences and supports and plastic coverings shall be removed and properly disposed of offsite by the Contractor. Areas disturbed by removal of these BMPs shall be immediately stabilized in a manner approved by the Owner.

***** END OF SECTION *****

SECTION 02700

GRAVEL MATERIALS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the various types of granular materials that are to be used in trenches and other excavations as shown on the Plans and as specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01200	Measurement and Payment
01300	Submittals
02300	Earthwork
02305	Wet Weather Earthwork

1.3 SUBMITTALS

The Contractor shall provide certificates of laboratory tests in accordance with Section 01300, indicating particle size distribution for review for each type of granular material furnished and proctor test reports for all material to be placed as pipe bedding material, trench backfill, backfill under and around structures and underneath crushed surfacing and asphalt concrete pavements.

The certificates and proctor test reports shall be provided to the Owner at least 5 calendar days prior to placement.

PART 2 PRODUCTS

2.1 FOUNDATION GRAVEL

Foundation gravel shall be Class A Gravel Backfill for Foundations in conformance with Section 9-03.12(1)A of the WSDOT Standard Specifications.

2.2 GRAVEL BACKFILL FOR PIPE BEDDING

Gravel backfill for pipe bedding shall meet the requirements of Section 9-03.12(3) of the WSDOT Standard Specifications.

Native granular material shall not be utilized for gravel backfill for pipe bedding.

2.3 BANK RUN GRAVEL FOR TRENCH BACKFILL

Bank run gravel for trench backfill shall be free from organic matter or other deleterious materials and in conformance with Section 9-03.19 of the WSDOT Standard Specifications.

2.4 CRUSHED SURFACING

Crushed surfacing base course and top course shall conform to Section 9-03.9(3) of the WSDOT Standard Specifications.

2.5 MISCELLANEOUS GRAVEL

If the Plans call for a gravel that is not herein specified than the gravel shall conform to the type of gravel called for as per the WSDOT Specifications.

PART 3 EXECUTION

3.1 FOUNDATION GRAVEL

Foundation gravel shall be placed and compacted underneath all structures to a minimum depth of 12 inches unless indicated otherwise on the Plans, and to a greater depth where foundations are unstable and excess suitable excavated material is unavailable to stabilize such foundations.

In the event the Contractor unnecessarily overexcavates the pipe trench or structure foundation, or if the width of the pipe trench becomes wider than the pay limit shown on the Plans, all material so placed shall be at the Contractor's sole expense.

3.2 GRAVEL BACKFILL FOR PIPE BEDDING

Bedding material shall be placed simultaneously on both sides of the pipe for the full width of the trench in lifts not exceeding 6 inches. To assure uniform support, the material shall be carefully worked underneath the pipe haunches with a tool capable of preventing the formation of void spaces around the pipe. In the event the Contractor overexcavates the pipe trench, or if the width of the pipe trench becomes wider than the pay limit shown on the Plans, all material so placed shall be at the Contractor's sole expense.

3.3 BANK RUN GRAVEL FOR TRENCH BACKFILL

Bank run gravel for trench backfill shall be used where excavated material is unsuitable or unavailable for the backfill of trenches as approved by the Owner.

In the event the Contractor overexcavates the pipe trench, or if the width of the pipe trench becomes wider than the pay limit shown on the Plans, all material so placed shall be at the Contractor's sole expense.

3.4 CRUSHED SURFACING

Crushed surfacing base course and/or top course shall be placed underneath asphalt paving, to the lines and grades shown on the Plans or as required by the Plans and shall be compacted to a dense, unyielding state of at least 95 percent of the maximum dry density, using the modified Proctor, per ASTM D1557.

3.5 MISCELLANEOUS GRAVEL

Miscellaneous gravel shall be installed per the Plans.

***** END OF SECTION *****

DIVISION 3

CONCRETE

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes reinforcement and associated items for all concrete, including, but not necessarily limited to: reinforcing steel bars, wire fabric, and accessories for cast-in-place concrete.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
03300	Cast In Place Concrete

1.3 REFERENCES

This Section references the latest revisions of the following documents:

<u>Reference</u>	<u>Title</u>
ACI 301	Structural Concrete for Buildings
ACI 318	Building Code Requirements for Structural Concrete
ACI SP-66	American Concrete Institute - Detailing Manual
ANSI/ASTM A82	Cold Drawn Steel Wire for Concrete Reinforcement
ANSI/ASTM A185	Welded Steel Wire Fabric for Concrete Reinforcement
ANSI/AWS D1.4	Structural Welding Code for Reinforcing Steel
ASTM A615	Deformed and Plain Billet Steel Bars for Concrete Reinforcement

1.4 SUBMITTALS

Submit in accordance with provisions of Section 01300.

A. SHOP DRAWINGS

Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and welded wire fabric, bending and cutting schedules, and supporting and spacing devices.

B. MANUFACTURER'S CERTIFICATE

Certify that reinforcing bar and welded wire fabric meet or exceed specified requirements.

Submit certified copies of mill test reports of reinforcement materials analysis.

1.5 QUALITY ASSURANCE

Perform Work in accordance with ACI 301.

1.6 COORDINATION

Coordinate with placement of formwork, formed openings, and other Work.

PART 2 PRODUCTS

2.1 REINFORCEMENT

A. REINFORCING STEEL

ASTM A615, deformed bars: Grade 40 for #3 bars and smaller, Grade 60 for #4 bars and larger, unless noted otherwise on the Plans.

B. WELDED STEEL WIRE FABRIC

ASTM A185 Plain Type; in flat sheets; plain.

2.2 ACCESSORY MATERIALS

A. TIE WIRE

Minimum 16-gauge annealed type.

B. CHAIRS, BOLSTERS, BAR SUPPORTS, SPACERS

Sized and shaped for strength and support of reinforcement during concrete placement conditions including load-bearing pad on bottom where required to prevent vapor barrier puncture.

**C. SPECIAL CHAIRS, BOLSTERS, BAR SUPPORTS, SPACERS
ADJACENT TO WEATHER EXPOSED CONCRETE SURFACES**

Plastic-coated steel type; size and shape as required.

D. MECHANICAL BAR SPLICES

Comply with ACI 318 requirement of minimum tensile strength of 125 percent of specified yield for reinforcement.

Subject to compliance with the requirements and approval of the Engineer, products, which may be incorporated into the work include, but are not limited to, the following:

BAR-LOCK (MBT) Coupler Systems
“ERICO” REBAR SPLICING

E. ADHESIVE ANCHORS

Injection adhesive system shall consist of a dual-cylinder adhesive refill pack, a mixing nozzle, and dispenser. The adhesive shall be formulated to include resin and hardeners.

1. Subject to compliance with the requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. HIT RE 500 Injection Adhesive Anchor, Hilti, Inc.
 - b. SET-XP, Simpson Strong Tie, Inc.
 - c. PE1000+, Powers Fasteners, Inc.

2.3 FABRICATION

Fabricate concrete reinforcing in accordance with ACI SP-66. Obtain written approval from the Engineer prior to welding reinforcing steel. Weld reinforcement in accordance with ANSI/AWS D1.4.

PART 3 EXECUTION

3.1 PLACEMENT

Comply with Concrete Reinforcing Steel Institute’s recommended practice for “Placing Reinforcing Bars” for details and methods of reinforcement placement and supports, and as herein specified. Avoiding cutting or puncturing vapor barrier during reinforcement placement and concreting operations.

Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete. Accurately position, support, and

secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal/plastic chairs, runners, bolsters, spacers, and hangers, as required.

Install reinforcing bars with clearance indicated on the Plans. Provide laps as shown and stagger locations to minimize the concentration of multiple reinforcing at joints. Bar lap splicing shall have full contact. Where full contact cannot be achieved, the maximum space between the spliced bars shall not exceed 2 inches. Unless noted otherwise on the Plans, provide two #5 minimum trim bars around all openings and penetrations. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with tie wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

***** END OF SECTION *****

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes schedules, notes, and details for the construction of cast-in-place concrete structures, landings, equipment piers, housekeeping pads and slabs on grade.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01300	Submittals
01310	Project Meetings
01400	Quality Control
03200	Concrete Reinforcement

1.3 REFERENCES

This Section references the latest revisions of the following documents:

<u>Reference</u>	<u>Title</u>
ACI 117	Specifications for Tolerances for Concrete Construction and Materials and Commentary
ACI 212.3	Chemical Admixtures for Concrete
ACI 301	Specifications for Structural Concrete
ACI 304	Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI 305	Hot Weather Concreting
ACI 306	Cold Weather Concreting
ACI 309	Guide for Consolidation of Concrete
ACI 318	Building Code Requirements for Structural Concrete and Commentary
ACI 350	Code Requirements for Environmental Engineering Concrete Structures and Commentary
ACI 347	Guide to Formwork for Concrete
ACI 350.1	Tightness Testing of Reinforced Engineering Concrete Structures and Commentary
ASTM C31	Making and Curing Concrete Test Specimens in the Field
ASTM C33	Concrete Aggregates
ASTM C39	Compressive Strength of Cylindrical Concrete Specimens

ASTM C42	Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C94	Ready-Mixed Concrete
ASTM C131	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C143	Slump of Hydraulic Cement Concrete
ASTM C150	Portland Cement
ASTM C172	Sampling Freshly Mixed Concrete
ASTM C173	Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C231	Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Air-Entraining Admixtures for Concrete
ASTM C309	Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C494	Chemical Admixtures for Concrete
ASTM C535	Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C618	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
ASTM C881	Epoxy-Resin-Base Bonding Systems for Concrete

1.4 SUBMITTALS

Submittals shall be in accordance with Section 01300.

A. GENERAL

The submittal for each included concrete mix shall include, as a complete package, the following as defined below:

1. Concrete Mix Design
2. Certified Test Results
3. Sieve Analysis
4. Product Data

An incomplete concrete mix submittal package may render a rejection of the mix or could delay the review process.

B. CONCRETE MIX DESIGN

Submit mix design for the proposed mix to be used on the Project, indicating components, and proportions by weight, including any admixtures. Mix design shall state chloride content. Mix designs to be provided are:

1. Unspecified Concrete
2. Lean Concrete
3. Cement Grout

C. CERTIFIED TEST RESULTS

Submit laboratory test results indicating compressive strength of concrete in compliance with requirements specified herein and in accordance with ACI 301.

D. SIEVE ANALYSIS

Submit sieve analysis for proposed coarse and fine aggregates indicating components, source, gradation, and WSDOT aggregate source approval report, including WSDOT Aggregate Source ID.

E. PRODUCT DATA

Provide product data on all proposed admixtures, accessories, and embedded items to be used on the Project, including, but not limited to:

1. Cement; source and type
2. Air Entraining Agent
3. Water Reducing Admixtures
4. Pozzolans
5. Bonding Agents
6. Curing Compounds/Floor Hardeners
7. Non-Shrink Grout; Non-metallic and Metallic
8. Plastic Joint Formers

For admixtures other than those proposed for air entrainment, submit a letter from the manufacturer describing the benefits of its use for the project and effect of its use on the properties of the concrete. Product data shall expressly state admixtures are chloride free, or the manufacturer shall submit a letter certification stating the same.

F. MATERIAL DELIVERY TICKETS

Provide copies of all concrete and grout material delivery tickets for the Project to the Engineer.

1.5 QUALITY ASSURANCE

Perform work in accordance with ACI 301. Acquire cement and aggregates from same source for all work performed on the Project. Conform to ACI 305 when concreting during hot weather. Conform to ACI 306 when concreting during cold weather. Provide or coordinate field and laboratory testing as described later in this Section and under provisions of Section 01400.

1.6 COORDINATION

Coordinate work in accordance with provisions of Section 01310. Coordinate the placement of embedded items with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 FORM MATERIALS

A. FORMS FOR EXPOSED FINISH CONCRETE

Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on the Plans.

B. FORMS FOR UNEXPOSED FINISH CONCRETE

Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

C. FORMS FOR CYLINDRICAL COLUMNS AND SUPPORTS

Metal, fiberglass reinforced plastic, or paper or fiber tubes. Construct paper or fiber tubes of laminated plies using water-resistant adhesive with wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist loads imposed by wet concrete without deformation.

D. FORM COATINGS

Provide commercial formulation form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

E. FORM TIES

Factory-fabricated, adjustable-length, removable or snapoff metal form ties, designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units, which will leave no metal closer than 1-1/2 inches to surface. Unless noted otherwise on Plans, provide ties with plastic cone devices which, when removed, will leave holes not larger than 1-inch diameter in concrete surface.

2.2 CONCRETE MATERIALS

A. CEMENT

ASTM C150, Type II – Moderate or Type I - II. Use one brand of cement throughout the project, unless otherwise approved by the Engineer. Provide low alkali cement where Alkali-Silica Reaction (ASR) mitigation measures are required by WSDOT Aggregate Source Approval.

B. FINE AND COARSE AGGREGATES

Comply with ASTM C33. Provide aggregates from a single source. Coarse aggregate shall be size designation 467 (Nominal size 1-1/2 inch to No. 4 sieve) for all liquid containing structures, and size designation 67 (Nominal size 3/4-inch to No. 4 sieve) for all other concrete. Aggregates shall show a loss of weight not exceeding 35 percent after 500 revolutions in a Los Angeles wear machine, when tested in accordance with ASTM C131 or ASTM C535. Aggregates shall be from a WSDOT approved source.

C. WATER

Clean, potable, and not detrimental to concrete, in compliance with ASTM C94.

2.3 ADMIXTURES

Except for air entrainment, use of all other admixtures used shall be subject to approval of the Engineer and at no additional cost to the Owner. Only admixtures expressly stated by the manufacturer as being chloride-free shall be used. Subject to compliance with requirements, products, which may be incorporated into the work include, but are not limited to, the following:

A. AIR ENTRAINMENT

ASTM C260 certified by manufacturer to be compatible with other proposed admixtures.

Master Builders MB AE 90 or MICRO-AIR
Sika AER
W.R. Grace Daravair or Darex Series

B. WATER REDUCING ADMIXTURE

ASTM C494 Type A.

Master Builders PolyHeed
Sika Plastocrete 161
W.R. Grace WRDA Series

C. ACCELERATING ADMIXTURE

ASTM C494 Type C.

Master Builders Pozzolith NC534
Sika Plastocrete 161 FL
W.R. Grace Polarset or DCI

D. WATER REDUCING, RETARDING ADMIXTURE

ASTM C494, Type D.

Master Builders Pozzolith 100XR
Sika Plastiment
W.R. Grace Daratard Series

E. WATER REDUCING, ACCELERATING ADMIXTURE

ASTM C494, Type E.

Euclid Chemical Co. Accelguard 80
Master Builders Pozzutec 20
W.R. Grace Daracel

F. HIGH RANGE WATER REDUCER (HRWR)

ASTM C494, Type F.

Master Builders Rheobuild 1000/3000 FC
Sika Sikament 10 ESL
W.R. Grace ADVA 100

G. HIGH RANGE WATER REDUCER AND RETARDER

ASTM C494, Type G.

Master Builders Pozzolith 440N
W.R. Grace Daracem-100

H. POZZOLAN

ASTM C618 - CLASS F, with a CaO maximum content of 10 percent.

2.4 ACCESSORIES

A. BONDING AGENT

ASTM C881, Type I and II, Grade 2, Class C, Epoxy Resin. Subject to Contract requirements, provide one of the following or equal:

Sika Armatec 110
Conspec SpecBond 100
W.R. Meadows Sealtight Rezi Weld 1000

B. CURING COMPOUND/CHEMICAL FLOOR HARDENER

ASTM C309, Type I, Class A and B. Subject to Contract requirements, provide one of the following or equal:

W.R. Meadows Sealtight 1100-Clear
Conspec RX cure
Chemrex, Inc. Masterkure
Burke Spartan-Cote WB

C. GENERAL PURPOSE NON-SHRINK NON-METALLIC GROUT

Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi (17 Mpa) in 48 hours and 7,000 psi (48 Mpa) in 28 days. Subject to Contract requirements, provide one of the following or equal:

Sika SikaGrout 212
Conspec 100 Non Metallic
Chemrex, Inc. Masterflow 928 Grout
W.R. Meadows Sealtight 588

D. PLASTIC JOINT FORMER

Provide and install, per manufacturer's recommendations, where shown on the Plans or at locations approved by the Engineer. Subject to compliance with requirements, manufacturers offering products, which may be incorporated in the work, include, but are not limited to, the following:

Greenstreak
Vinylex Corporation
W.R. Meadows

2.5 CONCRETE MIX

A. GENERAL

Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method is used, use an independent testing facility acceptable to the Engineer for preparing and reporting proposed mix designs. The testing facility shall not be the same as that used for field quality control testing.

The maximum water soluble chloride ion content, expressed as a percent of the cement, contributed from all ingredients of the concrete mix, including water, aggregates, cementitious materials, and admixtures, shall not exceed 0.10 percent. Pozzolans may be counted as part of the total cementitious material in the concrete mix design. The cementitious material is the “minimum cement content” specified in the mix design for each type of concrete. When pozzolans are used as part of this “cement content,” the minimum content shall be 15 percent by weight of the total cementitious materials (Portland cement and pozzolans) and not more than 20 percent.

Where ASR mitigation measures are required by WSDOT, provide a minimum of 15 percent pozzolan included in the cementitious material in the design mix.

B. MIX DESIGNS

Provide normal weight concrete with the following properties, unless noted otherwise on the Plans.

1. Unspecified Concrete for Liquid Containment Structures

Structural concrete of general use in liquid containment structures.

Minimum compressive strength @ 28 days:	4,000 psi
Minimum cement content:	6 sacks per cubic yard
Maximum water cement ratio by weight:	0.45
Nominal coarse aggregate size:	1-1/2" to No. 4 (size designation 467)

2. Lean Concrete

Concrete for pipe thrust blocks or for use as noted as “Concrete Fill” on the Plans.

Minimum compressive strength @ 28 days:	2,500 psi
Minimum cement content:	5 sacks per cubic yard

3. Cement Grout

Material for filling guard posts, grouting of clarifier bottoms or for other uses as shown on the Plans. Cement grout shall be sand and cement only and shall not contain coarse aggregate.

Minimum compressive strength @ 28 days: 2,500 psi
Minimum cement content: 6.5 sacks per cubic yard
Maximum water cement ratio by weight: 0.54

C. ADMIXTURES

1. Air Entrainment

Use air-entraining admixture complying with ASTM C260 in all exterior exposed concrete. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement in accordance with ASTM C173 or C231 having total air content with a tolerance of plus or minus 1 percent within the following limits:

5.5 percent for 1.5 inch max. coarse aggregate size
6.0 percent for 1.0 inch max. coarse aggregate size
7.0 percent 0.50 inch or less max. coarse aggregate size

2. Other Admixtures

Use of all other admixtures shall be subject to the approval of the Engineer, and shall be in accordance with ACI 212.3 and Manufacturer's recommendations. Only admixtures stated by the manufacturer to be chloride free shall be used.

D. SLUMPLIMITS

Proportion and design mixes to result in concrete slump (1 inch \pm of the maximum) at the point of placement in accordance with ASTM C143 as follows:

Ramps, slabs, and sloping surfaces: 3 inches.

Reinforced foundation systems: 3 inches.

Other concrete: 4 inches.

Concrete containing HRWR admixture (super-plasticizer): Not more than 8 inches after addition of HRWR to site-verified 2- to 3-inch slump concrete.

E. CONCRETE MIXING

Comply with requirements of ASTM C94, and as herein specified.

During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than that specified in ASTM C94 may be required.

PART 3 EXECUTION

3.1 GENERAL

Coordinate the installation of joint materials and vapor barriers with placement of forms and reinforcing steel.

3.2 FORMS

Design, erect, support, brace, and maintain formwork to support vertical and lateral, static, and dynamic 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. Maintain formwork construction tolerances complying with ACI 347.

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

Construct forms to sizes, shapes, lines, and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the work. Use selected materials to obtain required finishes. Solidly butt joints and provide back up at all joints to prevent leakage of cement paste.

Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast-in-place concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Provide Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

Chamfer all exposed corners and edges and other areas shown on the Plans, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

3.3 JOINTS AND WATERSTOPS

A. CONSTRUCTION JOINTS

Locate and install construction joints where indicated, or locate so as not to impair strength and appearance of the structure, as acceptable to the Engineer. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise shown on the Plans.

B. ISOLATION JOINTS IN SLABS-ON-GRADE

Unless otherwise noted, construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as shown on the Plans.

Joint filler and sealant materials are specified in Division 7.

C. SLAB (CONTROL) JOINTS

Construct joints in slabs-on-grade as shown on the Plans. Use saw cuts 1/8 of an inch wide x 1/4 of the slab depth or inserts 1/4-inch wide x 1/4 of the slab depth.

D. PREMOLDED (CONTROL) JOINTS

Insert premolded plastic, hardboard or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.

E. **EDGE FORMS AND SCREED STRIPS FOR SLABS**

Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.4 INSTALLATION OF EMBEDDED ITEMS:

A. **GENERAL**

Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use installation drawings, diagrams, instructions, and directions provided by suppliers of items to be embedded.

B. **CLEANING AND TIGHTENING**

Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed. Retighten forms and bracing after concrete placement as required to eliminate mortar leaks and maintain proper alignment.

3.5 PLACING REINFORCEMENT

See Section 03200.

3.6 PREPARATION OF FORM SURFACES

Clean reused forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

Thin form coating compounds only with thinning agent of type, amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.7 PREPARATION OF EXISTING CONCRETE SURFACES

The Contractor shall bush hammer all existing concrete surfaces that are to have new concrete cast against them. Apply epoxy bonding agent prior to placing concrete.

3.8 CONCRETE PLACEMENT

A. GENERAL

Comply with ACI 304 and as herein specified.

Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Apply temporary protective covering to lower 2 feet of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during concrete placement.

B. PLACING CONCRETE IN FORMS

Deposit concrete in forms in horizontal layers not deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.

Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

C. PLACING CONCRETE SLABS

Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded

items and into corners. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations. Maintain reinforcing in proper position during concrete placement operations.

D. COLD WEATHER PLACING

Protect concrete work from physical damage or reduced strength, which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

When air temperature has fallen to or is expected to fall below 40 degrees F (4 degrees C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C), and not more than 80 degrees F (27 degrees C) at point of placement.

Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

E. HOT WEATHER PLACING

When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F (32 degrees C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is at Contractor's option.

Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed. Upon approval, water-reducing retarding admixture (Type D) may be used when required by high temperatures, low humidity, or other adverse placing conditions.

3.9 FINISH OF FORMED SURFACES

Provide smooth form finish for all formed concrete surfaces exposed-to-view including all surfaces exposed to water or wastewater, or that are to be covered with a coating material applied directly to the concrete, or a covering material applied directly to concrete, such as veneer plaster, painting, or other similar type of system.

Provide smooth form finish for surfaces to be waterproofed or dampproofed. Surfaces must comply with recommendations of the manufacturer of the product being utilized.

Provide rough form finish for formed concrete surfaces not exposed-to-view in the finished work or by other construction, unless otherwise indicated.

A. SMOOTH FORM FINISH

This is to be the as-cast concrete surface obtained utilizing selected form facing material, arranged orderly and symmetrically with a minimum of seams, and as specified herein.

Repair and patch tie holes and defective areas, with all fins or other projections completely removed and smoothed, by one of the following methods:

1. Provide smooth rubbed finish to concrete surfaces after form removal. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.
2. Provide grout "sacked" cleaned finish. The sacking grout shall be one part Portland cement to 1-1/2 parts fine sand by volume, and mixed with water to consistency of thick paint. Proprietary additives such as epoxy bonding agents or adhesives may be used at Contractor's option. Blend standard Portland cement and white Portland cement, amounts to be determined by trial patches, so that final color of dry grout matches adjacent surfaces. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep sacked surfaces damp by fog spray or other acceptable method so surfaces do not dry out.

B. ROUGH FORM FINISH

This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/8 of an inch in height rubbed down or chipped off. All “bug holes” exceeding 1/2 inch in diameter and exceeding 1/4-inch depth shall be repaired or filled in.

C. RELATED UNFORMED SURFACES

At tops of walls, horizontal offsets, and similar unformed surfaces occurring at adjacent formed surfaces, continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

D. TOLERANCES FOR FORMED SURFACES

1. Variations from the plumb:

- | | | |
|----|--|---|
| a. | In the lines and surfaces of columns, pier, walls and in arises | In any 10 feet of length – 1/4 inch. Maximum for entire length – 1 inch |
| b. | For exposed corner columns, control-joint grooves, and other conspicuous lines | In any 20 feet of length – 1/4 inch. Maximum for entire length – 1/2 inch |

2. Variations from level or from the grades indicated on the Plans:

- | | | |
|----|--|--|
| a. | In slab soffits, ceilings, beam soffits, and in arises, measured before removal of supporting shores | In any 10 feet of length – 1/4 inch. In any bay or opening, or in any 20 feet of length – 3/8 of an inch. Maximum for entire length – 3/4 inch |
| b. | In exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines | In any bay or opening, or in any 20 feet of length – 1/4 inch. Maximum for entire length – 1/2 inch |

- | | | |
|----|---|--|
| 3. | Variations in the linear building lines from the established position in plan view | In 20 feet of length – 1/2 inch.
Maximum for entire length – 1 inch |
| 4. | Variations in distance between walls, columns and partitions | In any 10 feet of distance – 1/4 inch. In any bay or opening – 1/2 inch. Maximum total variation – 1-inch. |
| 5. | Variations in the sizes and locations of sleeves, floor openings and wall openings | Minus – 1/4 inch
Plus – 1/2 inch |
| 6. | Variations in cross-sectional dimensions of columns and beams and in the thickness of slabs and walls | Minus – 1/4 inch
Plus – 1/2 inch |
| 7. | Variations in footings: | |
| | a. Variation from dimensions on Plans when formed or plus 3-inches when placed against unformed excavations | Minus – 1/2 inch
Plus – 2 inches |
| | b. Misplacement of eccentricity | 2 percent of the footing width in the direction of the misplacement, but not more than 2 inches |
| | c. Reduction in thickness of specified thickness | Minus – 5 percent |
| 8. | Variations in steps: | |
| | a. In a flight of stairs | Riser – 1/8 of an inch
Tread – 1/4 inch |
| | b. In consecutive steps | Riser – 1/16 of an inch
Tread – 1/8 of an inch |

3.10 MONOLITHIC SLAB FINISHES:

A. SCRATCH FINISH

Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping, including grout finishes where indicated on plans, or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated. Slope surfaces uniformly to floor drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms, or rakes.

B. FLOAT FINISH

Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.

After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. TROWEL FINISH

Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks and uniform in texture and appearance. Grind smooth surface defects that would telegraph up through applied floor covering system.

D. TROWEL AND FINE BROOM FINISH

Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming.

E. NON-SLIP BROOM FINISH

Apply non-slip broom finish to exterior concrete platforms, landings, steps, and ramps, sidewalks and elsewhere as indicated. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Owner before application.

F. CHEMICAL-HARDENER FINISH

Apply chemical-hardener finish to interior exposed concrete floors and steps, unless noted otherwise. Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Evenly apply each coat, and allow 24 hours for drying between coats. Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions. After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

G. TOLERANCES FOR MONOLITHIC SLAB FINISHES

The flatness of the concrete shall be carefully controlled and the tolerances shall be measured by the straight edge system as specified in paragraph 4.5.7 of ACI 117, using a 10-foot straight edge, within 72 hours after floor slab installation and before shores and/or forms are removed. The tolerances listed below shall be met at any and every location at which the straight edge can be placed.

Bullfloated	1/2 inch
Float Finish	3/16 inch
Trowel Finish	1/8 inch
Straightedges	5/16 inch

3.11 CONCRETE CURING AND PROTECTION

A. GENERAL

Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep concrete continuously wet for not less than 7 days. Begin final curing procedures immediately following initial curing and before concrete has dried out. Continue final curing for at least 7 days in accordance with ACI 301 curing methods. Avoid rapid drying of concrete at the end of final curing period.

B. CURING METHODS

Perform curing of concrete by use of curing and sealing compound, by moist curing, by moisture-retaining cover curing, or by combinations thereof, as herein specified.

Provide moisture curing by the following methods. Keep concrete surface continuously wet by covering with water, or provide continuous water-fog spray.

Covering concrete surface with absorptive cover, thoroughly saturating cover with water and keeping continuously thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4-inch lap over adjacent absorptive covers.

Provide moisture-cover curing as follows: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in wide as practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

Provide curing and sealing compound to exposed interior slabs and to exterior slabs, walls, sidewalks, and curbs, as follows:

Apply curing and sealing compound to concrete slabs and walls as soon as initial curing operations are complete or immediately after the forms have been stripped (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Completely cover the concrete surfaces with curing and sealing compound. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair any damage during curing period.

Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting, and other coatings and finish materials, unless otherwise acceptable to the Engineer.

C. CURING FORMED SURFACES

Cure formed concrete surfaces, including undersides of beams, supported slabs, and other similar surfaces by moist curing with forms in place for full curing period and until forms are removed. When forms are removed, continue curing by methods specified above, as applicable.

D. CURING UNFORMED SURFACES

Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of an appropriate curing method.

Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture retaining cover.

3.12 SHORES AND SUPPORTS

A. GENERAL

Comply with ACI 347 for shoring, and as herein specified. Extend shoring from ground to roof for structures four stories or less, unless otherwise permitted. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support work without excessive stress or deflection.

Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required, until all concrete has attained its required 28 day strength and heavy loads due to construction operations have been removed.

B. REMOVAL OF FORMS

Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F (10 degrees C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

Formwork supporting weight of concrete, such as beam soffits, joints, suspended slabs, and other structural elements, may not be removed in less than 14 days and until concrete has attained 70 percent of the design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens, representative of concrete location or members.

Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.13 REUSE OF FORMS

Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable for exposed surfaces. Provide new form facing material. Apply new form coating compound as specified for new formwork prior to reuse of forms.

When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use “patched” forms for exposed concrete surfaces, unless approved by the Engineer and acceptable to the Owner.

3.14 MISCELLANEOUS CONCRETE ITEMS

A. FILLING-IN

Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work. Fill-in all form tie holes and other forming system holes with non-shrink grout.

B. CURBS

Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. BASE PLATE, EQUIPMENT BASES AND FOUNDATIONS

Provide machine and equipment bases (housekeeping pad/pier) and foundations, as shown on the Plans. Set anchor bolts for machines and equipment with template at correct elevations, complying with certified diagrams or templates of manufacturers furnishing machines and equipment.

Provide 4-inch-high, square or rectangular concrete pad around all conduits and small diameter pipes that penetrate through floor slabs.

Provide leveling grout under base plates and equipment frames using non-metallic, non-shrink grout. Minimum thickness for leveling grout shall be 1/2 inches unless noted otherwise on the Plans or specified by equipment manufacturer.

3.15 CONCRETE SURFACE REPAIRS

A. PATCHING DEFECTIVE AREAS

Repair and patch defective areas immediately after removal of forms. Cut out honeycomb, rock pockets, voids or bugholes over 1/4 inch in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. For water and wastewater containment structures, utilize an epoxy resin bonding agent. Place patching mortar after bonding compound has dried.

For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

B. REPAIR OF FORMED SURFACES

Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of the Engineer. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, bug holes, honeycomb, rock pockets; fins and other discolorations that cannot be removed by cleaning. Flush out form tie holes and form bolt holes, fill with non-shrink grout, or precast concrete cone plugs or rubber plugs secured in place with bonding agent or epoxy adhesive.

Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. All repairs shall be approved by the Engineer. If defects cannot be repaired, the Contractor shall remove and replace the concrete.

C. REPAIR OF UNFORMED SURFACES

Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces

sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.

Repair finished unformed surfaces that contain defects, which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01 inches wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to the Engineer.

Repair defective areas, except random cracks and single holes not exceeding 1-inch diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3 inches of clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

Repair isolated random cracks and single holes not over 1 inch in diameter by dry-pack method. Groove top of cracks and cutout holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

Perform structural repairs with prior approval of the Engineer for method and procedure, using specified epoxy adhesive and mortar. Repair methods not specified above may be used, subject to approval of the Engineer. If acceptable repairs cannot be made, the Contractor shall remove and replace the concrete at no cost to the Owner.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. GENERAL

Sampling and testing for quality control during placement of concrete shall include the following:

1. Sampling Fresh Concrete

ASTM C172, except modified for slump to comply with ASTM C94.

2. Slump

ASTM C143: one test at point of discharge for each day's placement of each type of concrete; additional tests when concrete consistency seems to have changed.

3. Air Content

ASTM C173, volumetric method for lightweight or normal weight concrete; ASTM C231 pressure method for normal weight concrete; one for each day's placement of each type of air-entrained concrete.

4. Concrete Temperature

Test hourly when air temperature is 40 degrees F (4 degrees C) and below, and when 80 degrees F (27 degrees C) and above; and each time a set of compression test specimens is made.

5. Compression Test Specimen

ASTM C31; one set of four standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.

6. Compressive Strength Tests

ASTM C39; one set for each day's placement exceeding 5 cubic yards plus additional sets for each 50 cubic yards over and above the first 25 cubic yards of each concrete class placed in any 1 day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

When total quantity of a given class of concrete is less than 50 cubic yards, Engineer may waive strength test if, in their judgment, adequate evidence of satisfactory strength is provided.

When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

Test results will be reported in writing to Engineer and Contractor within 24 hours after testing. FAX of test results is acceptable; however, mailing hard copies of test results is also required. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7 day tests and 28-day tests.

7. Nondestructive Testing

Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection of concrete.

8. Additional Tests

The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in a structure, as directed by the Owner. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall pay for cost of such tests when unacceptable concrete is verified.

***** END OF SECTION *****

DIVISION 16

ELECTRICAL

SECTION 16050

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the requirements and methods for furnishing and installing the basic electrical materials, and other associated items as shown on the Plans, and as further specified herein.

1.2 RELATED WORKS SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01300	Submittals
01800	Testing, Commissioning, and Training
02300	Earthwork
Division 3	Concrete
Division 16	Electrical

1.3 DEFINITIONS

A. ANALOG I/O

Analog I/O are PLC input/output electronic signals that are contiguous over time. Analog signals represent a large number of values within a specific range.

B. ATTICS

Attics shall be considered those closed environments between ceilings and roofing that allow full entry of personnel by use of ladders, pull-down stairs, or other special means.

ATTICS are considered dry crawl spaces (see CRAWL SPACES).

Tight spaces between ceilings and roofs that do not allow full entry of personnel are considered concealed areas (see CONCEALED AREAS).

C. CONCEALED AREAS

Locations that are underground, within walls, or within other areas that do not allow full entry of personnel are considered concealed. Concealed

areas are not exposed (see EXPOSED AREAS) or accessible (see ATTICS and CRAWL SPACES).

D. CRAWL SPACES

Crawl spaces shall be considered those closed environments that are not normally accessible to personnel, but that allow full entry of personnel by special means.

Crawl spaces are considered exposed areas and may be dry or wet (see ATTICS).

E. DAMP AREAS

Damp areas are considered wet (see WET AREAS).

F. DEDICATED RECEPTACLES

Dedicated receptacles are provided for a specific receptacle load such as computers, heat tracing, fans, louvers, metering pumps, sump pumps, and etc. Dedicated receptacles are not intended for general use.

G. DIGITAL I/O

A digital I/O point consists of a single input or output binary bit at one of two possible states, which may be represented as 1's or 0's, ON or OFF, YES or NO, TRUE or FALSE, etc. Digital I/O may also be called "discrete" I/O. Within these specifications, both terms are synonymous.

H. DRY AREAS

Locations not normally subject to dampness or wetness. A location classified as dry may be temporarily subjected to dampness or wetness, as in the case of a building under construction (see FINISHED AREAS).

Rooms containing process water, chemical piping, or related equipment are not considered DRY. Areas that are not considered DRY are considered WET.

I. EXPOSED AREAS

Locations that are visible, outdoors, or exposed to a process or room environment. Exposed areas are not concealed (see CONCEALED AREAS).

J. FINISHED AREAS

Indoor confined areas that are not directly exposed to a process or process chemicals. They typically include closed offices, bathrooms, laboratories, lunch/break rooms, etc. Finished areas are considered DRY.

K. I/O

Inputs/Outputs – Input and output signals into and out of a PLC or RTU.

L. LEGALLY REQUIRED STANDBY SYSTEMS

Those systems required and so classed as legally required to have standby power by Government requirements.

M. OIU

Operator Interface Unit – A graphical display of industrial plant system variables and status. It may also allow for process control adjustments. Navigation of its programming may be via keypad, touch screen, or a combination of both. An OIU is typically located on a field control panel or control panel in an electrical equipment room.

An Operator Interface Unit is considered a possible extension of a PLC, like an I/O or network card. PLC installations may or may not include an OIU.

N. OUTDOOR AREAS

Locations where the equipment is normally exposed, or partially exposed, to weather in the form of wind, dust, rain, snow, and other natural elements.

O. PROCESS AREAS

Process areas are those areas that are directly exposed to process moisture, or that may be subjected to moisture in the event of a process leak or failure. They typically include pump rooms, chemical rooms, and direct process-exposure areas such as clearwells, open filters, and reservoirs. Process areas are considered WET.

P. PLC

Programmable Logic Controller – A device used to monitor and control system process. It can be used stand-alone or in conjunction with other

systems such as SCADA. It may provide telemetric functions or interface with telemetric equipment.

Q. SCADA

Supervisory Control and Data Acquisition (SCADA) systems are data monitoring and control stations that allow operators to visualize and adjust live process conditions at a centralized HMI. These systems often include process historical data tracking and alarming capabilities. SCADA systems can be used for data monitoring locally, remotely, or both.

R. SHOP FABRICATED

Manufactured or assembled equipment for which a UL test procedure has not been established.

S. VIBRATING EQUIPMENT

Equipment that is subject to vibration under normal operating conditions, such as motors, transformers, electrically operated valves, etc.

T. WET AREAS

Locations outdoors, underground, directly or indirectly exposed to the process, in concrete slabs or masonry in direct contact with the earth, or in any other way subject to saturation with water or other liquids.

1.4 REFERENCES

Unless otherwise noted, the requirements of the following code-making authorities and standard organizations apply:

<u>References</u>	<u>Title</u>
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
IEEE	Institute of Electrical and Electronics Engineers
ISA	Instrument Society of America
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NRTL	National Recognized Testing Laboratory
OSHA	Occupational, Health, and Safety Administration
UL	Underwriters Laboratories, Inc.
UL 508	Safety Industrial Control Equipment

WAC 296-46B Washington Administrative Code, Electrical Safety
Standards, Administration, and Installation

In case of conflict or disagreement between codes, standards, laws, ordinances, rules, regulations, plans, and specifications, the more stringent condition shall govern.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Prior to submittal of shop plans, coordinate all electrical equipment, particularly motor control equipment, process and control panels, and instrumentation, with related manufacturers and with other applicable equipment and systems specified in other divisions of the Specifications.
- C. Provide submittals in the following manner:
 - 1. Organize the submittals by CSI code type.
 - 2. Clearly show the Tag Number associated with each submittal within each CSI grouping.
 - 3. Include non-tagged devices such as grounding systems, conduits, wireway, ductbank details, wire, cable, boxes, fittings, switches and receptacles.
 - 4. Clearly show the specific part, part number, order code, etc. associated with the device. Use pointers, highlights, circles, etc. to clearly identify the specific part.
- D. Provide manufacturer's product technical data including, but not limited to:
 - 1. Manufacturer's name, address, and contact number.
 - 2. Manufacturer's product descriptive bulletin.
 - 3. Nameplate data, current, voltage, load, impedance, and other electrical data pertinent to the Project and necessary to assure compliance with the Specifications and Plans.
- E. Clearly, indicate on submittals that the equipment or material is NRTL listed or is constructed of listed or recognized components. Where a

NRTL standard has not been established, clearly identify that no NRTL standard exists for that equipment.

F. OPERATION AND MAINTENANCE MANUALS

Reference base requirements in specification 01300.

Manuals for the electrical system shall also include:

1. In each section, compile a spare parts list and supplier index.
2. Assemble records of all tests, measurements, and calibration settings made for each device.
3. The Contractor shall supply three electronic copies of the final equipment manuals in a tabbed, searchable, .pdf format, with a table of contents bookmarked to provide a navigation link to each section of the manual(s).

1.6 SYSTEM DESCRIPTION

- A. Provide the labor, materials, and equipment necessary to furnish, install, and place into operation complete power, lighting, control, alarm, communications, and instrumentation electrical system of this Contract as shown on the Plans or Specifications herein.
- B. Provide a functioning system(s) in compliance with manufacturer's instructions, performance requirements as specified or indicated, and modifications resulting from reviewed shop plans and field coordinated plans.
- C. Provide complete wiring and controls for all equipment specified under other divisions and that comply with Division 16.
- D. Pay and make arrangements for necessary permits, licenses, and inspections.

1.7 QUALITY ASSURANCE

A. TESTING AGENCY QUALIFICATIONS

A “Nationally Recognized Testing Laboratory” (NRTL) recognized and approved by the State of Washington.

1. Testing Agency Field Supervision: Use persons currently certified by NETA or the National Institute for Certification in Engineering Technologies, or equal, to supervise onsite testing specified in Part 3.
 - B. Comply with NFPA 70 (NEC) for components and installation.
 - C. LISTING AND LABELING
- Provide products specified in this Section that are listed and labeled.
1. The Terms “Listed and Labeled:” As defined in the National Electrical Code, Article 100.
 2. Listing and Labeling Agency Qualifications
 - a. A NRTL recognized and approved by the State of Washington.

1.8 DELIVERY, STORAGE AND HANDLING

Ensure that equipment is not used as steps, ladders, scaffolds, platforms, or for storage – either inside or on top of enclosures. Protect nameplates on electrical equipment from being defaced. Repair or replace damaged, corroded, and rejected items at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Refer to individual Division 16 sections.
 1. Similar equipment shall be provided by only one manufacturer throughout the project unless otherwise noted in the Specifications.
- B. Submit requests for substitution in accordance with Section 01300.
- C. Trade names and catalog numbers may be used in the Plans or Specifications to establish quality standards and basis of design:
 1. Other listed manufacturers in the applicable specification sections with equal equipment may be acceptable.

2.2 GENERAL PRODUCT REQUIREMENTS

- A. Except as otherwise indicated, provide new materials and equipment, which are standard products of manufacturers, regularly engaged in production of such equipment. Provide material or equipment approved and labeled for the purpose for which it is to be used by NRTL or other organizations acceptable to the State of Washington Department of Labor and Industries.
- B. Where voltage, current, power, temperature or other ratings are specified that do not correspond to standard ratings of the manufacturer selected by the Contractor, furnish the next rating level which is more conservative or increases the capacity of the device or material in question.
- C. Furnish materials, devices, and equipment that are non-corrosive or coat them in a manner that renders them non-corrosive and acceptable to the Engineer. Do not provide materials, which contain polychlorinated biphenyls, asbestos, or other hazardous or detrimental materials. Do not install materials in a location or construction manner that produces galvanic action or do not install material combinations with corroding or eroding action.
- D. Where changes in the work, or substitutions in material are proposed, ensure that sizes, weights, openings, etc., are provided that do not require changes in the work outside this Division.
- E. All terminals shall be suitable for 75 degrees C rated copper conductors.

2.3 FABRICATION

- A. When equipment is shop fabricated specifically for this Project, use electrical devices and enclosures, which are NRTL, listed and labeled or recognized.
- B. Fabricate equipment or devices in the field equivalent in every respect to manufactured items used for the same purpose. Where cutting, drilling, grinding, etc., is done to galvanize or painted metal, regalvanize, or paint to match original finish.

2.4 SUPPORTING DEVICES

- A. Channel and angle support systems, hangers, anchors, sleeves, brackets, fabricated items, and fasteners are designed to provide secure support from the building structure for electrical components.

1. Material

Steel, except as otherwise indicated, protected from corrosion with zinc coating, or with treatment of equivalent corrosion resistance using approved alternative finish or inherent material characteristics.

2. Metal Items for Use Outdoors or in Damp Locations

Hot-dip galvanized steel, or stainless steel, except as otherwise indicated.

B. ANCHORS

Galvanized steel in dry areas; stainless steel or hot dipped galvanized steel in wet areas.

1. Lag screws or Type A tapping screws for wood.
2. Rockwell “well-nut” for light loads in masonry.
3. Thru-bolt with fender washers for heavy loads in masonry.
4. Toggle bolts with springhead for hollow partitions.
5. Self-drilling anchors with threaded studs for concrete.
6. Clamps or U-bolts for structural steel.
7. Self-drilling anchors with extension rods for hollow tile over concrete.

C. SHEET-METAL SLEEVES

0.0276 of an inch or heavier galvanized sheet steel, round tube, closed with welded longitudinal joint.

D. PIPE SLEEVES

ASTM A53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.

2.5 ELECTRICAL IDENTIFICATION

A. MANUFACTURER'S STANDARD PRODUCTS

Where more than one type is listed for a specified application, selection is Installer's option but provide single type for each application category. Use colors prescribed by ANSI A13.1, NFPA 70, and Specifications.

B. COLORED ADHESIVE MARKING TAPE FOR RACEWAYS, WIRES, AND CABLES

Self-adhesive vinyl tape, not less than 3 mils thick by 1 inch wide.

C. UNDERGROUND LINE WARNING TAPE

Provide bright-colored, vinyl tape not less than 3-mils thick by 6-inches wide compounded for direct-burial service with permanent and continuous print.

D. TAPE MARKERS

Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

E. COLOR-CODING CABLE TIES

Type 6/6 nylon, self-locking type. Colors to suit coding scheme.

F. FASTENERS FOR PLASTIC-LAMINATED AND METAL SIGNS

Self-tapping stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

G. FLASH PROTECTION WARNING

Provide Arc Flash Warning Label on all equipment as required by 110.16 NEC (2020). The label is to contain the following text:

WARNING or DANGER
Arc Flash Hazard!
Follow requirements in NFPA 70E
for safe work practices and
appropriate PPE. Failure to comply
can result in death or injury.

2.6 TOUCHUP PAINT

Use touchup paint on equipment provided by equipment manufacturer and select color to match existing equipment finish.

A. FOR NON-EQUIPMENT SURFACES

Matching type and color of undamaged, existing adjacent finish.

B. FOR GALVANIZED SURFACES

Zinc-rich paint recommended by equipment manufacturer.

PART 3 EXECUTION

3.1 ELECTRICAL SUPPORTING METHODS

A. WET AREAS

1. For pullboxes and equipment vaults, reference Specification Section 16130.
2. For wet areas which are not pullboxes or equipment vaults, hot-dip galvanized materials, stainless steel materials, or nonmetallic, U-channel system components unless otherwise noted on the Plans.

B. DRY AREAS

Hot-dip galvanized materials unless otherwise noted on the Plans.

C. METHODS

Support raceway, equipment, and devices from framing members or building structure with sufficient clearance for maintaining and servicing. Provide backing plates, and/or framing material to support equipment, devices, and materials, which are located between the building or facility structure-framing members.

3.2 RECORDS

- A. Maintain and annotate on the job at all times a separate set of Record Drawings in accordance with the General Conditions. Show changes from the Contract Documents, routing of hidden raceways, actual fixture and equipment locations, equipment sizes and dimensions and building outline

changes. At the end of the Project, provide the Engineer a complete set of Plans marked in red pencil in a manner consistent with the Contract Plans, indicating the changes made on the job.

- B. Record voltage, current, and megohmmeter and ground ohmic resistance test measurements made on the electrical work, the trip units, fuses, and overload relay elements installed in the equipment and the setting of all pressure, flow, level, etc., control devices. When the Project is completed and operating, turn over these records to the Owner.
- C. Equipment and raceways installed under this contract for future work shall be dimensioned on the Record Drawings.

3.3 COORDINATION

- A. Arrange for chases, slots, and openings in building structure during progress of construction to allow for electrical installations. Obtain approval from structural Engineer for penetration of structural components prior to penetrating the component.
- B. Coordinate installation of supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the work. Coordinate installation of large equipment requiring positioning prior to closing in the building.
- D. Coordinate the location of motors, switches, panel connections, and other points of connection with the equipment manufacturers or vendors prior to conduit installation. Route circuits to the actual connection point. Even if removal and reinstallation of building materials is necessary, remove and reinstall conduit, outlet boxes, and other electrical connections, if initial electrical connections are not made to the appropriate equipment location.
- E. Coordinate and schedule connecting electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
- F. Coordinate and verify work under Division 16 with work under other Divisions, cooperate in locating equipment to avoid interference with work of others, and plan work to harmonize with the work of other trades so that all work may proceed as expeditiously as possible. Coordinate the installing of built-in work, attaching items to buildings, and cutting and

patching. Coordinate connecting electrical circuits to components furnished under other Divisions. (Portions of the electrical design are based upon the equipment specified in other Divisions.) No extras are allowed because of moving work required to avoid interference with work of other Contractors.

- G. Coordinate the interruption of electrical systems to any part of the facility in use by the Owner at least 2 working days before interruption of the system.
- H. Coordinate installing electrical identification after completion of finishing work where identification is applied to field-finished surfaces.
- I. Where changes in the work, or substitutions in material are proposed, ensure that sizes, weights, openings, etc., are provided that do not require changes in the work outside this Division.

3.4 INSTALLATION

A. ENCLOSURES FOR USE WITH ELECTRICAL EQUIPMENT

Unless specifically called out otherwise on the Plans, electrical enclosures shall meet the following specification:

1. Dry Areas – indoor only locations

NEMA 1.

2. Wet Areas

NEMA 3R. NEMA 4X where specifically noted in the plans or other specification sections.

B. WORKMANSHIP

Install the equipment and materials in a neat and workmanlike manner employing workers skilled in the particular trade and in accordance with the manufacturer's instructions, the National Electric Code, National Electric Safety Code, applicable local regulations, ordinances, and industry standards. A person in charge at the site shall maintain adequate supervision of the work under this division when necessary for coordination with other work.

C. SELF-SUPPORTED EQUIPMENT

Install self-supporting equipment in a level and plumb manner, shimming with full width stainless steel shims, as necessary. Bolt units to the floor with stainless steel expansion anchors and bolts, or weld units to embedded steel channels. Floor or pad shall be level within plus or minus 1/8 of an inch in a square yard before installing equipment. Grout or caulk enclosure to floor or pad. Provide bushings on conduits entering from above or at the side. For conduits entering from below, install grounded insulating bushings bonded to the ground bus or pad.

Install concrete pads and bases according to requirements of Section 03300.

D. MOUNTING HEIGHT

Install components and equipment to provide the maximum possible headroom where mounting heights or other location criteria are not indicated. Mount enclosures for individual units at 54 inches above floors to centerline of controls unless otherwise indicated in the Plans.

E. ACCESSIBILITY

Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, while minimizing interference with other installations.

F. EQUIPMENT ORIENTATION

Install items parallel and/or perpendicular to other building systems and components, except where otherwise indicated.

G. EQUIPMENT MOUNTED ENCLOSURES

Attach enclosures mounted on equipment with machine screws or clamps as required. Do not drill equipment frames or sheets without permission of supplier/manufacturer or the Engineer.

Do not mount safety switches and external equipment to other equipment enclosures, unless enclosure mounting surface is properly braced to accept mounting of external equipment.

H. COORDINATION

Give right of way to raceways and piping systems installed at a required slope.

I. WALL MOUNTED ENCLOSURES

Stand equipment off wall surfaces a minimum of 1/4 of an inch where enclosures are mounted on walls in WET AREAS with neoprene or plastic shim washers.

J. MISCELLANEOUS SUPPORTS

Install metal channel racks for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes, transformers, and other devices, except where components are mounted directly to a structural member of adequate strength.

K. SLEEVES

Install for cable and raceway penetrations of concrete slabs and walls, except where core-drilled holes are used. Install for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

L. FASTENING

Unless otherwise indicated, securely fasten electrical items and their supporting hardware to the building structure.

1. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or any other items.
2. Select fasteners so the load applied to any fastener does not exceed 25 percent of the proof-test load.

M. FIREPROOFING

1. Do not remove or damage fireproofing materials.
2. Install hangers, inserts, supports, and anchors prior to installation of fireproofing.
3. Repair or replace fireproofing removed or damaged.

N. PENETRATIONS

Make all penetrations of electrical work through walls and roofs water and weather-tight.

O. MISCELLANEOUS REQUIREMENTS

1. Screen or seal all openings into outdoor equipment to prevent the entrance of rodents and insects.
2. Equipment fabricated from aluminum shall not be placed in direct contact with earth or concrete.
3. Do not exceed the dimensions indicated for equipment except as approved in writing by the Engineer.
4. Do not use equipment or arrangements for equipment that reduce the required clearance or exceed the space allocations.

P. DIMENSIONS

Dimensions indicated for electrical equipment and dimensions indicated for the installation of electrical equipment are restrictive dimensions.

1. Field measurements take precedence over dimensioned plans.

3.5 IDENTIFICATION

A. LABELS

Install labels where indicated and at locations for best convenience of viewing without interference with operation and maintenance of equipment. Conduit labeling is further described in section 16130. The labeling of conductors is further described in section 16120.

B. NOMENCLATURE

Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated on the Contract Documents or required by codes and standards. Use consistent designations throughout the Project.

C. SELF-ADHESIVE IDENTIFICATION PRODUCTS

Clean surfaces of dust, loose material, and oily films before applying.

D. IDENTIFY PATHS OF UNDERGROUND ELECTRICAL LINES

During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above power and communication lines. Where multiple lines installed in a common trench or concrete envelope, do not exceed an overall width of 16 inches, use a single line marker.

E. ENGRAVED, PLASTIC-LAMINATED LABELS, SIGNS, AND INSTRUCTION PLATES

Engraving stock shall be melamine plastic laminate punched for mechanical fasteners with a minimum thickness of 1/16 of an inch for signs up to 20 square inches, and 1/8 of an inch thick for larger sizes. Engraved legend in white letters on black face. Provide nameplates on equipment enclosures giving the name and circuit identification of the enclosed device/equipment in 1/4 of an inch lettering.

F. PANELBOARD SCHEDULES

For panelboards, provide framed, typed circuit schedules with explicit description and identification of items controlled by each individual breaker.

G. ARC FLASH HAZARD

Provide and install warning labels for arc flash hazard on all switchboards, panelboards, control panels, motor control centers, and other equipment per the requirements of the NEC and Washington State Administrative Code (WAC).

3.6 DEMOLITION

A. EQUIPMENT TO BE DEMOLISHED

Demolish all existing electrical devices and circuits, which are noted for demolition. Demolition includes, but is not limited to:

1. Removing all conduit, conductors, fittings, device boxes, hangers, panels, devices, etc., which are not concealed in the building structure or below grade/slab.

B. TEMPORARY POWER

Provide temporary power to existing branch circuit panels, branch circuits, and/or directly to electrical devices as required to keep all portions of the existing facility, which are occupied by the Owner, or required for operation, in operation at all times. Obtain approval by all appropriate code authorities, including the Department of Labor & Industries Electrical Inspection Department, or the local jurisdiction having authority, for any temporary connections required.

C. DAMAGED ELECTRICAL EQUIPMENT

Where remaining electrical work is damaged or disturbed in the course of the work, remove damaged portions, and install new products of equal capacity, quality, and functionality.

D. ABANDONED WORK

Remove existing conductors from conduits, unless otherwise indicated. Cut and cap buried raceway indicated to be abandoned in place 2 inches below the surface. Cap and patch surface to match existing surface finish.

E. REMOVAL

See section 01900.

F. TEMPORARY DISCONNECTION

Remove, disconnect, store, clean, reinstall, reconnect, and make operational those components that are indicated for relocation and/or reconnection. Coordinate the process, mechanical, HVAC, and other equipment scheduled to be relocated and/or reused with other Divisions.

3.7 CUTTING AND PATCHING

Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for electrical installations. Perform cutting by skilled mechanics of the trades involved.

Repair disturbed surfaces to match adjacent undisturbed surfaces.

3.8 TOUCHUP PAINTING

Thoroughly clean damaged areas and provide primer, intermediate, and finish coats to suit the degree of damage at each location.

Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.

3.9 EXTRA MATERIALS

Extra materials in this Section cover all spare parts for electrical devices under this contract and are centrally listed here for clarification and completeness. Spares shall match products installed, and shall be packaged with protective covering for storage and identified with labels describing the contents within.

A. GENERATOR ASSEMBLIES (ASSOCIATED CSI SECTION – 16230)

1. Power Fuses (line power)

Provide 3 spare power fuses of each type and rating.

2. Control Fuses

Provide 10 percent (minimum of two) spare control fuses of each type and rating to cover all motor starters (not per starter).

Provide 1 control fuse puller.

3. Filters

Provide two sets each of lubricating oil, fuel, and combustion air filters.

4. V-Belts

Provide one complete replacement set of all V-belts.

5. Touchup Paint

Provide 1 quart (minimum) of touchup paint matching each color utilized on generator set.

6. Provide spare parts in suitable boxed watertight container marked "GENERATOR SPARE PARTS" and deliver to the Owner. Label

with supplier's/manufacture's name, the model number of the generator set, and the 24-hour service telephone number.

3.10 TESTING NOT REQUIRING THIRD PARTY

Test electrical equipment before energization and placing into service. Report all test results in writing. Where tests disclose a defect in the work, rework, or repair the work at no additional expense to the Owner and retest to confirm the rework or repair until testing confirms that the defect has been corrected. Test in accordance with the manufacturer's installation and testing instructions and the applicable electrical standards (i.e., NEMA, NFPA, IEEE, ISA, ANSI) for the class of equipment

A. CONDUCTOR MEGGER TEST

1. Power Conductor Testing

After pulling and prior to connection perform a Megger test between all power conductors (including the equipment ground) and between each power conductor and earth ground in the following manner:

- a. Perform megger tests at 600 V.
- b. Record ambient temperature and humidity during testing.
- c. Cables or conductors with a steady-state value less than 100 megohms shall be considered "failed".
- d. Failed cables and conductors shall be removed and replaced with new and retested per these specifications.
- e. Provide a Power Conductor Megger Testing Report. A blank copy of this report, specifically associated with this contract, is available from Engineering on request. A copy of these signed test results shall be submitted to the Engineer for approval prior to startup and shall be included in the O&M Manual.

2. Control Conductor Testing

- a. Control conductor insulation testing is not required.

3. Instrumentation Conductor Testing
 - a. Instrumentation conductor insulation testing is not required.

B. CONDUCTOR INSPECTION

On installation of wires and cables and before electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

1. Procedures
 - a. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.3.2. Certify compliance with test parameters.
 - b. Remove and replace conductors with visible insulation damage on conductor ends due to installation in an incomplete or damaged conduit system such as, but not limited to, missing bushings or burrs on conduit ends.

C. GROUND TEST

Engage an independent electrical testing organization to perform the test below.

1. Subject the completed GROUNDING ELECTRODE SYSTEM to a 3-point fail-of-potential ground test according to IEEE 81. Perform the test not less than 2 full days after the last trace of precipitation, and without the 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.

Maximum grounding resistance values shall be as listed below:

- a. Equipment Grounding System: 25 ohms.
 - b. Main Service, Grounding Electrode System: 5 ohms.
2. Provide ground test documents signed by the tester and the contractor and issued and approved by the Engineer prior to energizing the power distribution system.

These documents shall clearly show and describe the methods and equipment used in the test and all relevant readings and findings including ground resistance at each test location and observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

These documents shall clearly state whether the system has passed or not passed and show the point(s) where failure occurred. A copy of these signed test results shall be included in the O&M Manual.

3. Where resistance to ground exceeds specified values, notify the Engineer. Check connections of affected equipment and conductors. Replace or repair defective connections or conductors. Provide additional ground rods where the grounding electrode resistance is greater than specified. Revise and repeat testing until resistance is within specifications.
4. These specifications apply to the following Section if it is included in this contract: 16060.

3.11 GENERAL TESTING AND INSPECTION

A. PRIOR TO ENERGIZATION

1. After installing disconnect switches and circuit breakers, perform visual and mechanical inspection of enclosures and devices.
2. Test the equipment and electrical circuits for proper connection, tightness, and absence of undesirable shorts and grounds.
3. Check for continuity, visual damage, marking, and proper phase sequence.
4. Remove any burrs, filings, or other foreign materials from all enclosures; completely wipe down and vacuum.
5. Run a magnet around the bottom of each enclosure and around surfaces that may have collected metal shavings during manufacturing or construction.

B. AFTER ENERGIZATION

1. After electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

2. Correct malfunctioning units on site where possible and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.
3. Check fuses with an ohmmeter. Ring out wiring and busing. Check operation of control and safety interlocks. Check grounding of potential transformers, current transformers, and surge protective devices. Check control connections and tightness at terminal blocks, relays, meters, switches, etc. Tug on each connection to verify a tight connection.
4. Rework or repair equipment, which performs unsatisfactorily during, or as a result of, testing at no additional expense to the Owner.
5. Additional testing requirements specific to other sections are specified in those sections.

3.12 TEST DOCUMENTS

Test documents, as described above, shall be signed and submitted to Engineering for review prior to energizing associated electrical circuits.

3.13 DEMONSTRATION

Demonstrate to the Owner that the electrical installation is working by operating all electrical systems and equipment. Simulate control and emergency conditions, artificially where necessary, for complete system tests. Demonstrate equipment in accordance with each section in Division 16.

3.14 CLEANING

Clean dirt and debris from all internal and external surfaces. Vacuum out the interior of electrical panels.

Apply touchup paint as required to repair scratches, etc.

Replace nameplates damaged during installation. Thoroughly vacuum the interior of all enclosures to remove dirt and debris.

***** END OF SECTION *****

SECTION 16060

GROUNDING AND BONDING

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes grounding of electrical systems, equipment, and basic requirements for grounding, and protection of life, equipment, circuits, and systems. Grounding requirements specified in this Section may be supplemented in other Sections of these Specifications.

1.2 RELATED WORKS SPECIFIED ELSEWHERE

<u>Sections</u>	<u>Items</u>
01300	Submittals
16050	Basic Electrical Materials and Methods
16120	Conductors and Cables
16130	Raceway and Boxes
WAC 296-46B-250	Grounding and Bonding

1.3 DEFINITIONS

- A. BONDING JUMPER (from NEC 2017, Article 100 - Definitions, Bonding Jumper, Main)

The connection between the GROUNDED CIRCUIT CONDUCTOR and the EQUIPMENT GROUNDING CONDUCTOR at the service.

- B. EQUIPMENT GROUNDING CONDUCTOR (from NEC 2017, Article 100 - Definitions)

The conductive path installed to connect normally non-current-carrying metal parts of equipment together and to the SYSTEM GROUNDED CONDUCTOR or to the GROUNDING ELECTRODE CONDUCTOR, or both. Code requirements associated with equipment grounding is referenced to NEC 250, Section VI – Equipment Grounding and Equipment Grounding Conductors.

- C. GROUNDED SERVICE CONDUCTOR

Also called “utility neutral.” A conductor used to connect the neutral point of the utility transformer to the neutral point of the service entrance.

See SUSE, SYSTEM GROUNDING.

D. GROUNDING ELECTRODE (from NEC 2017, Article 100 - Definitions)

A conducting object through which a direct connection to earth is established.

E. GROUNDING ELECTRODE CONDUCTOR (from NEC 2017, Article 100 - Definitions)

A conductor used to connect the SYSTEM GROUNDED CONDUCTOR or the equipment to a GROUNDING ELECTRODE or to a point on the grounding electrode system.

F. GROUNDING ELECTRODE SYSTEM

See SYSTEM GROUNDING.

G. SUSE

The term SUSE is an acronym for “SUITABLE FOR USE AS SERVICE EQUIPMENT.” It is the point in the electrical grounding system where the SYSTEM GROUNDING CONDUCTORS connect to the EQUIPMENT GROUNDING CONDUCTORS, or the GROUNDED SERVICE CONDUCTOR, or both. For each separately-derived source, this shall occur at the SUSE point. These two points are connected by a BONDING JUMPER.

H. SYSTEM GROUND GRID

The SYSTEM GROUND GRID refers to all portions of SYSTEM GROUNDING. It may be as simple as a pair of ground rods and their associated GROUNDING ELECTRODE CONDUCTORS or a complex ground system with multiple types of GROUNDING ELECTRODES.

I. SYSTEM GROUNDED CONDUCTOR

See GROUNDING ELECTRODE CONDUCTOR.

J. SYSTEM GROUNDING

System Grounding (also referred to as a GROUNDING ELECTRODE SYSTEM) consists of all GROUNDING ELECTRODES, GROUNDING ELECTRODE CONDUCTORS, and associated connecting devices. The GROUNDED SERVICE CONDUCTOR, typically referred to as the

“utility neutral”, is also associated with the system ground. Code requirements associated with system grounding is referenced to NEC 250.50 – Grounding Electrode System.

1.4 SUBMITTALS

Submit under provisions of Section 01300, and Section 16050.

1.5 QUALITY ASSURANCE

See Section 16050.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING PRODUCTS

Where types, sizes, ratings, and quantities indicated are in excess of National Electrical Code (NEC) requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.

2.2 WIRE AND CABLE GROUNDING CONDUCTORS

Comply with Section 16120.

A. EQUIPMENT GROUNDING CONDUCTORS

1. Insulated Conductors

Color coded green, per section 16120.

2. Sized in compliance with NEC Table 250.122 or as shown on the Plans, whichever is larger.

B. GROUNDING-ELECTRODE CONDUCTORS

1. Bare Conductors

Soft drawn stranded copper meeting ASTM B8.

2. Sized in compliance with NEC Table 250.66 or as shown on the Plans, whichever is larger.

C. GROUNDING BRAIDS

1. Copper, manufactured, sized at 26,240 circular mils minimum (#6 AWG equivalent).
2. Certified C22.2, No. 41, Grounding and Bonding Equipment.
3. UL Listings: UL-467 and UL486A.

2.3 GROUND RODS

A. SIZE AND TYPE

1. Ground rods shall be 3/4-inch diameter by 10-feet long unless otherwise stated on the Plans.
2. Ground rods shall be copperclad steel rods as follows:
 - a. Heavy uniform coating of electrolytic copper molecularly bonded to a rigid steel core.
 - b. Corrosion resistant bonding between the copper and steel.
 - c. Hard drawn for a scar-resistant surface.

2.4 GROUND ROD BOX

A. GROUND ROD BOXES

1. Ground rod boxes shall be “Fogtite Ground Rod Box” or equal.

B. GROUND ROD BOX LIDS

1. Ground rods associated with vaults, pullboxes, or handholes that may be subjected to road traffic or heavy loads shall have their ground box lids match the road rating load value of the associated vaults, pullboxes, or handholes.
2. The minimum ground rod box lid shall be rated H20.

2.5 CONNECTOR PRODUCTS

A. COMPRESSION CONNECTORS

1. Compression type for interior locations:
 - a. Standards: UL 467.
 - b. High copper alloy content.
 - c. Non-reversible.
 - d. Terminals for connections to bus bars shall have two bolt holes.
2. Compression type suitable for direct burial in earth or concrete:
 - a. Standards: UL 467, IEEE 837.
 - b. High copper alloy content.
 - c. Non-reversible.

B. BOLTED CLAMPS

1. Standards: UL 467.
2. High copper alloy content.
3. Heavy-duty type.

PART 3 APPLICATION

There are two types of grounding systems covered in this specification; (1) Grounding Electrode Systems and (2) Equipment Grounding Circuits.

1. Grounding Electrode Systems shall comply, as a minimum, to the requirements of NEC Sections 250.50 through 250.104, including Table 250.66, "Grounding Electrode Conductor for Alternating-Current Systems."
2. Equipment Grounding Circuits shall comply, as a minimum, to the requirements of NEC Sections 250.110 through 250.148, including Table 250.122, "Minimum Size Equipment Grounding Conductors for Grounding Raceway and Equipment."

3.1 GROUND ROD BOX

The connection of Grounding Electrode Conductors to each ground rod shall be accessible through a ground rod box as described herein.

- A. Each ground rod shall be provided with a separate ground rod box which shall provide access to the ground rod, its Grounding Electrode Conductor, and its associated ground clamp.
- B. Each ground rod box shall be mounted flush to grade.

3.2 GROUNDING ELECTRODE SYSTEMS

Comply with NEC Article 250, Section III for types, sizes, and quantities of Grounding Electrode Conductors, except where specific types, larger sizes, or more conductors than required by NEC are shown on the Plans.

Provide grounding system as shown on the Grounding One Line Diagram of the Plans if provided.

A. OTHER GROUNDING ELECTRODE DEVICES AND METHODS

1. Generators

- a. In addition to the equipment ground provided with the generator feeder, provide a grounding electrode conductor to the generator's neutral terminal sized per the Plans or per NEC Table 250.66, whichever is larger. Treat this conductor as a neutral wire.
- b. Grounding Methods
 - i. The Grounding Electrode Conductor shall be connected to the neutral terminal of the generator as a neutral. This conductor shall be connected to the grounding system at the SUSE bonding connection.

If required to run through a transfer switch, then this neutral wire shall terminate at the transfer switch's isolated neutral bus before continuing to the SUSE bonding point.

- ii. The Equipment Grounding Conductor shall be connected to the metal frame of the generator in compliance with NEC.250.110.

3.3 EQUIPMENT GROUNDING

Comply with NEC Article 250, Section VI for sizes of Equipment Grounding Conductors, except where specific larger sizes are shown on the Cable and Conduit Schedule in the Plans.

A. EQUIPMENT GROUNDING CIRCUITS

Install insulated Equipment Grounding Conductors with circuit conductors in the manner listed below and in compliance with Code.

1. Service and Feeders.

Bond the Equipment Grounding Conductor to the equipment to which the circuit connects and to the raceway if it is metallic.

2. Single-phase motor or appliance branch circuits.
3. Three-phase motor or appliance branch circuits.
4. Flexible raceway runs.

B. EQUIPMENT GROUNDING CONDUCTORS

Equipment Grounding Conductors shall be insulated and color-coded green.

C. NONMETALLIC RACEWAYS

Install an Equipment Grounding Conductor in nonmetallic raceways unless they are designated for telephone or data cables. Bond the conductor at each end to grounded metallic raceway or equipment.

D. METALLIC RACEWAYS

Install grounding bushings at the end of each conduit and connect to the equipment ground or GROUNDING ELECTRODE SYSTEM.

3.4 FREE-STANDING ELECTRICAL SUPPORT STRUCTURES

Metal support structures used to support electrical equipment, devices, cabinets, panels, or enclosures shall be connected to the GROUNDING ELECTRODE SYSTEM by Grounding Electrode Conductors sized as shown on the Plans or per NEC Table 250.66, whichever is larger. Provide a ground conductor to each vertical support member within 6 inches after rising out of the concrete pad.

PART 4 EXECUTION

4.1 INSTALLATION

A. GROUNDING ELECTRODE CONDUCTORS IN RACEWAYS

1. GROUNDING ELECTRODE CONDUCTORS shall not be installed in metallic raceway. Where required to be in raceway, use PVC-Schedule 80 unless shown otherwise on the Plans. Reference Specification Section 16130.

Ground electrical systems and equipment according to NEC requirements, except where Plans or Specifications exceed NEC requirements.

Coordinate grounding connections made to the water system with the mechanical work and install bonding jumpers wherever deemed necessary.

4.2 CONNECTIONS

A. GENERAL

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

1. Use electroplated or hot-tin-coated materials to assure 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. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to the contact surfaces.

B. METAL RACEWAY TERMINATIONS

Where metallic raceways terminate at metallic or non-metallic enclosures, panels, or housings, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at both entrances and exits with grounding bushings and bare grounding conductors, except as otherwise indicated.

C. CONNECTION TORQUE

Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. Where these requirements are not available, use those specified in UL 486A and UL 486B.

D. COMPRESSION-TYPE CONNECTIONS

Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by manufacturer of connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

4.3 QUALITY CONTROL

A. TESTS

1. Provide ground testing per Specification 16050, Section 3.

***** END OF SECTION *****

SECTION 16120

CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes building wires, cables, and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.2 RELATED WORKS SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01300	Submittals
16050	Basic Electrical Materials and Methods
RCW 19.28.261	Revised Code of Washington, Exemptions from RCW 19.28.161 through RCW 19.28.271

1.3 SUBMITTALS

See Section 01300.

1.4 QUALITY ASSURANCE

See Section 16050.

PART 2 PRODUCTS

2.1 BUILDING WIRES AND CABLES

A. STRANDING

1. All power, control, and instrumentation conductors larger than #20 AWG shall be stranded.
2. All equipment ground conductors larger than #16 AWG shall be stranded.
3. All grounding electrode conductors larger than #10 AWG shall be stranded.

B. POWER AND CONTROL WIRE

All power and control wire and conductors in raceways shall be rated 600 VAC.

1. XHHW, XHHW-2

a. Conductor

Class B, stranded, annealed, uncoated copper. Conductors shall comply with:

- i. UL Standard 44.
- ii. ASTM-B3, ASTM-B8, and ASTM-B7B8.

b. Insulation

Cross-Linked Polyethylene (XLP) High Heat Water Resistant. Insulation shall comply with:

- i. UL-83 Thermoplastic-Insulated Wires and Cables.
- ii. UL-1063 Machine-Tool Wires and Cables.

c. The cable shall meet the following Standards and Agency approvals:

- i. NEMA WC70/ICEA S-95-658.
- ii. ASTM Stranding Class B3, B8, B7B8
- iii. Federal Specification A-A-59544

C. INSTRUMENTATION, COMMUNICATION, AND NETWORKING CABLES

All instrumentation, communication, and networking cables and conductors in raceway shall be rated 600 VAC.

2.2 SPLICES, TAPS AND TERMINAL BLOCKS

Splices are only allowed under the conditions of Section 4.2.E.

A. SPLICES TO POWER CONDUCTORS

1. Splices in Outdoor Areas, Handholes, Vaults, or Direct Buried
 - a. For inline butt splices, use inline resin splice kits for non-shielded cables, 600 V; 3M Scotchcast 82-A series or equal. UL listed 486D.
 - b. For odd-shaped and odd sized splices, use multi-mold resin splice kits for non-shielded cables, 600 V; 3M Scotchcast 85-14CP or equal. UL listed 486D
2. Power Terminal Blocks
 - a. All power terminals shall be 600 Vac, suitable for 75 degrees C rated copper conductor.
 - b. Power terminal blocks may be copper or aluminum and shall have a short circuit current withstand rating following the guidelines described in UL 1059 and shall meet or exceed the available bolted fault current at the point of application.

2.3 INSULATING MATERIALS

A. ELECTRICAL INSULATION PUTTY

Scotchfill, or equal.

B. INSULATING ELECTRICAL TAPE

7 Mil/0.18 mm Plasticized PVC, rubber-based adhesive, 200 percent elongation, 26 N/cm tensile strength, 8 kV breakdown voltage, meeting CE, CSA, UL certifications.

C. CONDUCTOR COLOR-MARKING TAPE

7 Mil/0.18 mm Plasticized PVC, rubber-based adhesive, 200 percent elongation, 26 N/cm tensile strength, 8 kV breakdown voltage, meeting CE, CSA, UL certifications, in required color.

D. ELECTRICAL HEAT SHRINK TUBING

Heat shrink tubing shall be dual-wall polyolefin, 3-1 shrink ratio, 600 Vac, -55 to 110 degrees C operating range meeting UL 224 600V, 125 degrees C.

PART 3 APPLICATIONS

3.1 WIRE APPLICATIONS

A. CABLE AND CONDUIT SCHEDULE

The Cable and Conduit Schedule shall be considered absolute. No changes to wire sizes, wire count, insulation type, or circuit type shall be allowed without approval from the Engineer.

B. WIRES IN RACEWAYS

Wires installed in raceways shall be considered "FIELD" wiring and shall be installed and terminated by qualified and licensed electrical contractors.

Exceptions:

- *Installation and termination may be by the owner under the provisions of "RCW 19.28.261, Exemptions from RCW 19.28.161 through RCW 19.28.271."*

1. Power Wire

a. Insulation

All service, feeder, and branch circuit conductors shall be XHHW-2.

2. Class 1 and 2 Control Wire

a. Insulation

All control circuits in raceways shall be XHHW-2.

b. Minimum control wire size in conduits and raceways

The minimum control wire size in conduits and raceways shall be #14 AWG.

PART 4 EXECUTION

4.1 EXAMINATION

Examine raceways and surfaces receiving wires and cables for compliance with requirements for installation tolerances and other conditions affecting performance of wires and cables. Do not proceed with installation until unsatisfactory conditions have been corrected.

4.2 INSTALLATION

A. GENERAL INSTALLATION METHODS

1. Install wires and cables in raceway system, according to manufacturer's written instructions and NECA's "Standard of Installation," after raceway system is complete.
2. 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 and UL 486B.
3. Install cables and conductors neatly in all enclosures. Bend or form wires in neat runs from conduits to terminals. Arrange wires so that they may be grouped by conduit or function in the enclosure. Install cable ties and straps to support and bundle wires in enclosures. Arrange wires to allow wire tags and numbers to be easily read without bending or flexing wiring.
4. Leave 6 inches or more of free conductor at each connected device or equipment terminal and 9 inches of free conductor at each unconnected outlet. Tape free ends of conductors at unconnected outlets and coil neatly in outlet box.
5. Install wiring to equipment neutral and grounding blocks on the bottom or furthest back row first. Leave unconnected blocks accessible for future neutral or grounding connections.
6. Provide individual neutral conductors for each associated circuit. Common neutral conductors for multi branch circuits are not permitted.
7. All power distribution raceways shall contain at least one continuous copper grounding conductor with a minimum size as

per NEC 250.122. Larger sizes shall be used if identified in the Cable and Conduit Schedule on the Plans.

E. SPLICING CONDUCTORS

1. Install service, feeder, and motor circuits continuous without splices from equipment terminal to equipment terminal or motor lead.

Exceptions:

- *Service entry feeders at weatherheads.*
- *As specifically called out.*
- *With written permission from the Engineer.*

2. Where splicing is allowed, or specifically called out, install in the following manner:

- a. Splicing Inside Vaults, Handholes, Outdoor J-Boxes, or J-Boxes in Wet Areas

Power and control conductors shall be spliced per Section 2.2.A. Provide a minimum of 24 inches of length on both wires for future re-splicing.

- b. Splicing in J-Boxes and Control Panels Mounted Indoors in Dry Rooms

- i. Conductors size #12 AWG through #6 AWG:

For conductors less than #6 AWG, provide crimped butt-splice with heat shrink cover. The heat shrink shall overlap the butt barrel ends by a minimum of 1/2 inch. Cover the splice with a minimum of three layers of black electrical tape. Provide a 2-wrap (minimum) single band of the appropriate phase color tape.

ii. Conductors size #4 AWG and larger:

(1) Terminal Connectors

For conductors larger than #6 AWG, connections shall be made using insulated multiple tap connectors rated for 600 Vac; N.S.I. Polaris or equal.

Cover the splice with a minimum of three (3) layers of black electrical tape. Provide a 2-wrap (minimum) single band of the appropriate conductor color tape.

(2) Terminal Blocks

All power terminals shall be 600 Vac, suitable for 75 degrees C rated copper conductor.

Connect using properly sized terminal blocks.

Exception:

- *If splices are allowed by the Engineer, then use plated copper alloy compression splicing sleeves installed by high-pressure compression tools and insulated with heat shrink Raychem sleeves.*

F. REPLACING FAULTY CONDUCTORS

When replacing a faulty conductor or cable that shares a raceway with other conductors or cables, all conductors and cables must be removed and replaced with new.

Exceptions:

- *If the raceway is straight and without bends or offsets and its length is less than 30 feet, and the conductors are not bound together in the raceway, then only the faulty cable must be pulled and replaced with new. A manufacturer-approved pulling compound or lubricant must be used to minimize degradation to*

the remaining conductors. The contractor is responsible for the integrity of the remaining conductors.

- *With specific approval by the Engineer.*

G. CONDUCTOR LABELLING

All conductors shall be labeled in the following manner.

Exceptions:

- *Non-insulated ground conductors.*
1. Conductors shall be labeled the same at each end in a place where the label can be clearly read without moving other wires or rotating the label.
 2. Conductor labels shall reference the device (destination) tag as provided on the “TAG LIST” in the Plans. For example, conductors from panelboard [01 PB 01] to dedicated receptacle [01 DREC 05] shall be labeled as follows:

Line:	01DREC05.L
Neutral:	01DREC05.N
Ground:	01DREC05.G

3. Conductor labels shall each be unique for each circuit. For example, 10 control conductors from Main Control Panel [02 CP 01] (source) to Automatic Transfer Switch [02 ATS 01] (destination) shall be labeled as follows:

Wire #1:	02ATS01.01
Wire #2:	02ATS01.02
Wire #9:	02ATS01.09
Wire #10:	02ATS01.10

4. The labels shall be white heat shrink sized appropriately for the associated conductor with typed lettering in black indelible ink.
5. Label each conductor. When terminating cables, if there is insufficient room to provide a label on each conductor, then label the cable sheath.

H. CONDUCTOR COLORS

1. For conductor colors inside control panels, reference Section 3.1.C.1.
2. Equipment grounding conductors: Green or green with yellow stripes.
3. 240/120 volt, single phase systems:

Phase A	Phase B	Neutral
Black	Red	White

4. Use wire with insulation of required color for conductors of #6 AWG and smaller. For wire larger than #6 AWG, where not available in specified colors, use conductor color marking tape per Section 2.3.C. When conductors are marked in this manner, mark each conductor at all accessible locations such as panelboards, junction boxes, pullboxes, auxiliary gutters, outlets, switches, and control centers.
5. Connect power conductors of the same color to the same phase throughout the installation. Viewing all equipment from the front, make connections so phase color sequence is in the same order as that for panelboards, switchboards, motor control centers, etc.

I. PULLING CONDUCTORS

1. Instrumentation, Communication, Networking, and Fiber Cables

Make all cable pulls by hand using a manufacturer-approved pulling compound or lubricant where necessary.

2. Power and Control Conductors
 - a. Make all cable pulls by hand where possible. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, or wrapping extra conductor into an eye, that will not damage cables or raceway.
 - b. On mechanically-assisted pulls use a manufacturer-approved pulling compound or lubricant where necessary. The compound used must not deteriorate the conductors or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

Install pullboxes where necessary to prevent exceeding manufacturer's recommendations.

3. Cut cable or conductor ends off after pulling and clean all pulling compound from exposed conductors before terminating.

J. CABLE SUPPORTS

Support cables according to Section 16050.

4.3 FIELD QUALITY CONTROL

A. TESTING

1. Provide conductor megger testing per Specification 16050, Section 3.

***** END OF SECTION *****

SECTION 16130

RACEWAY AND BOXES

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.2 RELATED SECTIONS SPECIFIED ELSEWHERE

<u>Sections</u>	<u>Items</u>
01300	Submittals
16050	Basic Electrical Materials and Methods
16060	Grounding and Bonding
16120	Conductors and Cables

1.3 DEFINITIONS

A. CONDUITBODIES

A separate portion of a conduit system that provides access through a removable cover to the interior of the system at a junction of two or more sections of the system.

B. CONTROL CONDUITS

Control conduits typically contain cables or conductors in the range of 12 Vdc to 120 Vac. These cables/conductors are used to provide discreet field inputs and outputs to motor drives, PLC controllers, operator stations, etc. They typically connect to discreet I/O field devices like local panel pushbuttons, indicating lights, selector switches, field limit switches, relay circuits, etc.

C. DRY LOCATIONS

Reference Section 16050, Definitions.

D. EMT

Electrical Metallic Tubing (a type of RMC).

E. EQUIPMENT VAULT

An Equipment Vault is a VAULT that contains one or more electrical devices that are terminated within the vault; such as flow meters, control valves, control or power panels, lighting, and etc.

SEE VAULTS

F. FINISHED AREAS

Reference Section 16050, Definitions.

G. FMC

Flexible Metal Conduit (a type of RMC).

H. HANDHOLES

A handhole is a pullbox that is not sufficiently sized for entrance of personnel (reference PULLBOXES).

I. JUNCTION BOXES

Junction boxes are electrical enclosures used for combining, splitting, pulling, or redirecting electrical circuits. Junction boxes may terminate one conduit or join multiple conduits. Circuits are not *altered* inside a junction box. Enclosures where circuits are altered are called CONTROL PANELS. With the exception of terminal strips, junction boxes do not contain electrical devices.

J. POWER CONDUITS

Power conduits contain branch and feeder conductors with voltages 120 Vac and above. These conductors provide operating power to MCCs, panels, motors, lighting, receptacles, HVAC, etc. Conductors can be of #12 AWG wire gauge and larger, either separate or in power cables.

K. PVC

Polyvinyl Chloride Conduit (a type of RNC).

L. PVC-RGS

Polyvinyl chloride, externally coated RGS (a type of RMC).

Alias: May be called or shown on Plans and elsewhere in specifications as PVC-Coated RGS or PVC-RMC.

M. PVC-RMC

Reference PVC-RGS.

N. RGS

Rigid Galvanized Steel (a type of RMC).

O. WET LOCATIONS

Reference Section 16050, Definitions.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Provide data for surface raceways, wireways and fittings, hinged-cover enclosures, and cabinets.

1.5 QUALITY ASSURANCE

See Section 16050.

1.6 COORDINATION

Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

Coordinate electrical work with outside utilities associated with the project.

Non electrical piping and structural has priority over underground conduit routing.

PART 2 PRODUCTS

2.1 METALLIC CONDUIT TYPES

A. EMT

1. Conduit

Galvanized steel tubing meeting ANSI C80.3.

2. Conduit bodies shall be galvanized, or epoxy coated cast iron or aluminum one piece with galvanized, or epoxy coated cast cover, gasket, and threaded hubs. Use stainless steel screws or other approved non-corroding screws to hold cover in place.
3. EMT connectors shall be compression type only. Set screw connectors shall not be allowed.
4. Conduit clamps for EMT shall be stamped galvanized steel.

B. FMC

1. Conduit

Flexible, galvanized steel convolutions forming a continuous raceway.
2. Connectors

Galvanized steel, screw in, approved for grounding.

C. LFMC

1. Conduit

Flexible, galvanized steel convolutions forming a continuous raceway, covered by a liquid tight PVC layer. Electri-Flex Type LA or American Sealtite, Type UA
2. Connectors

Galvanized steel, screw in, grounding type with a ferrule, which covers the end of the inside and outside of the conduit.

D. RGS

1. Conduit

Hot dipped galvanized with threaded ends meeting ANSI C80.1.

2. Couplings

Steel, cast iron, or malleable iron compression type employing a split, corrugated ring and tightening nut, with integral bushings and locknuts. No indent or set screw type.

a. Couplings

Unsplit, NPT threaded steel cylinders with galvanizing equal to the conduit.

b. Nipples

Factory made through 8 inches, no running threads.

c. Conduit bodies shall be galvanized, or epoxy coated cast iron or aluminum one piece with galvanized, or epoxy coated cast cover, gasket, and threaded hubs. Use stainless steel screws or other approved non-corroding screws to hold cover in place.

3. Conduit Clamps

Conduit clamps for RGS shall be cast iron.

E. PVC-COATED RGS, PVC-RMC

1. General

a. A proprietary colored urethane coating shall be uniformly and consistently applied to the interior of all conduit and fittings. This internal coating shall be a nominal 2 mil thickness. Conduit or fittings having areas with thin or no coating shall be unacceptable.

b. The PVC exterior and urethane interior coatings applied to the conduit shall afford sufficient flexibility to permit field bending without cracking or flaking at temperatures above 30 degrees F (-1 degrees C).

c. All male and female threads on conduit, elbows, and nipples shall be protected by application of an electronically conducting corrosion resistant compound.

- d. Installation of the PVC coated conduit system shall be performed in accordance with the manufacturer's installation manual.
- e. Conduits and fittings shall meet the following standards:
 - i. ASTM D870
 - ii. ASTM D1151
 - iii. ASTM D3359
 - iv. ASTM D1308
 - v. NEMA RN1

2. Conduit

- a. The PVC coated rigid metal conduit must be UL listed. The PVC coating must have been investigated by UL as providing the primary corrosion protection for the rigid metal conduit. Ferrous fittings for general service locations must be UL listed with PVC as the primary corrosion protection. Hazardous location fittings, prior to plastic coating must be UL listed. All conduit and fittings must be new, unused material. Applicable UL standards may include: UL 6 Standard for Safety, Rigid Metal Conduit, UL 514B Standard for Safety, Fittings for Conduit and Outlet Boxes.
- b. The conduit shall be hot dip galvanized inside and out with hot dipped galvanized threads.

3. Fittings and Accessories

The design shall be equipped with a positive placement feature to ease and assure proper installation. Certified results confirming seal performance at 15 psig (positive) and 25 inches of mercury (vacuum for 72 hours shall be available).

- a. A PVC sleeve extending one pipe diameter or 2 inches, whichever is less, shall be formed at every female fitting opening except unions. The inside sleeve diameter shall be matched to the outside diameter of the conduit.

- b. The PVC coating on the outside of conduit couplings shall have a series of longitudinal ribs 40 mils in thickness to protect the coating from tool damage during installation.
 - c. Conduit Form 8 Bodies shall be 1/2 inch through 2-inch diameter, shall have a tongue-in-groove “V-Seal” gasket to effectively seal against the elements. Conduit bodies shall be Form 8 and shall be supplied with plastic encapsulated stainless steel cover screws.
 - d. Right angle beam clamps and U bolts shall be specially formed and sized to snugly fit the outside diameter of the coated conduit. All U bolts will be supplied with plastic encapsulated nuts that cover the exposed portions of the threads.
 - e. Conduit clamps and fittings for PVC-Coated RGS conduits shall be 316L stainless steel.
4. Approved Material
- a. Plasti-Bond REDH2OT, Perma-Cote, or KorKap manufactured by Robroy Industries.
 - b. Ocal-Blue Steel conduit and fittings as manufactured by Ocal, Inc.
 - c. Any deviation from the above approved materials must be approved by the Engineer.

2.2 NONMETALLIC CONDUIT TYPES

A. PVC

1. Conduits

NEMA TC 2, Schedule 40 or 80 PVC.

2. Fittings and Accessories

NEMA TC 3; match to conduit type and material, but elbows shall be RMC.

3. Conduit bodies

Where allowed, shall match type, material, and gauge of conduit.

2.3 OUTLET AND DEVICE BOXES

A. STANDARD METAL BOXES

Assembled from stamped steel hot dipped zinc galvanized coated flat pieces, welded or mechanical assembled into a device box, with knockouts for conduit or connector entrance, meeting NEMA OS 1, with plaster or extension rings and necessary mounting appurtenances to suite construction and application.

B. CAST BOXES

1. Cast Aluminum

Epoxy coated cast aluminum box, one piece, with mounting lugs, with threaded holes or hubs, with internal green ground screw and with neoprene gaskets.

2. Cast Iron

Cast iron with electro-galvanized and aluminum acrylic paint finish, one piece, with mounting lugs, with threaded holes or hubs, with internal green ground screw and with neoprene gaskets.

C. DEVICE COVERS

1. Plastic: Thermoplastic nylon, device-mount, ivory.

2. Aluminum: Sheet Aluminum.

3. Cast Iron: Iron alloy.

D. WEATHERPROOF COVERS AND PLATES

Weather proof, self-closing, die-cast aluminum, UL listed.

E. IN-SERVICE COVERS

Shall be weather proof and hinged from top with removable cord slots.

2.4 JUNCTION BOXES AND HANDHOLES

A. JUNCTION BOXES

1. Standard

Stamped steel, deep drawn one piece (without welds or tab connections), galvanized, with knockouts for conduit or connector entrance, meeting NEMA OS 1. Boxes 6" x 6" x 4" or larger may be code gauge fabricated steel continuously welded at seams and painted after fabrication.

2. Cast

Cast iron with electrogalvanized and aluminum acrylic paint finish, one piece, with threaded cover of the same metallurgy and finish, with mounting lugs, with threaded holes or hubs, with internal green ground screw and with neoprene gaskets; explosion-proof, dust-ignition-proof, raintight, rated for Class I, Division 1 and 2, Groups C, D.

3. Stainless Steel

NEMA 4X 316L stainless steel with gasketed screw down cover.

B. HANDHOLES

1. Material and Strength

Handholes shall be made from Concrete or Polymer Concrete. The boxes and covers are required to conform to all test provisions of ANSI/SCTE 77 2002 "Specification For Underground Enclosure Integrity" for Tier 15 applications (Design Load Vertical 22,500 lbs. and Lateral 800 lbs/sq. ft.) and to be Listed and Labeled. The boxes must physically accommodate and structurally support compatible covers, which possess the Tier rating. In no assembly can the cover design load exceed the design load of the box. All components in an assembly (box and cover) are to be manufactured by the same manufacturer. All covers are required to have a minimum coefficient of friction of 0.50 in accordance with ASTM C1028. Independent third-party verification or test reports stamped by a registered Professional Engineer certifying that all test provisions of this specification have been met are required with each submittal. The cover is to have an identifying function descriptor imprinted on it. The Descriptor shall be

ELECTRICAL, CONTROL, SIGNAL, TELEPHONE, STREET LIGHT, or similar approved by the Engineer.

Handholes with metallic lids shall be grounded per Specification Section 16060.

Handhole lid assemblies comprised of steel shall have a factory-applied galvanized finish.

Exception:

- *Unless the assembly is fabricated from stainless steel.*

2. Manufacturers

Quazite (Strongwell Corp.)
Carson Industries

PART 3 APPLICATION

3.1 CONDUIT BODIES

This section describes the types of raceways, junction boxes, and device boxes that can be used for different circuits and different environments. Reference Section 4.1 for methods and practices required for installation.

A. CABLE AND CONDUIT SCHEDULE

The Cable and Conduit Schedule shall be considered absolute. No changes to wire sizes, wire count, insulation type, circuit type, or conduit size shall be allowed without approval from the engineer.

The Cable and Conduit Schedule does not indicate conduit type (PVC, EMT, RGS, etc.) since, in many cases, a conduit's type may change between its source and destination. The rules stated in this specification define the necessary and allowed conduit type(s) for various applications and routes.

B. RACEWAY REQUIREMENTS

The term "RGS conduits" refers to a type of conduit body and **does not imply whether the conduit is PVC-coated or not**. Certain applications require RGS conduits with PVC coating, others do not. Reference Section 3.2, "RGS RACEWAY PROTECTIVE COATINGS" for these requirements.

1. Circuit Types and Categories

a. Circuit Types

Conduits are broken into three general circuit types; 1) Power, 2) Control, and 3) Instrumentation (see Definitions).

On the Cable and Conduit Schedule, Power conduits are those starting with the letter "P", Control conduits are those starting with the letter "C", and Instrumentation conduits are those starting with the letter "S".

2. Conduit Shape

Wiring shall be routed in pipe or tubular conduits, NOT in fabricated wireways or gutters.

C. PVC SCHEDULE 40 RACEWAY APPLICATIONS

1. All straight portions of conduits completely concealed in walls, attics, concrete, or below ground (not exposed) shall be PVC Schedule 40.

Exceptions:

- *All conduits containing grounding electrode conductors shall be PVC Schedule 80 over their entire length.*
- *PVC conduit areas under roads or heavy traffic areas shall be Schedule 80.*
- *Where specifically called out otherwise in the Cable and Conduit Schedule.*

2. All portions of power and control conduits completely concealed inside a reservoir shall be PVC Schedule 40.

D. PVC SCHEDULE 80 RACEWAY APPLICATIONS

1. All portions of conduits which contain grounding electrode conductors shall be PVC Schedule 80 and shall contain no metal fittings, connectors, or devices. Such conduits containing grounding electrode conductors shall contain no other types of conductors.

2. PVC conduit areas under roads or heavy traffic areas.
3. As stated in the Cable and Conduit Schedule.

E. RGS RACEWAY APPLICATIONS

1. Underground factory or bent elbows and offsets greater than or equal to 30 degrees shall be RGS.

Exceptions:

- *Where the radius of a conduit bend is greater than or equal to 15 feet per inch of trade size.*
- *Raceways used for the containment and protection of bare grounding electrode conductors shall be PVC Schedule 80. Reference PVC Schedule 80 raceway applications.*

2. All portions of conduits exposed outdoors shall be RGS.

Exception:

- *All conduits containing grounding electrode conductors shall be PVC Schedule 80 over their entire length.*

3. All conduit penetrations from grade shall be RGS.

Exception:

- *All conduits containing grounding electrode conductors shall be PVC Schedule 80 over their entire length.*

4. All portions of exposed conduits inside closed buildings shall be RGS.

Exceptions:

- *EMT conduit shall be allowed per the “EMT Raceway Applications” section herein.*
- *LFMC conduit shall be allowed per the “LFMC Raceway Applications” section herein.*

- *All conduits containing grounding electrode conductors shall be PVC Schedule 80 over their entire length.*
- *Unless otherwise specifically called out on a separate plan or detail.*

F. LFMC RACEWAY APPLICATIONS (REFERENCE DEFINITIONS)

1. LFMC conduit shall be used for the last 18 inches of connection to motors, transformers and other vibrating equipment.

G. EMT RACEWAY APPLICATIONS (REFERENCE DEFINITIONS)

1. Exposed conduits may be EMT in completely enclosed dry (see Definitions) rooms.
2. EMT conduits may be used in attics and where concealed in walls.

3.2 RGS RACEWAY PROTECTIVE COATINGS

Protected RGS conduits are used to minimize conduit degradation from moisture and chemicals.

Where called in the Plans or Specifications as “Protected RGS,” “PVC-Coated RGS,” “PVC-Coated,” “PVC-RGS,” or “PVC-RMC,” all such conduits, elbows, and fittings shall be factory coated PVC as defined in Section 2.1.

A. PVC-COATED RGS CONDUIT APPLICATIONS

1. All portions of RGS elbows, bends, straight pipes, couplings, and fittings buried underground shall be PVC-Coated.
2. All portions of RGS elbows, bends, straight pipes, couplings, and fittings encased in concrete shall be PVC-Coated.
3. All portions of RGS elbows, bends, straight pipes, couplings, and fittings exposed outdoors shall be PVC-Coated.
4. All portions of RGS conduits penetrating concrete floors and below-ground walls and ceilings shall be PVC-Coated at least 12" into the exposed area and extending at least 24" underground.

3.3 JUNCTION AND DEVICE BOX APPLICATIONS

A. JUNCTION BOXES

1. Dry Areas (see Definitions).
 - a. Flush-mounted junction boxes may be the standard type.
 - b. Wall-mounted junction boxes shall be the NEMA 1 gasketed.
2. Wet Areas (see Definitions).
 - a. NEMA 4X 316L stainless steel.

3.4 HANDHOLE APPLICATIONS

A. HANDHOLES

Handholes are used as pull and splice points in underground installations and are typically installed in driveways, parking lots, and off-roadway applications subject to occasional non-deliberate heavy vehicular traffic.

PART 4 EXECUTION

4.1 EXAMINATION

Examine surfaces and spaces to receive raceways, boxes, for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

4.2 INSTALLATION, GENERAL

A. COORDINATION WITH OTHER WORK

1. Non-electrical buried piping has routing priority over electrical burials.

B. MOUNTING PRACTICES

1. All conduits in process areas shall be surface mounted unless specifically called out otherwise on the Plans.

2. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions.
3. Where several conduits follow a common route, stagger pull boxes, junction boxes, pulling sleeves, and fittings.

C. CONDUIT INSTALLATION

Install conduit as a complete and continuous system without wires. Mechanically secure to boxes, fittings, and equipment. Electrically connect conduits to all metal boxes, fittings, and equipment.

1. All field or manufactured ferrous metal threaded connections of conduits and fittings shall be installed with a coating of electrically conductive, corrosion resistant, copper colloidal compound such as "Shamrock Kopr-Shield™ Compound" or equivalent.
2. Keep conduits clean and dry. Close each exposed end.
3. Properly ground each metallic box, cover, lid, hatch, conduit, etc., in compliance with the National Electrical Code and Specification Section 16060.
4. When blowing through conduits, cover electrical components installed in enclosures to avoid blowing dirt, shavings, or moisture into equipment.
5. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel, monofilament plastic line, or woven polyester pull line with not less than 200-lb tensile strength. Leave at least 8 inches of slack at each end of the pull wire.
6. Install exposed raceways in lines parallel or perpendicular to the building or structural member's lines except if structure is not level then follow the surface contours as much as practical. Do not crossover or use offsets if they can be avoided by installing the raceway in a different routing.
7. Run parallel or banked conduits together, on common supports where practical.
8. Make bends in parallel or banked runs concentric (common radius point, expanding radius). Use factory elbows only where elbows can be installed concentrically; otherwise, provide field bends for parallel raceways.

9. Labeling

With the exception of conduits supplying power to lighting and convenience receptacles, all conduits shall be labeled in the following manner.

- a. Conduits shall be labeled at each entrance and exit of a raceway, box, and device. Labels shall be placed no more than 3 inches from the relevant entrance or exit and shall be positioned in a manner where they can best be read by technicians and maintenance personnel.

Exception:

- *Only one label shall be required for conduits less than 6 feet in length where the entire conduit can be seen from a single point.*
- b. The labels used shall be permanent items manufactured specifically for tagging conduits in direct sunlight and wet environments.
 - c. The conduit label shall be the full conduit number as listed on the Cable and Conduit Schedule.
 - d. The conduit label shall be attached near the ends of conduit stub ups through floors and penetrations into vaults even if equipment is set over the conduit.

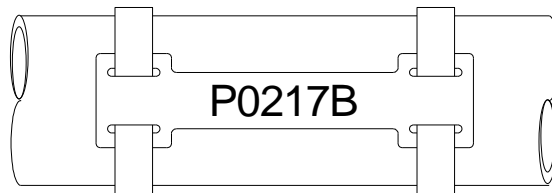


Figure 4.2.D.11

Example of a Conduit Label

D. RACEWAY TERMINATIONS AND CONNECTIONS

1. Join raceways with fittings designed and approved for the purpose and make joints tight.

2. Make connections waterproof and rustproof by application of a watertight, conductive thread compound. Clean threads of cutting oil before applying thread compound.
3. PVC–RMC Conduits
Use only fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduits.
4. Apply PVC adhesive by brush.
5. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.
6. Cut ends of conduit square with hand or power saw or pipe cutter. Ream cut ends to remove burrs and sharp ends. Make conduit threads cut in the field with the same effective length and same thread dimensions and taper as specified for factory-cut threads.
7. Flexible Connections
Use maximum of 18 inches of flexible conduit for equipment subject to vibration, noise transmission, removal, or movement; and for all motors. Do not use flexible conduit in place of elbows, offsets, or fittings to attach to fixed equipment.
8. Provide double locknuts and insulating bushings at conduit connections to boxes and cabinets. Align raceways to enter squarely and install locknuts with dished part against the box. Use grounding type bushings where connecting to concentric or eccentric knockouts.
9. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.
10. Connect conduit to hubless enclosures, cabinets, and boxes with double locknuts and with insulating type bushings. Use grounding type bushings where connecting to concentric or eccentric knockouts. Make conduit connections to enclosures at the closest point possible where the devices are located to which the circuits contained in the conduit will connect.

Exception:

- *In wet areas, connect to enclosures, boxes, and devices from the bottom side using Myer-type hubs.*

E. RACEWAY SUPPORT

Support raceways as specified in Section 16050.

1. Provide anchors, hangers, supports, clamps, etc., to support the raceways from the structures in or on which they are installed. Do not space supports further apart than 10 feet.
2. Provide sufficient clearance to allow conduit to be added to racks, hangers, etc., in the future.
3. Support raceway within 3 feet of every outlet box, junction box, panel, fitting, etc.
4. Support raceway and boxes in an approved manner by:
 - a. Expansion shields in concrete or solid masonry;
 - b. Toggle bolts on hollow masonry units;
 - c. Wood screws on wood;
 - d. Metal screws on metal.
5. Raceway in wet areas shall have clamp backs or other appropriate spacers to hold them a minimum of 1/2 inch off the surface. Horizontal runs on the roof surface shall be blocked at every 5 feet to hold them a minimum of 2 inches above roof surface.

F. INSTALLING PVC-COATED RGS CONDUITS

1. Follow the manufacturer's requirements and recommendations when installing PVC-Coated RGS conduits.
2. Seal the connections to protect the conduit.
3. Provide manufacturer's PVC repair compound where the thickness of the conduit coating has been reduced or damaged (from bending, threading, nicking, etc.)

G. BENDS AND OFFSETS

1. Fabricated bends and offsets shall be made with manufacturer-approved bending tools, by manufacturer-certified personnel.
2. Where possible, use standard elbows, conduit fittings, or junction boxes to avoid fabricated bends.
3. Make bends and offsets uniform and symmetrical. Make bends and offsets so that the inner diameter is not reduced. Use expanding plugs for bends in PVC conduit of 2-inch trade size or larger. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.

H. PENETRATIONS FOR RACEWAYS

1. Do not bore holes in floor and ceiling joists outside center third of member depth or within 2 feet of bearing points. Holes shall be 1-inch diameter maximum.

Exception:

- *Unless specifically approved by Structural Engineer.*
2. Penetrate through roofs with core drill hole 1/2 to 1 inch larger than conduit, flash with neoprene, caulk conduit in place and seal with silicone sealant under flashing. Sleeve roof opening where non-concrete roof construction occurs.

4.3 HANDHOLES

A. HANDHOLE INSTALLATION

Install handholes for underground raceway systems true to line and grade. Provide a compacted foundation of fine sand or 3/8 minus crushed rock for the bearing surface edges of the handholes.

The handholes shall be installed per the NEC sections 314, and other applicable sections of the NEC.

B. HANDHOLE CONDUIT INSTALLATION

1. End all conduits with a vertical riser.
2. Conduits shall be allowed to extend into the handhole as a PVC conduit. Provide a PVC bell-end in each conduit as shown in Figure 4.5.B.2. Provide a removable filler at the end of each conduit to eliminate the possibility of water entry.

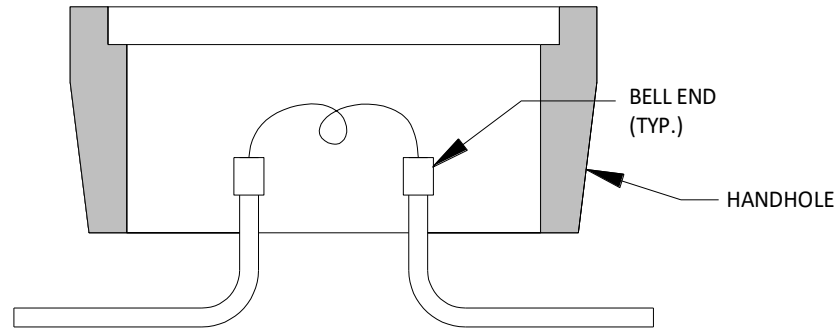


Figure 4.5.B.2

Typical PVC Conduit Terminations in a Handhole

C. HANDHOLE GROUNDING

1. All handholes with metal conduits or with metal lids shall be grounded per Section 16060-3.

4.4 INSTALLATION OF CONDUITS UNDERGROUND AND IN CONCRETE

A. UNDERGROUND RACEWAYS

1. The minimum conduit depth shall be 24 inches.

Exceptions:

- *Unless required to be shallower due to physical constraints (see requirements below).*
- *Unless under a concrete slab (see requirements below).*
- *Conduits contains a grounding electrode conductor shall be 30-inches deep.*

2. Conduits that require a buried depth of less than 18 inches shall require a 6-inch-thick concrete covering over that portion of such conduits. Such concrete covers need not be formed but shall be colored red or shall be painted red on top.
3. Conduits under a concrete slab-on-grade shall be separated from the slab and from the supporting soil by at least 3 inches with soft sand on all sides.
4. Run conduits as straight as practicable. Make changes in direction and/or grade of sufficient length to allow a gradual change (3-foot radius minimum). Make slight offsets with 5-degree couplings.
5. Run trenches true and clear of stones or soft spots. Place 4-inches of fine sand in the trench bottom and tamp into place. Provide preformed plastic spacers on top of sand spaced 5-feet on center.

After the raceway is placed in the trench, backfill 6 inches with sand, then with native earth backfill passing a No. 8 sieve, free of stones. Do not tamp on top of the conduit until the final backfill is placed. Tamp or water-settle the final backfill to finish the grade. Compact the backfill as specified under Section 02300 "Site Earthwork."

6. Mark direct buried conduit by placing a red marking tape a minimum of 12 inches below grade during backfilling of the trench.
7. Seal conduit connections to eliminate leakage.

B. CONCRETE ENCASED RACEWAYS

Raceways encased in structural concrete must be defined in detail and presented to the Structural Engineer for approval at least 7 days prior to installation. As a minimum, approval will be based on the assurance that there will be no physical interference and that structural integrity will not be jeopardized.

1. In general, conduits encased in concrete may take the most direct route providing they do not jeopardize the structural integrity of the slab or interfere with process-related piping or equipment.
2. Conduits shall be at least 1-1/2 inches to the edge of a concrete body. If a structural block-out is desired for conduit bundling near

the edge of a concrete body, then submit the desired layout to the Engineer for approval and design as defined in this Section.

3. Conduit density, crossover, and routing must be minimized and coordinated to assure that structural integrity is not jeopardized.
4. At the point-of-exposure out of the slab, conduits must be perpendicular to the slab surface from all angles.
5. No part of an elbow's bending radius shall be seen at the point-of-exposure from the slab.

C. CONDUITS IN ELEVATED SLABS

See "CONCRETE ENCASED RACEWAYS" above.

D. CONDUITS UNDER SLABS ON GRADE

1. No conduits will be encased in slabs less than 8 inches in depth.
2. For slabs-on-grade, all conduits larger than 3/4-inch trade size must be run underground below the slab.

E. CONDUIT TRANSITIONS

Where raceway exits from grade or concrete, provide the following:

1. All conduits exiting grade or concrete shall be PVC-Coated RGS.

Exception:

- *Raceways used for the containment and protection of bare grounding electrode conductors shall be PVC Schedule 80. No portion of these conduits shall be metallic.*
2. For equipment to be moved into place at a later date, install a PVC-Coated RGS coupling flush with the floor slab. Insert a threaded flush plug into the coupling. Provide a pull wire looped backed into the conduit that can be reached after removal of the plug.
 3. Only the straight portion of conduits shall exit grade or concrete. No curved portion of a factory or field-bent conduit shall be visible existing the penetration, even when covered or hidden by equipment.

F. CONDUIT STUB-UPS INTO EQUIPMENT AND ENCLOSURES

1. Where conduits are stubbed up into open bottom equipment and enclosures, extend the bottom of the conduit threads 1/2 inch above grade. Provide ground bushing and end fittings, flush with fitting and 2-inch stub, above the bottom of the enclosure. Stub conduits to a uniform height (plus or minus 1/8 of an inch) and align within plus or minus 1/4 inch.

4.5 PROTECTION

Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer that ensures coatings, and finishes are without damage or deterioration at the time of Substantial Completion.

- A. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
- B. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

4.6 CLEANING

On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

***** END OF SECTION *****

SECTION 16230

GENERATOR ASSEMBLIES

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section consists of a packaged diesel engine generator set with accessories as specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01300	Submittals
16050	Basic Electrical Materials and Methods
16060	Grounding and Bonding
16410	Enclosed Switches and Circuit Breakers

1.3 DEFINITIONS

A. FULL LOAD

The generator delivering 100 percent of its rated output power.

B. MAXIMUM FREQUENCY DIP AND PEAK

The maximum allowable frequency deviation, in percent, below and above the generator's specified output frequency during application-specific starting and stopping steps as specified in 1.5.

Example: A 10 percent MAXIMUM FREQUENCY DIP AND PEAK on a 480 Vac, 3 PH, 60 Hz generator equates to ± 10 percent (± 6 Hz) maximum deviation from 60 Hz, or 54 Hz absolute minimum to 66 Hz absolute maximum frequency limits during the worse-case specified step changes while either loading or unloading.

C. MAXIMUM FREQUENCY RECOVERY TIME PERIOD

The maximum period of time, in seconds, for the frequency to recover back to its specified steady-state operating band following load transitions from no load to full load or from full load no load.

Example: A 5 second MAXIMUM VOLTAGE RECOVERY TIME PERIOD requires that the generator repeatedly recover from full load added or removed load steps within 5 seconds maximum. This means that during a full load transition, in either direction, the generator frequency may deviate from its specified steady-state operating band for a maximum of 5 seconds before it has fully recovered back to its specified steady-state operating band.

D. MAXIMUM STEADY-STATE FREQUENCY OPERATING BAND

The maximum allowable frequency deviation, in percent, below and above the generator's specified operating frequency during steady-state operating conditions at any load between no load and full load.

Example: 0.5 percent MAXIMUM STEADY-STATE FREQUENCY OPERATING BAND on a 480 Vac, 3 PH, 60 Hz generator equates to ± 0.5 percent (± 0.3 Hz) maximum deviation from 60 Hz, or 59.7 Hz absolute minimum to 60.3 Hz absolute maximum frequency limits at any stable operating load from no load to full load.

E. MAXIMUM VOLTAGE DIP AND PEAK

The maximum allowable voltage deviation, in percent, below and above the generator's specified output voltage during application-specific starting and stopping steps as specified in 1.5.

Example: 25 percent MAXIMUM VOLTAGE DIP AND PEAK on a 480 Vac, 3 PH, 60 Hz generator equates to ± 25 percent (± 120 Vac) maximum deviation from 480 Vac, or 360 Vac absolute minimum to 600 Vac absolute maximum voltage limits during the worse-case specified step changes while either loading or unloading.

F. MAXIMUM VOLTAGE RECOVERY TIME PERIOD

The maximum period of time, in seconds, for the voltage to recover back to its specified steady-state operating band following load transitions from no load to full load or from full load no load.

Example: A 5 second MAXIMUM VOLTAGE RECOVERY TIME PERIOD requires that the generator repeatedly recover from full load added or removed load steps within 5 seconds maximum. This means that during a full load transition, in

either direction, the generator voltage may deviate from its specified steady-state operating band for a maximum of 5 seconds before it has fully recovered back to its specified steady-state operating band.

G. MAXIMUM STEADY-STATE VOLTAGE OPERATING BAND

The maximum allowable voltage deviation, in percent, below and above the generator's specified operating voltage during steady-state operating conditions at any load between no load and full load.

Example: 2 percent MAXIMUM STEADY-STATE VOLTAGE OPERATING BAND on a 480 Vac, 3 PH, 60 Hz generator equates to ± 2 percent (± 9.6 Vac) maximum deviation from 480 Vac, or 470.4 Vac absolute minimum to 489.6 Vac absolute maximum voltage limits at any stable operating load from no load and full load.

H. NO LOAD

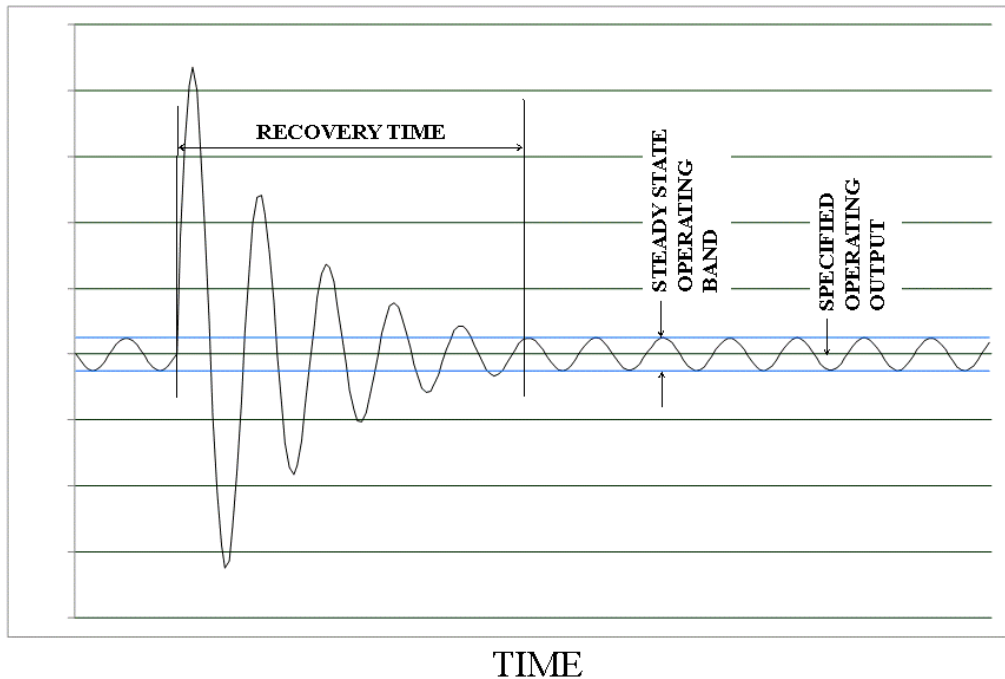
The generator delivering 0 percent of its rated output power.

I. STANDBY POWER OUTPUT RATING

The power output rating equal to the power the generator set delivers continuously under normally varying load factors for the duration of an electrical utility power outage. The power output rating is the gross electrical power output of the generator set minus the total power requirements of the electric motor driven cooling fan, water pump, and other auxiliary loads related to the generator set operations.

J. DEFINITIONS REFERENCE GRAPH

The following graph is a reference chart to better define the following terms "MAXIMUM VOLTAGE RECOVERY TIME PERIOD," "MAXIMUM STEADY-STATE VOLTAGE OPERATING BAND", "MAXIMUM FREQUENCY RECOVERY TIME PERIOD," and "MAXIMUM STEADY-STATE FREQUENCY OPERATING BAND." The Y axis can either be voltage or frequency and the X axis is time.



1.4 REFERENCES

- A. The latest Washington State adopted, published edition of a reference shall be applicable.
- B. All Washington State amendments adopted prior to the effective date of this Contract shall be applicable.
- C. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:
 1. National Fire Protection Association (NFPA)
 - a. NFPA 30 Flammable and Combustible Liquids Code
 - b. NFPA 37 Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines
 - c. NFPA 70 National Electrical Code
 2. International Fire Code (IFC)
 3. International Building Code (IBC)

4. National Electrical Manufacturers Association (NEMA)
 - a. NEMA MG 1: Motors and Generators
5. International Mechanical Code (IMC)
6. Underwriters Laboratory (UL)
 - a. UL 2200 Generator Engine Generator Assemblies
 - b. UL 142 Steel Aboveground tanks for Flammable and combustible Liquids.

1.5 PERFORMANCE REQUIREMENTS

- A. Engineering calculations indicate a standby power output rating requirement of 150kW at 80 percent power factor at 240/120 volts, 1 phase, 60 hertz while operating at site elevation (reference 1.9) in an ambient temperature range of 0 to 104 degrees F.
- B. **MAXIMUM VOLTAGE DIP AND PEAK**
Shall not exceed 25 percent.
- C. **MAXIMUM FREQUENCY DIP AND PEAK**
Shall not exceed 10 percent.
- D. **MAXIMUM STEADY-STATE VOLTAGE OPERATING BAND**
Shall not exceed 2 percent.
- E. **MAXIMUM STEADY-STATE FREQUENCY OPERATING BAND**
Shall not exceed 0.5 percent.
- F. **MAXIMUM VOLTAGE RECOVERY TIME PERIOD**
Shall not exceed 5 seconds.
- G. **MAXIMUM FREQUENCY RECOVERY TIME PERIOD**
Shall not exceed 5 seconds.

H. ALTERNATOR OUTPUT WAVEFORM

At no load, harmonic content measured line-to-line or line-to-neutral does not exceed 5 percent total and 3 percent for single harmonics. The telephone influence factor, determined according to NEMA MG 1, does not exceed 50.

I. SUSTAINED SHORT-CIRCUIT CURRENT

For a 3-phase, bolted short circuit at the system output terminals, the system will supply 300 percent of rated full load current for not less than 10 seconds to coordinate circuit breaker tripping. This system shall include over-voltage relay protection to preclude damage to any generator system component.

J. TEMPERATURE RISE OF GENERATOR

Within limits permitted by NEMA MG 1, when operating continuously at full nameplate rating, the temperature rise of the generator shall not exceed 250 degrees F over 100 degrees F ambient.

K. STARTING TIME

The maximum allowable time period to cold start the generator, while operating at the low end of the specified temperature range, and have its voltage and frequency sufficiently stable for a transfer switch to accept or automatically initiate a power transfer, shall be 10 seconds.

1.6 SUBMITTALS

For each generator set submit under provisions of Section 01300 and as specified herein.

A. PRODUCT DATA

Provide the manufacturer and a full description of the generator set and associated components. Include features, ratings, and performance including, but not limited to:

1. Engine including the following:
 - a. Horsepower at rated speed and load
 - b. Emission Ratings

- c. Lubrication oil capacity
- 2. Overall dimensions of generator set system including the sub-base fuel tank, and the enclosure.
- 3. Fuel consumption for 1/4, 1/2, 3/4, and full load of generator set
- 4. Electrical governor
- 5. Coolant heater
- 6. Alternator
 - a. Electrical rating (kVA, reactance, time constants, temperature rise, etc.).
- 7. Voltage regulator type, make, model, and wiring diagram
- 8. Noise levels at twenty-three feet (7 meters) in a free field
- 9. Exhaust pipe and muffler sizing backpressure calculations
- 10. Warranty and Service Agreement documentation
- 11. Vibration isolation calculations, Plans and seismic certification from manufacturer per the seismic information listed in Part 1.8B of this Section.
- 12. Bill of Materials
- 13. Wiring Diagram

B. QUALITY ASSURANCE

Provide documentation showing all CD&Es (compliances, deviations, and exceptions) for this Specification.

C. OPERATION AND MAINTENANCE MANUAL

1. Field Test Reports

Indicate and interpret test results for compliance with manufacturer's published standards for unit provided. Provide written approval of installation in accordance with all manufacturers' recommendations.

2. Operation and Maintenance Data

Provide information to be included in the operation and maintenance equipment manuals specified in Section 01300, Section 11000, and as specified herein.

3. Test Reports

The O&M manual shall include a copy of the factory test data and the field test report.

4. Service Agreement and Warranty

Include copies of the Service Agreement and Warranty in the Operation and Maintenance Manual.

1.7 QUALITY ASSURANCE

See Section 16050.

A. SOURCE LIMITATIONS

1. Obtain engine generator set from a single generator distributor with responsibility for the complete system. Furnish a new product built from components with proven reliability and compatibility. The generator set shall be coordinated to operate as a unit as evidenced by records of prototype testing by the OEM.
2. The warranty shall be supported by the original distributor, not offset to an engine manufacturer, an alternator manufacturer, or a new manufacturer's distributor.
3. The local representative for the generator manufacturer shall have the minimum qualifications and meet the minimum requirements:
 - a. Shall have represented the product for a minimum of 5 years.
 - b. Shall provide, on request, a reference list of five similar projects, no older than 2 years, with site contact information.
 - c. Shall provide formal classroom or online training for service and maintenance of generators and transfer

switches on a regular basis. The schedule and pricing for this training shall be available on request. The training shall be conducted in a location that is within a 1 day drive of the job site.

- d. Shall have a field service group, with no fewer than 10 qualified field service technicians, dedicated to generator repair and maintenance with dedicated service vehicles, parts, and tooling needed for general maintenance and common repairs.
 - e. Shall have qualified field service technicians with a minimum of 2 years of generator field experience on the product being supplied and shall be factory trained and certified.
 - f. Shall have qualified field service technicians with a current EL-07 Maintenance Electrician License as required by the Washington State Department of Labor and Industries.
 - g. Shall have a warehouse of with sufficient parts located within 150 miles of the job site.
- 4. Only a factory direct or a first tier distributor shall be acceptable. Second tier distributors are not approved.
 - 5. Only approved local distributors shall supply equipment provided under this contract. Equipment by non-local distributors shall not be accepted.
 - 6. The distributor shall be the authorized engine distributor for the prime mover.

B. PRODUCT SELECTION

The structural, mechanical and electrical designs shown on the Plans are based on the equipment manufactured by Cummins. Any modifications to the mechanical, structural, electrical, instrumentation and control, and other portions of the work that may be required to adapt the layout, connections, and details shown on the Plans to the equipment actually furnished shall be at no additional cost to the Owner. All necessary design revisions shall be made at the Contractor's sole expense. All redesign information prepared by the Contractor shall be submitted for review prior to incorporating the redesign into the work.

C. Generator set to be UL 2200 listed “Stationary Engine Generator Assemblies.”

D. EMISSIONS

EPA certified for all current EPA emissions requirements.

E. FACTORY TEST

Test assembled generator set at the factory prior to shipment to the job site. The power factor for the factory test shall be at 0.8 p.f.

1. Show the following conditions at load and no load on the Generator Set: Charging System Volts, Voltage Output, Frequency, Coolant Temperature, and Oil Pressure, and other pertinent information on the test report. Provide a plot of the transient voltage and a plot of the frequency response versus time as a result of a full load single step.
2. Perform manufacturer’s standard factory tests.
3. Test for a minimum of 30 minutes at full load per NFPA 110.

1.8 PROJECT/SITE CONDITIONS

A. ENVIRONMENTAL REQUIREMENTS

Engine generator system is designed, engineered, and rated to withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: Minus 5 degrees F to 122 degrees F.
2. Relative Humidity: 0 to 95 percent.
3. Elevation: Sea level to 500 feet.

B. SEISMIC REQUIREMENTS

The entire generator package including all mounted accessories shall comply with the requirements of the 2018 IBC and ASCE 7-16 Minimum Design Loads for Building and Other Structures, Chapter 13 “Seismic Design for Nonstructural Components,” as referenced and amended by the IBC. Seismic design parameters are as follows:

1. Risk Category IV.
2. Seismic Design Category D.
3. Component Importance Factor: $I_p = 1.5$.
4. Design response acceleration parameters:
 - a. $S_{DS} = 0.827g$.
 - b. $S_{D1} = 0.634g$.

1.9 WARRANTY AND MAINTENANCE

A. WARRANTY

The manufacturer shall warrant the materials and workmanship of the generator set for a minimum of 5 years, or 2,500 hours from the registered commissioning and startup.

The warranty shall be comprehensive and shall include all components included in the generator package. No deductibles shall be allowed for travel time, service hours, repair part costs, etc., during the warranty period.

B. 2-YEAR MAINTENANCE SERVICE

Beginning at time of Substantial Completion, provide 24 months full maintenance service performed by qualified service technicians of the manufacturer's designated service organization. Include 2x yearly inspections to check for defects and operational abnormalities. Include routine preventive maintenance (oil changes, filter changes, belt adjustments, etc.) as recommended by the manufacturer and perform adjustments as required to bring the generator performance back into compliance with the original specifications. Provide OEM parts and supplies to complete all service to support all factory warranty requirements with written reports to the Owner upon completion of visits. No deductibles shall be allowed for travel time, service hours, repair part costs, etc., during the warranty period.

Provide a 2-hour load bank test on the generator at 11 months and 23 months from the time of Substantial Completion.

1.10 EXTRA MATERIALS

Reference Specification Section 16050 for spare parts.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. APPROVED MANUFACTURERS

1. Kohler as provided by Power Systems West.
2. Cummins Power Generation as provided by Cummins Northwest.
3. MTU as provided by Pacific Power Group.
4. Caterpillar as provided by NC Power Systems.

No other manufacturers shall be accepted.

2.2 ENGINE

A. FEATURES

1. Four-stroke cycle diesel engine of either vertical in-line or V-type suitable for operation on No. 2 diesel fuel.
2. Engine speed shall be governed by an electronic governor. Refer to frequency requirements specified earlier in this Specification.

B. COMPONENTS

1. Oil Pump

Gear type lubricating oil pump for supplying oil under pressure to main bearings, crankpin bearings, pistons, piston pins, timing gears, camshaft bearings, and valve rocker mechanism.

2. Oil Filters

Full flow oil filters conveniently located for servicing, with a spring-loaded bypass valve to ensure oil circulation.

3. Air Filter
Dry type air filter.
4. Cooling System
Sufficient to cool the engine when the generator set is delivering full rated load in an ambient temperature of 104 degrees F.
 - a. Engine-driven, centrifugal-type water circulating pump.
 - b. Thermostatic valve.
5. Coolant/ Jacket/ Block Heater
As described in Part 2.6-B of this Section.
6. Electrical starters sufficient to start the engine within 10 seconds of call to start.
7. Batteries
Lead acid batteries shall be of sufficient capacity to permit starting the generator engine a minimum of four times without recharging. Batteries are to be mounted in an earthquake- and drip-proof rack on the skid, frame, or other approved separate location with required connections provided.
8. Battery Heater
As described in Part 2.6-B of this Section.
9. Battery Charger
 - a. Silicone rectifier static type, self regulated with high current and full float operation with a filtered output.
 - b. The charger shall be capable of providing a 10 A DC high current charging rate when the battery voltage is below the “float voltage set point.” Full floating charging when voltage is above the set point.
 - c. Battery charger operates from 120 volts, single phase AC connected to Generator Auxiliary Device Panel (GADP) as per Section 2.6.A.

- d. The charger shall be complete with voltmeter, ammeter, charging rheostat, automatic equalizing timer, and high/low battery voltage alarm.
 - e. The battery charger shall be factory mounted with vibration isolators to prolong service life.
 - f. Battery charger shall include standard NFPA outputs where generator is legally required for life safety.
10. Provide watertight flex connections for all conduits and piping attached to generator.

2.3 ALTERNATOR

A. GENERAL

Four pole, 1,800 rpm revolving field generator. Enclosure shall be of drip-proof construction. Insulation Class H. Wiring shall be 12-lead, reconnectable, and configured for the specified voltage, phasing, neutral point, and frequency.

B. ALTERNATOR HEATER

As described in Part 2.6-B of this Section.

2.4 VOLTAGE REGULATOR

An electronic voltage regulator shall be provided.

2.5 CONTROL PANEL

The Control panel shall be of the rotatable dead-front type, vibration free mounted on the generator set. The generator control panel and the generator main circuit breaker shall be installed per NEC clearances and provide accessibility to equipment. The tops of control panels and the circuit breakers shall be mounted a maximum of 72 inches above the finished floor.

- A. The control panel shall operate at 12 or 24 VDC from the generator/battery electrical system as required by manufacturer based on the size of the system.

- B. Control panel shall include the following functions/devices:
1. Automatic Starting System
 - a. Provides three 15 second cranking cycles and two rest periods followed by a lockout and alarm.
 - b. Operation is initiated by the closing of a remote Form A contact in the automatic transfer switch control circuit.
 2. Indicating light for alarm condition.
 3. Indication for the following:
 - a. Running
 - b. Low coolant level
 - c. High coolant temperature
 - d. Low oil pressure
 - e. Over speed
 - f. Over crank
 - g. AC volts for each phase
 - h. AC current for each phase
 - i. Frequency
 - j. Lube oil pressure
 - k. Coolant temperature
 - l. Run Time
 - m. Number of Starts
 4. Engine “AUTO-OFF-MANUAL” control selector switch.
 5. Red colored emergency shutdown pushbutton/switch.

6. Time delay relay to permit operation at “NO-LOAD” after retransfer of load to normal source (cool down timer).
7. Automatic safety controls which shut down the engine on:
 - a. Low lubricating oil pressure
 - b. Low coolant level
 - c. High jacket water temperature
 - d. Engine over speed
8. Include a Form A (N.O. Dry) contact for remote connection for each of the following Generator functions.
 - a. Running
 - b. General Alarm
 - c. Fail (shall include, as a minimum, any combination of conditions in 8 above)
 - d. AUTO-OFF-MANUAL control switch in Auto Mode
 - e. Low Battery Voltage
 - f. Low Oil Pressure
 - g. High Coolant Temperature
 - h. Low Fuel Level
 - i. High Fuel Level
 - j. Fuel Tank Leak
9. Control Cabinet Heater
As described in Part 2.6-B of this Section.

2.6 ACCESSORIES

A. GENERATOR AUXILIARY DEVICE PANEL

The generator manufacturer shall provide, install, and prewire a Generator Auxiliary Device Panel (GADP) as part of the generator system with the following minimum features:

1. The GADP shall consist of a NEMA 1 gasketed 240/120 VAC single phase load center with a main breaker and appropriately sized branch circuit breakers for the battery charger and the heaters listed below under GENERATOR HEATERS. Available power to the panel is 240/120 VAC, single phase.

Exception:

The GADP load center can be replaced with one or more 20 A, 4-plex receptacle sets in cast aluminum boxes under the following conditions:

- a. *The battery charger and all heater loads are 120 VAC, single phase,*
 - b. *The sum of the battery charger and all heater loads does not exceed 1920 VA (16 A),*
 - c. *All loads are prewired by the manufacturer with grounded plug cables,*
 - d. *The receptacles are placed within reach of all load plugs,*
 - e. *If required, multiple 4-plex receptacle sets are connected together by the manufacturer (provide a single electrical connection point for the Contractor).*
2. For outdoor generators, the GADP shall be securely mounted within the enclosure in a location easily accessible by the operator and to a Contractor-provided power conduit.
 3. The GADP shall be internally connected to the described loads by the generator manufacturer.
 4. It is the intent that the Contractor need only provide a single power conduit and associated conductors to the manufacturer-provided GADP and terminate the conductors to a main circuit breaker,

neutral, and ground. All connections for heater controls and devices shall be prewired and pretested by the manufacturer.

B. GENERATOR HEATERS

1. Coolant Heater

Engine mounted, thermostatically controlled immersion type engine coolant heater to ensure a minimum coolant temperature of 120 degrees F at ambient room temperature of 5 degrees F. Provide as shown in the table below.

Provide the following generator set heaters:

Device	Voltage Configuration	Wattage (W)
Coolant Heater	240V	< 3,000

C. CIRCUIT BREAKERS

1. Provide an output main circuit breaker according to the plans and specifications section 16410. This breaker shall be lockable in its open position.
2. Provide a generator field protection circuit breaker, or other means to protect the alternator.
3. Provide a load bank circuit breaker according to the plans and that meets specification section 16410.

D. DECALS, PLACARDS, AND SIGNS

1. The generator manufacturer shall provide all decals and signage as required by the regulatory and/or inspecting agency for the particular installation, including, but not limited to the following:
 - a. One hazardous material placard, diamond shape, 4 color (red, white, blue, yellow) with numbers 020 (diesel, kerosene, fuel oil) in accordance with NFPA 704.
 - b. A permanent sign at the fill point for the fuel tank. The sign shall include the filling procedure and tank calibration chart. The filling procedure shall require the person filling the tank to determine the gallons required to fill it to

90 percent of capacity before commencing the fill operation.

2. The Contractor shall provide the following in an easily viewable location on the fuel tank unless noted otherwise:
 - a. One 3" x 12" decal labeled "Diesel" (black/white).
 - b. At each entrance to the room, one 8" x 33" decal labeled "Danger Combustible Liquid" with white letters no less than 3 inches in height and 1/2 inch in stroke on a red background.
 - c. At each entrance to the room one 3" x 12" decal labeled "No Smoking" (red/white).

E. VIBRATION ISOLATORS

1. Provide vibration isolators between the unit and the sub-base fuel tank. The isolation mountings shall consist of malleable cast iron top and bottom housings incorporating steel spring or elastomeric construction and shall be provided with built-in leveling bolts, elastomeric pad and built-in resilient chocks to control oscillation and withstand lateral forces in all directions. Isolators shall be presized and installed in accordance with the recommendations of the generator set manufacturer.
2. Vibration isolation efficiency shall be 96 percent at 1,800 rpm. Provide Korfund or equal.
3. Calculations shall be provided with the vibration isolation submittal demonstrating that the specified efficiency can be met with the project specific system characteristics.
4. Vibration isolators may be waved with manufacturer's documentation that the entire generator package including mounted accessories is IBC certified without them.

F. ANCHORS

Anchors used to secure the generator to the base or other stable surface shall be designed and sized by the manufacturer. Anchors shall be cast-in-place 316 stainless steel anchor bolts or drilled-in 316 stainless steel anchors set with epoxy adhesive. Expansion type anchors shall not be acceptable. The Contractor shall provide and install these anchors.

2.7 SUBBASE TANK

A. GENERAL

Provide dual wall UL 142 listed subbase tank sized to meet 24 hours runtime at full load. The external tank profile shall be “flat” within ± 0.25 inches of vertical offset per 100 inches of horizontal length (± 0.14 degrees maximum).

The subbase tank shall have custom dimensions to reduce the height and accommodate the filling and venting components.

B. LEVEL SWITCH

Provide a liquid level float switches, Pneumercator LS600 or equal, assembly capable of the following:

1. High level alarm set at 90 percent tank capacity
2. Low level alarm set at 30 percent tank capacity

C. LEAK DETECTION SWITCH

Provide secondary containment leak detection. Provide Pneumercator LS600LD or equal.

D. OVERFILL PREVENTION VALVE

Provide an overfill prevention mechanical valve set to shut off fuel flow when the tank level reaches 95 percent tank capacity. The overfill prevention valve shall be sized and coordinated with the fuel tank manufacturer to fit the fill port. Provide Guillotine Inc., or equal.

E. DROP TUBE

Provide aluminum drop tube at the fuel fill, fuel return, and fuel supply ports. The drop tube with diffuser or suction strainer shall terminate a minimum of 6 inches from the bottom of the tank and shall be installed in a manner, which avoids excessive vibration.

F. FUEL FILL CONNECTION

Provide a 2-inch quick connect adapter and cap. Materials of construction shall be A36 carbon steel or aluminum meeting ASTM B221.

G. SPILL CONTAINER

Provide a 5-gallon spill container with a hinged, lockable cover and a manual drain valve into the primary tank. The spill container shall be of steel construction with a powder coated finish. The spill container shall be Morrison Bros. Fig. 516 or equal.

H. NORMAL VENT

Provide a 2-inch-diameter upward vent for normal atmospheric venting. The normal vent shall terminate outside, 12 feet above adjacent ground level. Vent piping shall be Schedule 40 Type S, Grade A steel pipe conforming to ASTM A53. The contractor shall provide all supports for the vent.

I. PRESSURE VACUUM VENT

A pressure/vacuum vent shall be installed at the top of the normal vent pipe, set at 1 oz per square inch. The body construction shall be Aluminum with stainless steel seat and poppet and the vacuum gasket shall be constructed of fuel resistant material. The pressure/vacuum vent shall be in accordance with NFPA 30. Provide Morrison Bros. Fig. 748 or equal.

J. EMERGENCY VENTS

Supply emergency vents for pressure relief only, Manufacturer shall size to prevent a pressure greater than 2.5 psi for the secondary containment tank and primary tank. The emergency vents shall terminate outside. Construction shall be aluminum with painted cast iron cover and Viton O-ring seat material; galvanized materials shall not be used. Mounting connection shall be male NPT. Vents shall be UL listed and in accordance with NFPA 30. Provide Morrison Bros. Fig. 244 or equal.

2.8 EXHAUST SYSTEM

A. EXHAUST

Sufficiently sized to ensure against loss of power due to excessive backpressure in accordance with engine manufacturer's recommendations. Include a drain plug and drip leg in low point of exhaust piping to protect engine. Terminate exhaust piping with a rain cap.

The exhaust systems shall be mounted inside the enclosure.

B. FLEX CONNECTION

Provide a stainless steel flexible exhaust connector, with an exhaust temperature test fitting, flanged for service disconnection.

C. SILENCER

Provide a critical grade silencer. Silencer construction shall be steel with high temperature paint or aluminized finish.

2.9 ENCLOSURE

A. ACOUSTICAL ENCLOSURE

The Generator shall be provided with a skintight acoustical weather protective enclosure.

The enclosure shall reduce the sound pressure level of the generator set while operating at full rated load to an average of 75 dBA at any location 23 feet (7 meters) from the generator set in a free field environment.

The enclosure shall be constructed of minimum 12-gauge steel for framework and 14-gauge steel for panels. The enclosure shall have hinged access doors to maintain easy access for all operating and service functions. All hardware and hinges shall be stainless steel. All doors shall be lockable and include retainers to hold the door open during servicing. The roof shall be cambered to prevent the accumulation of water. The roof and walls shall be designed to withstand snow and wind loads per the IBC.

All sheet metal shall be primed for corrosion protection and finish painted with a color chosen by the Owner from the manufacturer's standard options.

The air intake and exhausts shall be sized to provide ample airflow for the generator set operation at rated load in ambient temperature of 100 degrees F.

2.10 GENERATOR RECEPTACLES

Contractor shall provide NEMA 3R mounting boxes for all new generator receptacles. Size mounting boxes such that the conductors maintain or exceed their minimum bending radius as required by the NEC.

Generator receptacles shall be provided with lockable end caps.

See Plans for additional requirements.

2.11 FINISH

The entire standby generator set assembly with accessories is to be factory painted, color chosen by Owner from manufacturer's standard colors. Generator set manufacturer shall provide appropriate epoxy/polyurethane coating system for high heat conditions.

PART 3 EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

Deliver engine generator set and system components to their final locations in protective wrappings, containers, and other protection that will exclude dirt and moisture and prevent damage from construction operations. Remove protection only after equipment is safe from such hazards. Field repair of material or equipment made defective by improper storage or site construction damage by other trades may be cause for rejection of installation.

3.2 INSTALLATION

Install the complete generator set and accessories per the manufacturer's installation instructions.

Anchor the generator set to concrete housekeeping base or pad with high strength anchors and adequate penetration suitable for the Seismic Design Category as specified in the Plans. Make all electrical connections between accessory items, which are not factory wired, prior to requesting the test engineer.

Maintain minimum workspace around unit and components per manufacturer's installation shop plans and NFPA 70 NEC.

Provide a complete fill of lubricating oil.

Provide a complete fill of fuel in diesel storage tank before testing.

Provide a complete fill of manufacturer approved antifreeze (ethylene-glycol) and water to protect the engine and heat exchanger cooling system to minus 25 degrees F.

Contractor shall locate generator control panel and the generator main circuit breaker per NEC clearances and provide accessibility to equipment. Neither shall

be mounted more than 72 inches above the floor. Include all costs associated with relocating the standard control/service panel arrangement on generator set to maintain code requirements in the Bid Cost.

The generator set shall not be started up or tested in the field until all exhaust piping has been insulated as specified and shown on the Plans. All intake and exhaust louvers and fuel system components shall be fully functional.

3.3 IDENTIFICATION

Identify field installed wiring, components, and provide warning signs as specified in Section 16050.

3.4 GROUNDING

Provide ground continuity to facility electrical ground system as indicated in the Plans and Specification 16060.

3.5 FIELD QUALITY CONTROL

A. Provide services of a factory authorized service representative to provide inspection results of field visit and field testing in writing.

B. **TESTING AGENCY**

Provide the services of a qualified independent testing agency to perform specified field quality-control testing.

C. **TESTING**

1. **Prior to Energization**

After installing disconnect switches and circuit breakers, perform visual and mechanical inspection of enclosure and devices.

2. **Provide third party breakers testing per Specification 16050, Section 3.**

Check connections and mounting for proper torque.

Correct or replace malfunctioning units and retest.

Remove any burrs, filings, or other foreign materials from enclosure. Completely wipe down and vacuum enclosure.

3. After Energization

After electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

Correct malfunctioning units on site where possible and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

D. FIELD TEST

Test the assembled generator set after installation at the job site is complete.

1. Advise the Engineer, the Integrator, the Contractor, the local Fire Prevention Inspector, and the Owner of the proposed time and date of the field test at least 2 weeks in advance so that the test may be witnessed if desired.
2. Under supervision of a factory authorized service representative, pretest all system functions, operations, and protective features. Provide all instruments and equipment required for tests. Adjust to ensure operation is according to specifications.
3. Fuel, lubricating oil, and antifreeze shall be checked for conformity to the manufacturer's recommendations and these specifications under the environmental conditions present and expected.
4. Accessories that normally function while the set is standing by shall be checked prior to cranking the engine. These shall include, but not be limited to: all electric heaters, battery charger(s), etc.
5. Cold Start Test

The unit shall demonstrate the ability to start from a "cold" standby condition (i.e., normal standby mode with engine coolant temperature established by properly functioning water-jacket heater).
6. Calibration and PLC Signal Status Check
 - a. Calibrate all sensors and instruments.

- b. Verify the scaling and connections of each signal to the PLC. Coordinate this work with the Integrator.

7. Generator Load Testing

Generator load testing shall be provided using a manufacturer-provided temporary load bank at 1.0 power factor. The generator shall be operated at 50 percent of full load rating for thirty minutes, followed seamlessly by thirty minutes at 80 percent of full load rating, followed seamlessly by one hour at 100 percent full load rating.

After the first 15 minutes at full load, the following shall be recorded at 15-minute intervals (four recordings).

- a. Voltage (phase to phase and phase to ground) and phase rotation
- b. Amperage (each phase)
- c. Frequency
- d. Fuel pressure, oil pressure, and water temperature
- e. Exhaust gas temperature at engine exhaust outlet
- f. Ambient temperature

During the load test period, check for exhaust leaks, path of exhaust gases outside the building or enclosure, cooling air flow, movement during starting and stopping, vibration during 80 percent and 100 percent loading.

A certified copy of the test results shall be given to the Engineer and supplied with the O&M manuals.

8. Subbase Fuel Tank Test

The following test shall be observed by the local Fire Prevention Inspector:

- a. Prior to any filling of combustible or flammable liquids the base tank shall be pressure tested per NFPA 30, Section 2.4.2. Include the test report in the O&M manuals.

- b. The fuel fill container shall be tested for proper operation.

The Contractor shall demonstrate the backup power system is fully functional by simulating power outages. Coordinate phase rotation with the Contractor prior to transferring power.

Refill the generator tank after completion of field testing.

E. RETEST

Correct deficiencies identified by field tests and observations, and retest until specified requirements are fully met.

3.6 TRAINING

- A. The manufacturer of the generator set shall conduct specifically organized training sessions covering operation and maintenance of the unit for personnel employed by the Owner. The training sessions shall be conducted to educate and train the personnel in maintenance and operation of all components of the unit. 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. Automatic mode operation
7. Manual mode operation
8. Fuel and monitoring system
9. Spare parts that have been provided

- B. At least one training session, at least 3 hours in duration, shall be conducted at the site after startup of the system. The manufacturer shall prepare and assemble specific instruction materials for each training session and shall supply such materials to the Owner at least 2 weeks prior to the time of the training.

3.7 FINAL ADJUSTMENTS

Adjust voltage and frequency output of generator set to nominal ratings and mark gauges with plastic pen for normal, operation references for Owner.

Adjust time response of control system to meet site performance requirements.

Check all remote connections again for proper tightness.

3.8 CLEANING

Upon completion of installation and startup, inspect engine generator set. Remove paint splatters, other spots, dirt, and debris. Perform touchup painting to cover scratches and marks to finish. Match original finish of generator set.

***** END OF SECTION *****

SECTION 16410

ENCLOSED SWITCHES, FUSES AND CIRCUIT BREAKERS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section consists of individually mounted switches and circuit breakers used for the following:

- A. Feeder and equipment disconnect switches
- B. Feeder and branch-circuit protection

1.2 RELATED WORKS SPECIFIED ELSEWHERE

<u>Sections</u>	<u>Item</u>
01300	Submittals
16050	Basic Electrical Materials and Methods

1.3 SUBMITTALS

Submit under the provisions of Section 01300.

Manufacturer's Product Data for disconnect switches, circuit breakers, and accessories specified in this Section.

Maintenance data for tripping devices to include in the operation and maintenance manual specified in Section 16050.

1.4 QUALITY ASSURANCE

See Section 16050.

Obtain disconnect switches and circuit breakers from one source and by a single manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. AVAILABLE MANUFACTURERS

Subject to compliance with requirements, manufacturers offering disconnect switches and circuit breakers that may be incorporated into the work include the following:

1. General Electric Co.; Electrical Distribution and Control Division.
2. Siemens Energy & Automation, Inc.
3. Square D Co.
4. Eaton, Cutler Hammer.

2.2 DISCONNECT SWITCHES

A. ENCLOSED, FUSIBLE SWITCH, 800 A AND SMALLER

1. NEMA KS 1, Type HD, Class R rejection fuse clips, enclosure consistent with environment where located, handle lockable with two padlocks, and interlocked with cover in CLOSED position.
2. Switches shall be horsepower rated when used in motor circuits.
3. Switches shall include pad lockable handles, lockable in both the open and closed positions.
4. Switches shall rated at 600 V.
5. Switches shall include two auxiliary contacts, rated at 10 A at 250 Vac each, connected to the switch pivot arm that are open when the switch is open, closed when the switch is closed.
6. Switch enclosures shall be NEMA 4X stainless steel unless specifically stated otherwise in the Plans or through the approval of the Engineer.

2.3 ENCLOSED CIRCUIT BREAKERS

A. ENCLOSED, MOLDED-CASE CIRCUIT BREAKER

NEMA AB 1, with lockable handle in both the open and closed positions.

B. CHARACTERISTICS

Frame size, trip rating, number of poles, and auxiliary devices as indicated on the Plans with interrupting rating to meet available fault current.

1. Main and feeder breakers shall be molded case breakers with thermal magnetic trip.
2. Motor circuit breakers shall be magnetic only trip with adjustable trip setting.
3. Branch circuit breakers shall be molded case, thermal-magnetic trip, trip-free with non-interchangeable, non-adjustable trip unless otherwise noted.

C. APPLICATION LISTING

Appropriate for application, including switching fluorescent lighting loads (SWD) or heating, air-conditioning, and refrigerating equipment (HACR).

D. CIRCUIT BREAKERS, 200 A AND LARGER

1. Trip units shall be interchangeable within frame size.
2. Assure ability to selectively coordinate circuit breakers.

E. CIRCUIT BREAKERS, 400 A AND LARGER

Where indicated on the Plans, provide trip units with separate field-adjustable settings of instantaneous trip, short-time trip, short-time delay, long-time trip, and long-time delay.

F. MOLDED-CASE SWITCH

Where indicated, molded-case circuit breaker without trip units.

G. LUGS

Mechanical lugs and power-distribution connectors suitable for copper conductors of the number and size indicated.

H. SHUNT TRIP

Where indicated.

I. ACCESSORIES

As indicated.

NEMA AB 1, Type 4X stainless steel unless stated otherwise in the Plans.

PART 3 EXECUTION

3.1 COORDINATION OF ELECTRICAL PROTECTION DEVICES

- A. The Contractor shall provide coordination of circuit breakers, fuses, and other associated protective devices.
1. For adjustable breakers, provide the values for continuous, short-time, instantaneous, ground fault, and other relevant trip and delay settings.
 2. Provide to the Owner and Engineer calculations, plots, and overlays that clearly show proper coordination of protection circuits.

3.2 INSTALLATION

- A. Install the disconnect switches and circuit breakers level and plumb in locations as indicated, according to manufacturer's written instructions.
- B. Install wiring between disconnect switches, circuit breakers, control, and indication devices.
- C. Connect disconnect switches and circuit breakers and components to wiring system and to ground as indicated and as instructed by manufacturer.
1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where

manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

- D. Identify each disconnect switch and circuit breaker according to requirements specified in Section 16050.

3.3 FIELD QUALITY CONTROL

A. TESTING

1. Prior to Energization

After installing disconnect switches and circuit breakers, perform visual and mechanical inspection of enclosure and devices.

Provide third party breaker testing per Specification 16050, Section 3.

Check connections and mounting for proper torque.

Remove any burrs, filings, or other foreign materials from enclosure. Completely wipe down and vacuum enclosure.

2. After Energization

After electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

Correct malfunctioning units on site where possible and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

3.4 ADJUSTING

Set field-adjustable disconnect switches and circuit-breaker trip ranges as indicated.

Provide fuses for fused disconnect switches to coordinate with manufacturer's listed maximum fuse size for equipment supplied by the disconnect switch.

***** END OF SECTION *****

SECTION 16415

TRANSFER SWITCHES

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section consists of the following types of power transfer switches:

- A. Automatic Transfer Switches.
- B. Manual Transfer Switches.

1.2 RELATED WORKS SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01300	Submittals
01800	Testing, Commissioning, and Training
16120	Conductors and Cables
16130	Raceway and Boxes

1.3 DEFINITIONS

A. 2-POSITION

A 2-position ATS transfers immediately from one switch position to another. 2-position ATS can apply to both “Open Transition” and “Closed Transition” switches.

B. 3-POSITION, DELAYED TRANSFER

A 3-position “delayed transfer” ATS can be held in the “center” (no load connection) position for a programmable delayed period of time before completing its transfer to the calling position. Delayed transfer applies to transfers in either direction. Delayed transfers can only apply to “Open Transition” switches.

C. AUTOMATIC TRANSFER SWITCH

Automatic transfer switches shall be defined as power transfer switches used to automatically switch system power away from faulty utility service power to backup generator power then back again to utility power when valid utility power is reacquired.

Automatic transfer switches can be configured for automatic generator starting, waiting for generator stability, then transferring the system bus to the generator. They are also configurable for switching back to utility power under selectable conditions.

Automatic transfer switches can be set up for automatic generator testing and shutdown.

D. CLOSED TRANSITION

A “Closed Transition” ATS provides a “make-before-break” transition when performing automatic generator tests. To make this type of transition, the voltage, frequency, and phase shift between the power sources must be within specified and programmable tolerances. Typical tolerances are $\delta V \leq \pm 5$ percent, $\delta f = \pm 0.2$ percent, and the phase shift between ± 5 electrical degrees. This may take from several seconds to several minutes and is only used during system testing where transition delays are not critical. During power failures, the transitions are “break-before-make” like an open-transfer switch where time delays are minimal.

E. DELAYED TRANSFER

A “Delayed Transfer” ATS provides a programmable delay in the “neutral position.” When in this mode, the load circuit is completely disconnected from both the normal and standby power sources. A delay in this position allows load circuits to dissipate electrical and mechanical energy before being re-energized.

F. NEUTRAL POSITION

The neutral position describes a position of the transfer switch when the load leads are connected to neither the normal nor the standby source. In this position, the load circuit is completely disconnected. This position should not be confused with the neutral bus or with neutral bus switching.

G. NON-AUTOMATIC TRANSFER SWITCH

Non-Automatic Transfer Switches are identical to ATS switches with the exception that they include a selector switch that allows manual transfer.

Non-Automatic Transfer Switches shall not be permitted.

H. MANUAL TRANSFER SWITCH

Manual transfer switches are double-throw switches with a center “OFF” position. Transfers are manually made by physically operating a switch handle to any one of three positions, “NORMAL,” “OFF,” “STANDBY.”

I. NEUTRAL SWITCHING

In a neutral-switching ATS, the neutral load bus is switched between power source neutrals in the same manner as the power leads.

J. NORMAL POSITION

A switch is in its “NORMAL” position when it is connected to the primary (utility) power source.

K. OPEN TRANSITION

An “Open Transition” ATS provides a “break-before-make” transition under all transition conditions.

L. STANDBY POSITION

A switch is in its “STANDBY” position when it is connected to the secondary (generator) power source. This position may also be referred to as the back-up position.

M. TIME DELAY DEFINITIONS

TD1 “Call Delay” is the delay from the ATS sensing faulty utility power and the issue of a generator call to run command.

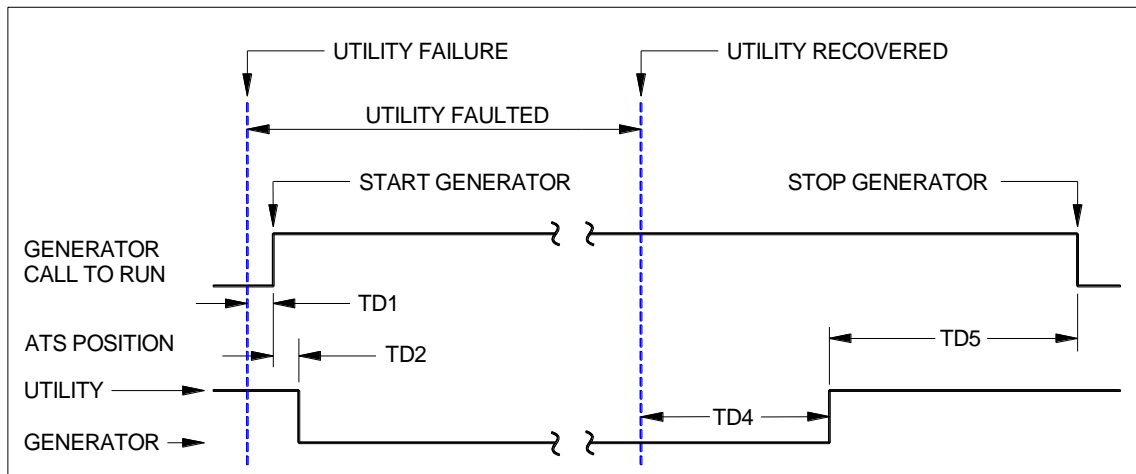
TD2 “Off Utility Delay” is the delay from the ATS issuing a generator call to run command and the transfer of the ATS away from the “UTILITY” position.

TD3 “Hold Neutral Delay” is the period of time that the ATS will hold the switch in its “neutral” (or “center” or “disconnected”) position when transferring from the “UTILITY” position to the “GENERATOR” position and from the “GENERATOR” back to the “UTILITY” position. In this neutral position, the load side of the ATS is disconnected from both utility and generator power. This delay allows the electronic equipment ample time to dissipate their residual power for proper reapplication of power flowing a

shutdown. This delay only applies to 3-position delayed-transfer switches.

TD4 “Hold Generator Delay” is the delay of the ATS to switch back to utility power after the utility has been sensed as healthy.

TD5 “Cool-Down Delay” is the duration of generator runtime after the ATS has switched back to utility. This cool down period is intended to shut the generator off only after a relaxed cooling period.



2-POSITION SWITCH SIMPLIFIED TIMING DIAGRAM

- N. UVTL
Utility Voltage Transition Level.
- O. GVTL
Generator Voltage Transition Level.

1.4 SUBMITTALS

Submit four copies of the following:

- A. Manufacturer’s Product Data for transfer switches and accessories specified in this Section.
- B. Manufacturer’s Product Data for trapped-key interlocks and accessories specified in this Section, and documentation of compatibility with hardware specified under other Sections.

C. O&M Manual requirements are outlined in Section 01300 and shall also contain the following information:

1. Two-year maintenance service agreement as described below.
2. Screenshots and descriptions detailing how to step through the setup and configuration menus.
3. Field test results as described herein.

1.5 MAINTENANCE

A. ATS

Beginning at the time of Substantial Completion, provide a 24 months full maintenance service performed by skilled employees of the manufacturer's designated service organization. Provide OEM parts and supplies to complete all service to support all factory warranty requirements with written reports to the Owner upon completion of visits.

PART 2 PRODUCTS

2.1 MANUFACTURERS

Subject to compliance with requirements, provide products by the following:

A. TRANSFER SWITCHES

All automatic transfer switches shall be compatible with the selected genset.

1. General Electric Co.; Electrical Distribution & Control Div.
2. Eaton, Cutler-Hammer.
3. ASCO
4. Kohler
5. Cummins Power Generation/Onan
6. Square D
7. MTU

2.2 PROCUREMENT

- A. The party responsible for the procurement of the automatic transfer switch shall be the single source of responsibility for submittal, products provided, warranty, startup and service purposes.
- B. All automatic transfer switches shall be provided by the contractor that is supplying the generator set as defined in Specification 16230.
- C. The generator and automatic transfer switches may be of different manufacturers.

2.3 AUTOMATIC TRANSFER SWITCHES

A. RATINGS

- 1. Phases: As shown on the Plans.
- 2. Poles: As shown on the Plans.
- 3. Voltage Rating: As shown on the Plans.
- 4. Current Rating: As shown on the Plans.
- 5. Fault Current Rating: As shown on the Plans.
- 6. Neutral: With neutral bus unless indicated otherwise on the Plans.
- 7. Enclosure: As shown on the Plans.

B. FEATURES

Reference “DEFINITIONS” in this specification.

- 1. UL 1008/CSA certification.
- 2. Open Transition
- 3. Conventional 2-position switch, capable of transferring the connected load from its “normal” power source to its "standby" power source and retransferring back from its “standby” power source to its “normal” power source.
- 4. Power switching shall be provided for all phases.

5. Power sensing shall be provided for all phases.
6. Switch transfer control sensing shall be provided on all phases.
7. Switching mechanism shall be a discrete purpose device specifically designed for Automatic Transfer Switches.
8. Electrically operated by solenoid mechanisms and held by mechanical latches.
9. High current-breaking capacity with silver-surfaced contacts equipped with arc barriers and magnetic blow-out coils.
10. Contacts rated in accordance with UL 1008 for current carrying and switching capabilities.
11. Suitable for repetitive load transfer switching. Minimum 1,000 transfer cycles under full load conditions and minimum 2,000 cycles under no load conditions.
12. Interlocked to prevent supplying the load from more than one source at a time.
13. Adjustable close differential voltage monitoring relays provided on all three phases to sense voltage on the “NORMAL” and “STANDBY” sources.
14. Auxiliary Contacts
 - a. All auxiliary contacts shall be isolated, dry, Form C, suitable for 120V, 10A inductive loads, NEMA B10 rated, wired to easily-accessible terminals in the low voltage control area.
 - b. Provide, as a minimum, the following status outputs:
 - i. Switch in utility power position.
 - ii. Switch in generator position.
 - iii. Switch fault.
 - iv. Generator call status. This status signal is one of two identical outputs. One can be directly connected to the generator to call a start operation.

The second is electrically isolated from the generator connection and intended for connection to monitoring equipment.

15. Molded case breakers are not acceptable.
16. Intelligent display panel with push-button navigation switches. The display shall be clearly visible in both bright (sunlight) and no light conditions. The display panel shall be capable of providing the following functions and capabilities:
 - a. Display source condition information, including AC voltage for each phase of normal source.
 - b. Display source status, to indicate source is connected or not connected.
 - c. Display load data, including AC voltage, frequency, kW, and kVA.
 - d. The display panel shall allow the operator to view and make the following adjustments in the control system, after entering an access code:
 - i. Set nominal voltage and frequency for the transfer switch.
 - ii. Adjust voltage and frequency sensor operation set points.
 - iii. Set up time clock functions.
 - iv. Set up load sequence functions.
 - v. Enable or disable control functions in the transfer switch, including program transition.
 - vi. Set up exercise and load test operation conditions, as well as normal system time delays for transfer time, time delay start, stop, transfer, and retransfer.
 - e. Display real time clock data, including date, and time in hours, minutes, and seconds. The real time clock shall incorporate provisions for automatic daylight saving time

and leap year adjustments. The control shall also log total operating hours for the control system.

- f. Display service history for the transfer switch. Display source connected hours, to indicate the total number of hours connected to each source. Display number of times transferred, and total number of times each source has failed.
- g. Display fault history on the transfer switch, including condition, and date and time of fault. Faults to include controller checksum error, low controller DC voltage, ATS fail to close on transfer, ATS fail to close on retransfer, battery charger malfunction, network battery voltage low, and network communications error.

C. OPERATION

- 1. When “normal” voltage falls below invalid UVTL, then
 - a. The ATS starts the generator.
- 2. When the “standby” voltage is above valid GVTL, then
 - a. After a programmable delay in the “normal” position, the switch transfers from the “normal” position to the “standby” position.
- 3. When “normal” voltage is above valid UVTL, then
 - a. After a programmable delay in the “standby” position, the switch transfers from the “standby” position to the "normal" position.
 - c. After the switch returns to the “normal” position, the transfer switch shuts off the generator after a programmable cool down delay.
- 4. Two separately adjustable time delays prevent transfer and retransfer on voltage dips.
- 5. Seven-day exercise timer provides periodic exercising of generator.

- a. Timer is programmable as to day of week, time of day, and duration for exercising.
 - b. Programmable as to whether generator is exercised with or without load being transferred
6. Initially preset the UVTL at:
- a. Valid \geq 90 percent nominal system voltage
 - b. Invalid \leq 80 percent nominal system voltage
 - c. Relay will pull in at the “valid” level and drop out at the “invalid” level.
7. Initially preset the GVTL at:
- a. Valid \geq 90 percent nominal system voltage
 - b. Invalid \leq 75 percent nominal system voltage
 - c. Relay will pull in at the “valid” level and drop out at the “invalid” level.
8. Initially preset the utility and generator frequency transition levels at:
- a. Valid \geq 95 percent of system frequency
 - b. Invalid \geq 90 percent of system frequency

2.4 MANUAL TRANSFER SWITCHES

A. RATINGS

1. Phases: As shown on the Plans.
2. Poles: As shown on the Plans.
3. Voltage Rating: As shown on the Plans.
4. Current Rating: As shown on the Plans.
5. Fault Current Rating: As shown on the Plans.

6. Neutral: With neutral bus where indicated on the Plans.
7. Enclosure

NEMA 4X stainless steel unless indicated otherwise on the Plans.

B. FEATURES

1. UL 508, UL 98 certification and in accordance with article 702 of the NEC, ANSI/NFPA 70.
2. Switches shall include pad lockable handles, lockable in the “NORMAL,” “OFF,” and “STANDBY” positions.
3. Switches shall include two auxiliary contacts:
 - a. One contact closed when in “NORMAL” position.
 - b. The other contact closed when in “STANDBY” position.
 - c. Both contacts open in “OFF” position.

Both contacts shall be rated at 10 A, 250 V.
4. Capable of transferring the connected load from “NORMAL” to “OFF,” from “OFF” to “STANDBY,” from “STANDBY” to “OFF,” and from “OFF” to “NORMAL.”
5. Manual mechanical switch movement.

C. OPERATION

1. Transfers from “NORMAL” to “OFF” on manual movement of switch handle.
2. Transfers from “OFF” to “STANDBY” on manual movement of switch handle.
3. Transfers from “STANDBY” to “OFF” on manual movement of switch handle.
4. Transfers from “OFF” to “NORMAL” on manual movement of switch handle.

PART 3 EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

Deliver transfer switch components to their final locations in protective wrappings, containers, and other means of protection that will exclude dirt and moisture and prevent damage from construction operations. Remove protection only after equipment is safe from such hazards. Field repair of material or equipment made defective by improper storage or site construction damage by other trades may be cause for rejection of installation.

3.2 INSTALLATION

Install transfer switch per the manufacturer's installation instructions.

Maintain minimum workspace around unit and components per manufacturer's installation shop drawings and NFPA 70 NEC.

3.3 IDENTIFICATION

Identify field-installed wiring, components, and provide warning signs as specified in Section 16050.

3.4 GROUNDING

Provide ground continuity to facility electrical ground system as indicated in the Contract Provisions.

3.5 FIELD QUALITY CONTROL

A. ADJUSTING AND PRETESTING

Pretest all system functions, operations, and protective features. Provide all instruments and equipment required for testing. Adjust the time delays, and trip point settings to ensure operation is within accordance to the specifications.

B. FIELD TEST

Test the transfer switch after installation is complete.

1. Advise the Engineer of the test date well in advance so that the test may be witnessed if desired.
2. Perform manufacturer's standard field tests.

3. Provide documented field test results to Owner and Engineer.
4. Provide trip set points and time delays in the O&M manual.

***** END OF SECTION *****

PART 5
WAGE RATES

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: 12/20/2022

County	Trade	Job Classification	Wage	Holiday	Overtime	Note	*Risk Class
Wahkiakum	Asbestos Abatement Workers	Journey Level	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Boilermakers	Journey Level	\$72.54	<u>5N</u>	<u>1C</u>		View
Wahkiakum	Brick Mason	Brick Finisher	\$44.33	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Brick Mason	Caulker-Pointer-Cleaner	\$68.14	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Brick Mason	Journey Level	\$68.14	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Building Service Employees	Janitor	\$14.49		<u>1</u>		View
Wahkiakum	Building Service Employees	Shampooer	\$14.49		<u>1</u>		View
Wahkiakum	Building Service Employees	Waxer	\$14.49		<u>1</u>		View
Wahkiakum	Building Service Employees	Window Cleaner	\$14.49		<u>1</u>		View
Wahkiakum	Cabinet Makers (In Shop)	Journey Level	\$14.49		<u>1</u>		View
Wahkiakum	Carpenters	Acoustical Worker	\$64.01	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Carpenters	Bridge & Highway Carpenter	\$64.61	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Carpenters	Floor Layer And Floor Finishers	\$64.18	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Carpenters	Journey Level	\$64.01	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Carpenters	Scaffold/Shoring Erecting & Dismantling	\$64.01	<u>7E</u>	<u>4X</u>	<u>8N</u>	View
Wahkiakum	Carpenters	Stationary Power Saw	\$64.18	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Cement Masons	Application of all Composition Mastic	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Application of all Epoxy Material	\$69.59	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Application of all Plastic Material	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Application of Sealing Compound	\$69.59	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Application of Underlayment	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Building General	\$69.59	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Composition or Kalman Floors	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Concrete Paving	\$69.59	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Curb & Gutter Machine	\$70.09	<u>15J</u>	<u>4U</u>		View

Wahkiakum	Cement Masons	Curb & Gutter, Sidewalks	\$69.59	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Curing Concrete	\$69.59	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Finish Colored Concrete	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Floor Grinding	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Floor Grinding/Polisher	\$69.59	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Green Concrete Saw, self-powered	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Grouting of all Plates	\$69.59	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Grouting of all Tilt-up Panels	\$69.59	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Gunite Nozzleman	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Hand Powered Grinder	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Journey Level	\$69.59	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Patching Concrete	\$69.59	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Pneumatic Power Tools	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Power Chipping & Brushing	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Sand Blasting Architectural Finish	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Screed & Rodding Machine	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Spackling or Skim Coat Concrete	\$69.59	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Troweling Machine Operator	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Troweling Machine Operator on Colored Slabs	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Cement Masons	Tunnel Workers	\$70.09	<u>15J</u>	<u>4U</u>		View
Wahkiakum	Divers & Tenders	Bell/Vehicle/Submersible Operator (not under pressure)	\$114.53	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Divers & Tenders	Dive Master	\$82.53	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Divers & Tenders	Dive Supervisor	\$82.53	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Divers & Tenders	Diver	\$114.53	<u>5A</u>	<u>1B</u>	<u>8V</u>	View
Wahkiakum	Divers & Tenders	Diver On Standby	\$77.53	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Divers & Tenders	Diver Tender	\$70.53	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Divers & Tenders	Manifold Operator	\$70.53	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Divers & Tenders	Manifold Operator Mixed Gas	\$75.53	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Divers & Tenders	Remote Operated Vehicle Operator/Technician	\$70.53	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Divers & Tenders	Remote Operated Vehicle Tender	\$65.87	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Dredge Workers	Assistant Engineer	\$64.45	<u>5D</u>	<u>1N</u>	<u>8D</u>	View
Wahkiakum	Dredge Workers	Assistant Mate (deckhand)	\$59.09	<u>5D</u>	<u>1N</u>	<u>8D</u>	View
Wahkiakum	Dredge Workers	Boatman (licensed)	\$64.45	<u>5D</u>	<u>1N</u>	<u>8D</u>	View
Wahkiakum	Dredge Workers	Fill Equipment Operator	\$61.79	<u>5D</u>	<u>1N</u>	<u>8D</u>	View
Wahkiakum	Dredge Workers	Fireman	\$62.96	<u>5D</u>	<u>1N</u>	<u>8D</u>	View
Wahkiakum	Dredge Workers	Leverman (hydraulic & Clamshell)	\$67.61	<u>5D</u>	<u>1N</u>	<u>8D</u>	View
Wahkiakum	Dredge Workers	Mate	\$64.45	<u>5D</u>	<u>1N</u>	<u>8D</u>	View
Wahkiakum	Dredge Workers	Oiler	\$59.09	<u>5D</u>	<u>1N</u>	<u>8D</u>	View
Wahkiakum	Dredge Workers	Tenderman (boatman Attending Dredge Plant)	\$62.96	<u>5D</u>	<u>1N</u>	<u>8D</u>	View
Wahkiakum	Dredge Workers	Welder	\$64.45	<u>5D</u>	<u>1N</u>	<u>8D</u>	View

Wahkiakum	Drywall Applicator	Journey Level	\$64.01	5A	1B		View
Wahkiakum	Drywall Tapers	Journey Level	\$62.05	7E	1E		View
Wahkiakum	Electrical Fixture Maintenance Workers	Journey Level	\$14.49		1		View
Wahkiakum	Electricians - Inside	Journey Level	\$81.89	5A	1B		View
Wahkiakum	Electricians - Inside	Journeyman, Welder	\$87.44	5A	1B		View
Wahkiakum	Electricians - Motor Shop	Craftsman	\$15.37		1		View
Wahkiakum	Electricians - Motor Shop	Journey Level	\$14.69		1		View
Wahkiakum	Electricians - Powerline Construction	Cable Splicer	\$88.89	5A	4D		View
Wahkiakum	Electricians - Powerline Construction	Certified Line Welder	\$81.65	5A	4D		View
Wahkiakum	Electricians - Powerline Construction	Groundperson	\$52.91	5A	4D		View
Wahkiakum	Electricians - Powerline Construction	Heavy Line Equipment Operator	\$81.65	5A	4D		View
Wahkiakum	Electricians - Powerline Construction	Journey Level Lineperson	\$81.65	5A	4D		View
Wahkiakum	Electricians - Powerline Construction	Line Equipment Operator	\$70.02	5A	4D		View
Wahkiakum	Electricians - Powerline Construction	Meter Installer	\$52.91	5A	4D	8W	View
Wahkiakum	Electricians - Powerline Construction	Pole Sprayer	\$81.65	5A	4D		View
Wahkiakum	Electricians - Powerline Construction	Powderperson	\$60.75	5A	4D		View
Wahkiakum	Electronic Technicians	Journey Level	\$66.73	5A	1B		View
Wahkiakum	Elevator Constructors	Mechanic	\$104.23	5N	4A		View
Wahkiakum	Elevator Constructors	Mechanic In Charge	\$112.57	5N	4A		View
Wahkiakum	Fabricated Precast Concrete Products	Journey Level	\$14.49		1		View
Wahkiakum	Fabricated Precast Concrete Products	Journey Level - In-Factory Work Only	\$14.49		1		View
Wahkiakum	Fence Erectors	Fence Erector	\$45.69	6Z	1M		View
Wahkiakum	Fence Erectors	Fence Laborer	\$45.69	6Z	1M		View
Wahkiakum	Flaggers	Journey Level	\$48.83	6Z	1M		View
Wahkiakum	Glaziers	Journey Level	\$69.97	7I	11K		View
Wahkiakum	Heat & Frost Insulators And Asbestos Workers	Mechanic	\$80.49	5N	1F		View
Wahkiakum	Heating Equipment Mechanics	Journey Level	\$94.11	7F	1E		View
Wahkiakum	Hod Carriers & Mason Tenders	Journey Level	\$55.45	5D	1B		View
Wahkiakum	Industrial Power Vacuum Cleaner	Journey Level	\$14.49		1		View
Wahkiakum	Inland Boatmen	Boat Operator	\$61.41	5B	1K		View
Wahkiakum	Inland Boatmen	Cook	\$56.48	5B	1K		View
Wahkiakum	Inland Boatmen	Deckhand	\$57.48	5B	1K		View
Wahkiakum	Inland Boatmen	Deckhand Engineer	\$58.81	5B	1K		View
Wahkiakum	Inland Boatmen	Launch Operator	\$58.89	5B	1K		View
Wahkiakum	Inland Boatmen	Mate	\$57.31	5B	1K		View

Wahkiakum	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Cleaner Operator, Foamer Operator	\$14.49		<u>1</u>		View
Wahkiakum	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Grout Truck Operator	\$14.49		<u>1</u>		View
Wahkiakum	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Head Operator	\$14.49		<u>1</u>		View
Wahkiakum	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Technician	\$14.49		<u>1</u>		View
Wahkiakum	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Tv Truck Operator	\$14.49		<u>1</u>		View
Wahkiakum	Insulation Applicators	Journey Level	\$64.18	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Ironworkers	Journey Level	\$72.11	<u>7N</u>	<u>1O</u>		View
Wahkiakum	Laborers	Anchor Machines	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Application (including Pot Power Tender For Same), Applying Protective Material By Hand Or Nozzle On Utility Lines Or Storage Tanks On Project	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Asbestos Removal	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Asphalt Plant Laborers	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Asphalt Raker	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Asphalt Spreaders	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Ballast Regulators	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Batch Weighman	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Bit Grinder	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Brick Pavers (Dry)	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Broomers	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Brush (power Saw)	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Brush Burners And Cutters	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Burners	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Car And Truck Loaders	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Carpenter Tender	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Change-house Man Or Dry Shack Man	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Chipping Guns	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Choker Setters	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Choker Splicer	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Chuck Tender	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Clary Power Spreader And Similar Types	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Clean Up Laborers	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Clean-up Nozzleman-green-cutter (concrete Rock, Etc.)	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Concrete Crew, Bull Gang	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Concrete Laborers	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Concrete Nozzlemen	\$53.93	<u>6Z</u>	<u>1M</u>		View

Wahkiakum	Laborers	Concrete Power Buggyman	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Concrete Saw Operator	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Concrete Saw Operator (walls)	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Confined Space / Hole Watch	\$48.83	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Crusher Feeder	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Curing, Concrete	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Demolition And Wrecking Charred Materials	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Demolition, Wrecking And Moving Laborers	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Drill Doctor	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Drill Operators, Air Tracks, Cat Drills, Wagon Drills, Rubber-mounted Drills And Other Similar Types, Including At Crusher Plants	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Dry Pack Machine	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Dry Stack Walls	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Dumpers, Road Oiling Crew	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Dumpmen (for Grading Crew)	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Elevator Feeders	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Erosion Control Specialist	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Final Clean-up	\$48.83	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Fine Graders	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Fire Watch	\$48.83	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Form Strippers (not Swinging Stages)	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	General Laborer	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Grade Checker	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Guard Rail, Median Rail, Reference Post Guide Post, Right-of-way Marker	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Gunite Nozzleman	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Gunite Nozzleman Tender	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Gunite Or Sand Blasting Pot Tender	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Hand Placed Sand Blasting (wet)	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Handlers Or Mixers Of All Materials Of An Irritating Nature (including Cement & Lime)	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Hazardous Waste Worker	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	High Scalers, Strippers And Drillers Covers Work In Swinging Stages, Chairs Or Belts, Under Extreme Conditions Unusual To Blasting, Barring Down, Or S	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Jackhammer	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View

Wahkiakum	Laborers	Laser Beam	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Laser Beam (pipe Laying) - Applicable When Employee Assigned To Move, Set Up, Align	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Laser Beam (tunnel) - Applicable When Employee Assigned To Move, Set Up, Align	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Lead Abatement	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Leverman Or Aggregate Spreaders (flaherty And Similar Types)	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Loading Spotters	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Loop Installation	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Manhole Building	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Material Yard Man (including Electrical)	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Miner - Tunnel	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Miner - Tunnel	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Mold Remediation Or Removal	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Multiple Tampers	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Nippers And Timbermen	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Nuclear Plant Worker - Lead Shield	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Paving Breakers	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Pilot Car	\$48.83	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Pipe Doping & Wrapping	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Pipe Layer All Types	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Pittsburgh Chipper Operator Or Similar Types	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Post Hold Digger, Air, Gas Or Electric	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Pot Tender	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Powderman	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Powderman Tender	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Power Jacks	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Power Saw Operators (bucking & Falling)	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Pressure Washer	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Pumpcrete Nozzleman	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Railroad Track Laborers	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Ribbon Setter, Head	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Ribbon Setters (including Steel Forms)	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Rigger/Signal Person	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Rip Rap Man (hand Placed)	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Rip Rap Man (head)	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Road Pump Tender	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Sand Blasting (dry)	\$53.43	<u>6Z</u>	<u>1M</u>		View

Wahkiakum	Laborers	Scaffold Tender	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Sewer Labor	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Sewer Timbermen	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Signalman	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Skipman	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Slopers	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Spraymen	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Stake Chaser	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Stake-setter	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Stockpiler	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Tampers	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Tie Back Shoring	\$52.84	<u>6Z</u>	<u>1M</u>	<u>8S</u>	View
Wahkiakum	Laborers	Timber Faller And Bucker (hand Labor)	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Toolroom Man (at Job Site)	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Track Liners	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Traffic Control Laborer	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Traffic Control Supervisor	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Tugger Operator	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Tunnel Bullgang (above Ground)	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Tunnel Chuck Tenders	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Tunnel Motorman - Dinky Locomotive	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Tunnel Muckers, Brakemen	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Tunnel Powderman	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Tunnel Shield Operator	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Vibrating Screed	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Vibrators (all Types)	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Water Blaster	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers	Weight-man-crusher (aggregate When Used)	\$52.06	<u>6Z</u>	<u>1M</u>	<u>8T</u>	View
Wahkiakum	Laborers	Welder	\$53.43	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers - Underground Sewer & Water	General Laborer and Topman	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Laborers - Underground Sewer & Water	Pipe Layer	\$53.93	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Landscape Construction	Landscape Operator	\$60.37	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Landscape Construction	Landscaping or Planting Laborer	\$41.52	<u>6Z</u>	<u>1M</u>		View
Wahkiakum	Landscape Maintenance	Groundskeeper	\$14.49		<u>1</u>		View
Wahkiakum	Lathers	Journey Level	\$63.65	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Marble Setters	Journey Level	\$69.14	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Metal Fabrication (In Shop)	Fitter	\$16.99		<u>1</u>		View
Wahkiakum	Metal Fabrication (In Shop)	Laborer	\$14.49		<u>1</u>		View
Wahkiakum	Metal Fabrication (In Shop)	Machine Operator	\$17.21		<u>1</u>		View
Wahkiakum	Metal Fabrication (In Shop)	Painter	\$17.03		<u>1</u>		View
Wahkiakum	Metal Fabrication (In Shop)	Welder	\$16.99		<u>1</u>		View
Wahkiakum	Millwright	Journey Level	\$69.85	<u>5A</u>	<u>1B</u>		View

Wahkiakum	Modular Buildings	Journey Level	\$14.49		<u>1</u>		View
Wahkiakum	Painters	Bridge Painter	\$52.67	<u>7E</u>	<u>11L</u>		View
Wahkiakum	Painters	Commercial Painter	\$45.20	<u>7E</u>	<u>11L</u>		View
Wahkiakum	Painters	Industrial Painter	\$47.00	<u>7E</u>	<u>11L</u>	<u>9F</u>	View
Wahkiakum	Pile Driver	Journey Level	\$65.00	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Plasterers	Journey Level	\$60.39	<u>5H</u>	<u>1E</u>		View
Wahkiakum	Playground & Park Equipment Installers	Journey Level	\$14.49		<u>1</u>		View
Wahkiakum	Plumbers & Pipefitters	Journey Level	\$83.47	<u>5A</u>	<u>1G</u>		View
Wahkiakum	Power Equipment Operators	Air Filtration Equipment(group 6)	\$57.15	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Asphalt Plant (any Type) (assistant Engineer Required) (group 2)	\$66.10	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Asphalt, Burner & Reconditioner (any Type), (asst To Engineer If Required)(group 5)	\$60.37	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Asphalt, Extrusion Machine Operator(group 5)	\$60.37	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Asphalt, Paver (screed Man Required)(group 4)	\$61.61	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Asphalt, Pugmill (any Type)(group 6)	\$57.15	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Asphalt, Raker(group 6)	\$57.15	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Asphalt, Roller (any Asphalt Mix)(group 5)	\$60.37	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Asphalt, Roto-mill, Pavement Profiler Under 8 Ft Lateral Cut(group 4)	\$61.61	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Asphalt, Roto-mill, Pavement Profiler, 8 Ft Lateral Cut & Over(group 2)	\$66.10	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Asphalt, Roto-mill, Pavement Profiler, Groundman(group 5)	\$60.37	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Asphalt, Screed(group 4)	\$61.61	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Asphalt, Truck Mounted Spreader, With Screed(group 6)	\$57.15	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Auger Oiler(group 6)	\$57.15	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Auto Grader Or "trimmer" (grade Checker Required) (group 2)	\$66.10	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Back Filling Machine (assistant To Engineer Required)(group 4)	\$61.61	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Backhoe, Robotic, Track And Wheel Type Up To And Including 20,000 Lbs. With Any Attachments(group 4)	\$61.61	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators	Band Wagons (in Conjunction With Wheel Excavator)(group 2)	\$66.10	<u>7B</u>	<u>4G</u>	<u>8U</u>	View

Wahkiakum	Power Equipment Operators	Bell Man (any Type Of Communication)(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Blade Any Type(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Blade, Robotic(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Boatman(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Boatman, Licensed(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Bobcat, Skid Steer (< 1yd)(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Boom Type Lifting Device, 5 Ton Capacity Or Less(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Boring Machine (asst To Engineer Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Broom Self-propelled, Construction Job Site(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Bulldozer Operator, 20,000 Lbs Or Less, Or 100 Horse Or Less(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Bulldozer Operator, Over 20,000 Lbs And More Than 100 Horse Up To 70,000 Lbs(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Bulldozer Over 70,000 Lbs Up To And Including 120,000 Lbs(group 3)	\$64.94	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Bulldozer Over 120,000 Lbs And Above(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Bulldozer Robotic Equipment(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Cable-plow (any Type)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Cableway 25 Ton & Over(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Cableway Up To 25 Ton(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Canal Trimmer (grade Oiler Required)(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Cat Drill (john Henry)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Cement Pump(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Challenger(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Chip Spreading Machine(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Chippers (asst To Engineer If Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Churn Drill & Earth Boring Machine(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Combination Heavy Duty Mechanic-welder, When Required To Do Both(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Compactor Self Propelled Without Blade(group 5)	\$60.37	7B	4G	8U	View

Wahkiakum	Power Equipment Operators	Compactor With Blade Self Propelled(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Compactor, Multi-engine(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Compactor, Robotic(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Compressor (any Power) 1,250 Cu Ft And Over Total Capacity(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Compressor Operator (any Power) Under 1,250 Cu Ft Total Capacity(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete Batch Plant And/or Wet Mix (3 Units Or More) (group1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete Batch Plant And/or Wet Mix Operator (1 & 2 Drums)(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete Batch Plant Quality Control(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete Breaker (assistant To Engineer Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete Canal Line, Assistant To Engineer Required(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete Curing Machine (riding Type)(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete Diamond Head Profiler(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete Paving Road Mixer(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete Planer(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete Saw(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Automatic Slip Form Paver (asst To Engineer Required)(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Combination Mixer & Compressor Operator, Gunite Work(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Curb Machine Mechanical Berm, Curb And/or Curb And Gutter(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Finishing Machine(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Grout Plant(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Grouting Machine(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Joint Machine(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Mixer Mobile(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Mixer Single Drum Any Capacity(group 5)	\$60.37	7B	4G	8U	View

Wahkiakum	Power Equipment Operators	Concrete, Paving Machine 8' And Less (asst To Engineer Required)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Placing Boom(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Pump Truck(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Pump(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Pumpcrete Operator (any Type)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Reinforced Tank Banding Machine (asst To Engineer Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Slip Form Pumps, Power Driven Hydraulic Lifting Device For Concrete Forms(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Spreader(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Telebelt(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Concrete, Treated Base Roller Operator, Oiling(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Conveyor Operator Or Assistant(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Conveyored Material Hauler(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Bridge Locomotive, Gantry And Overhead(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Carry Deck(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Chicago Boom & Similar Types(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Floating (derrick Barge) 30 Ton But Less Than 150 Ton (asst To Engineer Required)(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Floating 150 Ton But Less Than 250 Ton (asst To Engineer Required) (group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Floating 250 Ton And Over (asst To Engineer And Deckhand Required)(group 1)	\$70.16	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Floating Clamshell 3 Cu. Yds. & Over (fireman Or Diesel Electric Engineer Required)(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Floating Clamshell, Dragline Etc. Operator Under 3 Cu. Yds. Or Less Than 30 Ton (diesel-electric Engineer Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Hydraulic 200 Ton Through 399 Ton (group 1)	\$68.00	7B	4G	8U	View

Wahkiakum	Power Equipment Operators	Crane, Hydraulic 50 Ton Through 89 Ton With Luffing Or Tower Attachment(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Hydraulic 50 Ton Through 89 Tons(group 3)	\$64.94	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Hydraulic 90 Ton Through 199 Ton With Luffing Or Tower Attachment (group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Hydraulic 90 Ton Through 199 Ton(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Hydraulic Crane 200 Ton Through 300 Ton With Luffing Or Tower Attachment(group 1)	\$70.16	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Hydraulic Crane 400 Ton And Over(group 1)	\$72.32	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Hydraulic Crane Over 300 Ton Through 399 Ton With Luffer Or Tower Attachment(group 1)	\$72.32	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Hydraulic Under 50 Ton(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Lattice Boom 200 Ton Through 299 Ton, With Over 200' Boom(group 1)	\$70.16	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Lattice Boom 300 Ton Through 399 Ton(group 1)	\$70.16	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Lattice Boom 300 Ton Through 399 Ton, With Over 200' Boom(group 1)	\$72.32	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Lattice Boom 50 Ton Through 89 Ton With 150' Boom Or Less(group 3)	\$64.94	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Lattice Boom 50 Ton Through 89 Ton With Over 150' Boom	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Lattice Boom 90 Ton Through 199 Ton With 150' - 200' Boom(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Lattice Boom Under 50 Ton(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Lattice Boom, 200 Ton Through 299 Ton With 200' Boom Or Less (group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Lattice Boom, 90 Ton Through 199 Ton With Over 200' Boom (group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Shovel, Dragline Or Clamshell 3 Cu. Yds. But Less Than 5 Cu. Yds. (asst To Engineer Required)(group 3)	\$64.94	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Tower Crane With 175' Tower Or Less And With Less Than 200' Jib(group 2)	\$66.10	7B	4G	8U	View

Wahkiakum	Power Equipment Operators	Crane, Tower Crane With Over 175' Tower Or Over 200' Jib (group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Tugger(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Whirley 90 Ton And Over (group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crane, Whirley Under 90 Ton(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crusher Feederman(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crusher Oiler(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Crusher Plant(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Deckhand(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Derrick Operator Under 100 Ton (two Operators Required When Swing Control Is Remote From Hoist)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Diesel-electric Engineer (plant Or Floating)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Directional Drill Over 20,000 Lbs Pullback(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Drill Assistant(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Drill Cat Operator(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Drill Directional Type Less Than 20,000 Lbs Pullback(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Drill Doctor And/or (bit Grinder)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Drill Mud Mixer(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Drill Oscillator(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Drill, Directinal Locator(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Driller, Percussion, Diamond, Core, Cable, Rotary & Similar Type(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Elevating Grader Operator, Tractor Towed Requiring Operator Or Grader(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Elevating Loader Operator (any Type)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Elevator To Move Personnel Or Materials(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Excavator Over 80,000 Lbs Through 130,000 Lbs(group 3)	\$64.94	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Excavator Operator, Over 20,000 Lbs Through 80,000 Lbs(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Excavator Operator, Over 130,000 Lbs(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Fireman(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Floating, Crane 350 Ton And Over (asst To Engineer And Deckhand Required)(group 1)	\$72.32	7B	4G	8U	View

Wahkiakum	Power Equipment Operators	Fork Lift(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Fork Lift, Over 10 Ton Or Robotic(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Generator Operator(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Grade Checker(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Grade Setter / Layout From Plans(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Grade-all(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Guardrail Machines, I.e. Punch, Auger, Etc.(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Guardrail Punch Oiler(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Hammer Operator (pile Driver)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Heavy Duty Repairman Assistant(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Heavy Equipment Robotics Operator Or Mechanic(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Helicopter Hoist(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Helicopter Radioman (ground)(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Helicopter When Used In Erecting Workcrane(group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Hoist Operator, Single Drum(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Hoist, 2 Drums Or More(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Hoist, Stiff Leg, Guy Derrick Or Similar Type, 50 Ton And Over(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Hydraulic Backhoe Track Type Up To And Including 20,000 Lbs(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Hydraulic Backhoe Wheel Type (any Make)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Hydraulic Pipe Press(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Hydro Axe (loader Mounted Or Similar Type)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Hydrographic Seeder Machine Straw, Pulp Or Seed(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Hydrostatic Pump Operator(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Internal Full Slab Vibrator Operator(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Jack Operator, Elevating Barges, Barge Operator, Self-unloading (asst To Engineer Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Laser Screed(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Lattice Boom Crane 400 Ton And Over(group 1)	\$72.32	7B	4G	8U	View

Wahkiakum	Power Equipment Operators	Lime Spreader, Construction Job Site(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Loaders Operator, Front End & Overhead, 25,000 Lbs And Less Than 60,000 Lbs(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Loaders, 120,000 Lbs And Above(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Loaders, 60,000 Lbs And Less Than 120,000 Lbs(group 3)	\$64.94	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Loaders, Rubber-tire Type, Less Than 25,000 Lbs(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Log Skidders(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Master Environmental Maintenance Mechanic(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Material Handler(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Mechanic, Heavy Duty(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Mixer Box (c. t. b., Dry Batch, Etc.)(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Oiler(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Parts Man (tool Room)(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Pavement Grinder And Or Grooving Machine (riding Type)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Pile Driver Operator (not Crane Type) (asst To Engineer Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Pipe Bending, Cleaning, Doping And Wrapping Machines(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Pipe, Cast In Place Pipe Laying Machine(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Plant Oiler(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Pump (any Power)(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Pump Operator, More Than 5 Pumps (any Size)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Rail, Ballast Compactor, Regulator Or Tamper Machines(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Rail, Ballast Tamper Multi-purpose(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Rail, Brakeman, Switchman, Motorman(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Rail, Car Mover(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Rail, Clip Applicator(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Rail, High Rail Self Loader Truck(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Rail, Lo-railer(group 5)	\$60.37	7B	4G	8U	View

Wahkiakum	Power Equipment Operators	Rail, Locomotive, 40 Ton And Over (asst To Engineer Required)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Rail, Shuttle Car Operator(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Rail, Speedswing(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Rail, Switchman(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Rail, Tamping Machine, Mechanical, Self-propelled(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Rail, Track Liner(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Remote Controlled Earth Moving Equipment(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Rigger(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Roller Grading (not Asphalt) (group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Rubber-tired Dozers And Pushers(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Scraper All Types(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Service Oiler (greaser)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Shovel, Dragline, Clamshell, 5 Yards And Over(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Side-boom(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Skip Loader, Drag Box(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Stump Grinder (loader Mounted Or Similar Type)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Surface Heater And Planer(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Sweeper Self-propelled, Construction Job Site(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Tar Pot Fireman (power Agitated) Or Not(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Tractor Rubber-tired, 50 Hp Flywheel & Under(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Tractor, Rubber-tired Over 50 Hp Flywheel(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Trenching Machine 3 Ft Depth And Deeper (asst To The Operator If Required) (group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Trenching Machine Operator, Maximum Digging Capacity 3 Ft Depth(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Truck Crane Oiler-driver(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Truck, All Terrain Or Track Type(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Truck, Barrel Type(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Truck, Boom(group 5)	\$60.37	7B	4G	8U	View

Wahkiakum	Power Equipment Operators	Truck, Off-road Trucks, Articulated And Non-articulated Trucks(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Truck, Offroad Trucks, Articulated And Non-articulated Trucks(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Truck, Vacuum(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Truck, Water(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Tub Grinder(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Tunnel Boring Machine Mechanic(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Tunnel Boring Machine(group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Tunnel Segment Plant(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Tunnel Separation Plant(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Tunnel Shaef Loader(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Tunnel, Locomotive, Dinkey(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Tunnel, Micro Boring Tunnel Machine(group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Tunnel, Mucking Machine(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Tunnel, Power Jumbo Setting Slip Forms, Etc.(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Tunnel, Shield Operator(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Ultra High Pressure Water Jet Cutting Tool System Operator(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Underwater Equipment, Remote Or Otherwise(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Vacuum Blasting Machine Operator(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Water Pulls, Water Wagon(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Welder's Assistant(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Welder; Heavy Duty, Certified Or Not(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Welding Machine(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Wheel Excavation Any Size (grade Oiler Required)(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators	Wire Mat Or Brooming Machine(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Air Filtration Equipment(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Asphalt Plant (any Type) (assistant Engineer Required) (group 2)	\$66.10	7B	4G	8U	View

Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Asphalt, Burner & Reconditioner (any Type), (asst To Engineer If Required)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Asphalt, Extrusion Machine Operator(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Asphalt, Paver (screed Man Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Asphalt, Pugmill (any Type)(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Asphalt, Raker(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Asphalt, Roller (any Asphalt Mix)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Asphalt, Roto-mill, Pavement Profiler Under 8 Ft Lateral Cut(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Asphalt, Roto-mill, Pavement Profiler, 8 Ft Lateral Cut & Over(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Asphalt, Roto-mill, Pavement Profiler, Groundman(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Asphalt, Screed(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Asphalt, Truck Mounted Spreader, With Screed(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Auger Oiler(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Auto Grader Or "trimmer" (grade Checker Required) (group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Back Filling Machine (assistant To Engineer Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Backhoe, Robotic, Track And Wheel Type Up To And Including 20,000 Lbs. With Any Attachments(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Band Wagons (in Conjunction With Wheel Excavator)(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Bell Man (any Type Of Communication)(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Blade Any Type(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Blade, Robotic(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Boatman(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Boatman, Licensed(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Bobcat, Skid Steer (< 1yd)(group 6)	\$57.15	7B	4G	8U	View

Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Boom Type Lifting Device, 5 Ton Capacity Or Less(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Boring Machine (asst To Engineer Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Broom Self-propelled, Construction Job Site(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Bulldozer Operator, 20,000 Lbs Or Less, Or 100 Horse Or Less(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Bulldozer Operator, Over 20,000 Lbs And More Than 100 Horse Up To 70,000 Lbs(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Bulldozer Over 70,000 Lbs Up To And Including 120,000 Lbs(group 3)	\$64.94	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Bulldozer Over 120,000 Lbs And Above(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Bulldozer Robotic Equipment(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Cable-plow (any Type)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Cableway 25 Ton & Over(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Cableway Up To 25 Ton(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Canal Trimmer (grade Oiler Required)(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Cat Drill (john Henry)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Cement Pump(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Challenger(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Chip Spreading Machine(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Chippers (asst To Engineer If Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Churn Drill & Earth Boring Machine(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Combination Heavy Duty Mechanic-welder, When Required To Do Both(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Compactor Self Propelled Without Blade(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Compactor With Blade Self Propelled(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Compactor, Multi-engine(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Compactor, Robotic(group 4)	\$61.61	7B	4G	8U	View

Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Compressor (any Power) 1,250 Cu Ft And Over Total Capacity(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Compressor Operator (any Power) Under 1,250 Cu Ft Total Capacity(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete Batch Plant And/or Wet Mix (3 Units Or More) (group1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete Batch Plant And/or Wet Mix Operator (1 & 2 Drums)(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete Batch Plant Quality Control(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete Breaker (assistant To Engineer Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete Canal Line, Assistant To Engineer Required(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete Curing Machine (riding Type)(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete Diamond Head Profiler(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete Paving Road Mixer(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete Planer(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete Saw(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Automatic Slip Form Paver (asst To Engineer Required)(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Combination Mixer & Compressor Operator, Gunite Work(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Curb Machine Mechanical Berm, Curb And/or Curb And Gutter(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Finishing Machine(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Grout Plant(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Grouting Machine(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Joint Machine(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Mixer Mobile(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Mixer Single Drum Any Capacity(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Paving Machine 8' And Less (asst To Engineer Required)(group 5)	\$60.37	7B	4G	8U	View

Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Placing Boom(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Pump Truck(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Pump(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Pumpcrete Operator (any Type)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Reinforced Tank Banding Machine (asst To Engineer Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Slip Form Pumps, Power Driven Hydraulic Lifting Device For Concrete Forms(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Spreader(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Telebelt(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Concrete, Treated Base Roller Operator, Oiling(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Conveyor Operator Or Assistant(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Conveyored Material Hauler(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Bridge Locomotive, Gantry And Overhead(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Carry Deck(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Chicago Boom & Similar Types(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Floating (derrick Barge) 30 Ton But Less Than 150 Ton (asst To Engineer Required)(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Floating 150 Ton But Less Than 250 Ton (asst To Engineer Required) (group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Floating 250 Ton And Over (asst To Engineer And Deckhand Required)(group 1)	\$70.16	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Floating Clamshell 3 Cu. Yds. & Over (fireman Or Diesel Electric Engineer Required)(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Floating Clamshell, Dragline Etc. Operator Under 3 Cu. Yds. Or Less Than 30 Ton (diesel-electric Engineer Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Hydraulic 200 Ton Through 399 Ton (group 1)	\$68.00	7B	4G	8U	View

Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Hydraulic 50 Ton Through 89 Ton With Luffing Or Tower Attachment(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Hydraulic 50 Ton Through 89 Tons(group 3)	\$64.94	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Hydraulic 90 Ton Through 199 Ton With Luffing Or Tower Attachment (group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Hydraulic 90 Ton Through 199 Ton(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Hydraulic Crane 200 Ton Through 300 Ton With Luffing Or Tower Attachment(group 1)	\$70.16	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Hydraulic Crane 400 Ton And Over(group 1)	\$72.32	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Hydraulic Crane Over 300 Ton Through 399 Ton With Luffer Or Tower Attachment(group 1)	\$72.32	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Hydraulic Under 50 Ton(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Lattice Boom 200 Ton Through 299 Ton, With Over 200' Boom(group 1)	\$70.16	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Lattice Boom 300 Ton Through 399 Ton(group 1)	\$70.16	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Lattice Boom 300 Ton Through 399 Ton, With Over 200' Boom(group 1)	\$72.32	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Lattice Boom 50 Ton Through 89 Ton With 150' Boom Or Less(group 3)	\$64.94	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Lattice Boom 50 Ton Through 89 Ton With Over 150' Boom	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Lattice Boom 90 Ton Through 199 Ton With 150' - 200' Boom(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Lattice Boom Under 50 Ton(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Lattice Boom, 200 Ton Through 299 Ton With 200' Boom Or Less (group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Lattice Boom, 90 Ton Through 199 Ton With Over 200' Boom (group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Shovel, Dragline Or Clamshell 3 Cu. Yds. But Less Than 5 Cu. Yds. (asst To Engineer Required)(group 3)	\$64.94	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Tower Crane With 175' Tower Or Less And With Less Than 200' Jib(group 2)	\$66.10	7B	4G	8U	View

Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Tower Crane With Over 175' Tower Or Over 200' Jib (group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Tugger(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Whirley 90 Ton And Over (group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crane, Whirley Under 90 Ton(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crusher Feederman(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crusher Oiler(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Crusher Plant(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Deckhand(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Derrick Operator Under 100 Ton (two Operators Required When Swing Control Is Remote From Hoist)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Diesel-electric Engineer (plant Or Floating)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Directional Drill Over 20,000 Lbs Pullback(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Drill Assistant(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Drill Cat Operator(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Drill Directional Type Less Than 20,000 Lbs Pullback(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Drill Doctor And/or (bit Grinder)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Drill Mud Mixer(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Drill Oscillator(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Drill, Directinal Locator(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Driller, Percussion, Diamond, Core, Cable, Rotary & Similar Type(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Elevating Grader Operator, Tractor Towed Requiring Operator Or Grader(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Elevating Loader Operator (any Type)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Elevator To Move Personnel Or Materials(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Excavator Over 80,000 Lbs Through 130,000 Lbs(group 3)	\$64.94	7B	4G	8U	View

Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Excavator Operator, Over 20,000 Lbs Through 80,000 Lbs(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Excavator Operator, Over 130,000 Lbs(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Fireman(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Floating, Crane 350 Ton And Over (asst To Engineer And Deckhand Required)(group 1)	\$72.32	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Fork Lift(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Fork Lift, Over 10 Ton Or Robotic(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Generator Operator(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Grade Checker(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Grade Setter / Layout From Plans(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Grade-all(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Guardrail Machines, I.e. Punch, Auger, Etc.(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Guardrail Punch Oiler(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Hammer Operator (pile Driver)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Heavy Duty Repairman Assistant(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Heavy Equipment Robotics Operator Or Mechanic(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Helicopter Hoist(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Helicopter Radioman (ground)(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Helicopter When Used In Erecting Workcrane(group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Hoist Operator, Single Drum(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Hoist, 2 Drums Or More(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Hoist, Stiff Leg, Guy Derrick Or Similar Type, 50 Ton And Over(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Hydraulic Backhoe Track Type Up To And Including 20,000 Lbs(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Hydraulic Backhoe Wheel Type (any Make)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Hydraulic Pipe Press(group 6)	\$57.15	7B	4G	8U	View

Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Hydro Axe (loader Mounted Or Similar Type)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Hydrographic Seeder Machine Straw, Pulp Or Seed(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Hydrostatic Pump Operator(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Internal Full Slab Vibrator Operator(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Jack Operator, Elevating Barges, Barge Operator, Self-unloading (asst To Engineer Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Laser Screed(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Lattice Boom Crane 400 Ton And Over(group 1)	\$72.32	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Lime Spreader, Construction Job Site(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Loaders Operator, Front End & Overhead, 25,000 Lbs And Less Than 60,000 Lbs(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Loaders, 120,000 Lbs And Above(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Loaders, 60,000 Lbs And Less Than 120,000 Lbs(group 3)	\$64.94	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Loaders, Rubber-tire Type, Less Than 25,000 Lbs(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Log Skidders(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Master Environmental Maintenance Mechanic(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Material Handler(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Mechanic, Heavy Duty(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Mixer Box (c.t.b., Dry Batch, Etc.)(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Oiler(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Parts Man (tool Room)(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Pavement Grinder And Or Grooving Machine (riding Type)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Pile Driver Operator (not Crane Type) (asst To Engineer Required)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Pipe Bending, Cleaning, Doping And Wrapping Machines(group 4)	\$61.61	7B	4G	8U	View

Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Pipe, Cast In Place Pipe Laying Machine(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Plant Oiler(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Pump (any Power)(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Pump Operator, More Than 5 Pumps (any Size)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rail, Ballast Compactor, Regulator Or Tamper Machines(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rail, Ballast Tamper Multi-purpose(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rail, Brakeman, Switchman, Motorman(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rail, Car Mover(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rail, Clip Applicator(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rail, High Rail Self Loader Truck(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rail, Lo-railer(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rail, Locomotive, 40 Ton And Over (asst To Engineer Required)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rail, Shuttle Car Operator(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rail, Speedswing(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rail, Switchman(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rail, Tamping Machine, Mechanical, Self-propelled(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rail, Track Liner(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Remote Controlled Earth Moving Equipment(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rigger(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Roller Grading (not Asphalt) (group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Rubber-tired Dozers And Pushers(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Scraper All Types(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Service Oiler (greaser)(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Shovel, Dragline, Clamshell, 5 Yards And Over(group 2)	\$66.10	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Side-boom(group 4)	\$61.61	7B	4G	8U	View

Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Skip Loader, Drag Box(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Stump Grinder (loader Mounted Or Similar Type)(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Surface Heater And Planer(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Sweeper Self-propelled, Construction Job Site(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Tar Pot Fireman (power Agitated) Or Not(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Tractor Rubber-tired, 50 Hp Flywheel & Under(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Tractor, Rubber-tired Over 50 Hp Flywheel(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Trenching Machine 3 Ft Depth And Deeper (asst To The Operator If Required) (group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Trenching Machine Operator, Maximum Digging Capacity 3 Ft Depth(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Truck Crane Oiler-driver(group 6)	\$57.15	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Truck, All Terrain Or Track Type(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Truck, Barrel Type(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Truck, Boom(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Truck, Off-road Trucks, Articulated And Non-articulated Trucks(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Truck, Offroad Trucks, Articulated And Non-articulated Trucks(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Truck, Vacuum(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Truck, Water(group 5)	\$60.37	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Tub Grinder(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Tunnel Boring Machine Mechanic(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Tunnel Boring Machine(group 1)	\$68.00	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Tunnel Segment Plant(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Tunnel Separation Plant(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Tunnel Shaef Loader(group 4)	\$61.61	7B	4G	8U	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Tunnel, Locomotive, Dinkey(group 5)	\$60.37	7B	4G	8U	View

Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Tunnel, Micro Boring Tunnel Machine(group 1)	\$68.00	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Tunnel, Mucking Machine(group 4)	\$61.61	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Tunnel, Power Jumbo Setting Slip Forms, Etc.(group 5)	\$60.37	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Tunnel, Shield Operator(group 4)	\$61.61	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Ultra High Pressure Water Jet Cutting Tool System Operator(group 4)	\$61.61	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Underwater Equipment, Remote Or Otherwise(group 2)	\$66.10	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Vacuum Blasting Machine Operator(group 4)	\$61.61	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Water Pulls, Water Wagon(group 4)	\$61.61	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Welder's Assistant(group 6)	\$57.15	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Welder; Heavy Duty, Certified Or Not(group 4)	\$61.61	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Welding Machine(group 6)	\$57.15	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Wheel Excavation Any Size (grade Oiler Required)(group 2)	\$66.10	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Equipment Operators-Underground Sewer & Water	Wire Mat Or Brooming Machine(group 6)	\$57.15	<u>7B</u>	<u>4G</u>	<u>8U</u>	View
Wahkiakum	Power Line Clearance Tree Trimmers	Journey Level In Charge	\$57.22	<u>5A</u>	<u>4A</u>		View
Wahkiakum	Power Line Clearance Tree Trimmers	Spray Person	\$54.32	<u>5A</u>	<u>4A</u>		View
Wahkiakum	Power Line Clearance Tree Trimmers	Tree Equipment Operator	\$57.22	<u>5A</u>	<u>4A</u>		View
Wahkiakum	Power Line Clearance Tree Trimmers	Tree Trimmer	\$51.18	<u>5A</u>	<u>4A</u>		View
Wahkiakum	Power Line Clearance Tree Trimmers	Tree Trimmer Groundperson	\$38.99	<u>5A</u>	<u>4A</u>		View
Wahkiakum	Refrigeration & Air Conditioning Mechanics	Journey Level	\$83.96	<u>5A</u>	<u>1G</u>		View
Wahkiakum	Residential Brick Mason	Journey Level	\$38.27		<u>1</u>		View
Wahkiakum	Residential Carpenters	Journey Level	\$15.50		<u>1</u>		View
Wahkiakum	Residential Cement Masons	Journey Level	\$61.14	<u>7E</u>	<u>1H</u>		View
Wahkiakum	Residential Drywall Applicators	Journey Level	\$15.50		<u>1</u>		View
Wahkiakum	Residential Drywall Tapers	Journey Level	\$14.86		<u>1</u>		View
Wahkiakum	Residential Electricians	Journey Level	\$30.00		<u>1</u>		View
Wahkiakum	Residential Glaziers	Journey Level	\$14.86		<u>1</u>		View
Wahkiakum	Residential Insulation Applicators	Journey Level	\$14.86		<u>1</u>		View
Wahkiakum	Residential Laborers	Journey Level	\$15.16		<u>1</u>		View
Wahkiakum	Residential Marble Setters	Journey Level	\$38.27		<u>1</u>		View

Wahkiakum	Residential Painters	Journey Level	\$14.86		<u>1</u>		View
Wahkiakum	Residential Plumbers & Pipefitters	Journey Level	\$21.92		<u>1</u>		View
Wahkiakum	Residential Refrigeration & Air Conditioning Mechanics	Journey Level	\$14.49		<u>1</u>		View
Wahkiakum	Residential Sheet Metal Workers	Journey Level (Field or Shop)	\$56.12	<u>7F</u>	<u>1R</u>		View
Wahkiakum	Residential Soft Floor Layers	Journey Level	\$55.98	<u>7E</u>	<u>5A</u>		View
Wahkiakum	Residential Sprinkler Fitters (Fire Protection)	Journey Level	\$14.49		<u>1</u>		View
Wahkiakum	Residential Stone Masons	Journey Level	\$38.27		<u>1</u>		View
Wahkiakum	Residential Terrazzo Workers	Journey Level	\$14.86		<u>1</u>		View
Wahkiakum	Residential Terrazzo/Tile Finishers	Journey Level	\$14.86		<u>1</u>		View
Wahkiakum	Residential Tile Setters	Journey Level	\$14.86		<u>1</u>		View
Wahkiakum	Roofers	Journey Level	\$59.00	<u>5A</u>	<u>2O</u>		View
Wahkiakum	Roofers	Using Irritable Bituminous Materials	\$62.00	<u>5A</u>	<u>2O</u>		View
Wahkiakum	Sheet Metal Workers	Journey Level (Field or Shop)	\$94.11	<u>7F</u>	<u>1E</u>		View
Wahkiakum	Shipbuilding & Ship Repair	New Construction Heat & Frost Insulator	\$80.49	<u>5N</u>	<u>1F</u>		View
Wahkiakum	Shipbuilding & Ship Repair	Ship Repair Heat & Frost Insulator	\$80.49	<u>5N</u>	<u>1F</u>		View
Wahkiakum	Sign Makers & Installers (Electrical)	Journey Level	\$16.88		<u>1</u>		View
Wahkiakum	Sign Makers & Installers (Non-Electrical)	Journey Level	\$16.74		<u>1</u>		View
Wahkiakum	Soft Floor Layers	Journey Level	\$55.98	<u>7E</u>	<u>5A</u>		View
Wahkiakum	Solar Controls For Windows	Journey Level	\$14.49		<u>1</u>		View
Wahkiakum	Sprinkler Fitters (Fire Protection)	Journey Level	\$69.97	<u>7J</u>	<u>1R</u>		View
Wahkiakum	Stage Rigging Mechanics (Non Structural)	Journey Level	\$14.49		<u>1</u>		View
Wahkiakum	Stone Masons	Journey Level	\$68.14	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Street And Parking Lot Sweeper Workers	Journey Level	\$15.00		<u>1</u>		View
Wahkiakum	Surveyors	Chain Person	\$57.15	<u>7B</u>	<u>1B</u>		View
Wahkiakum	Surveyors	Instrument Person	\$60.37	<u>7B</u>	<u>1B</u>		View
Wahkiakum	Surveyors	Party Chief	\$66.09	<u>7B</u>	<u>1B</u>		View
Wahkiakum	Telecommunication Technicians	Journey Level	\$66.73	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Telephone Line Construction - Outside	Cable Splicer	\$39.15	<u>5A</u>	<u>2B</u>		View
Wahkiakum	Telephone Line Construction - Outside	Hole Digger/Ground Person	\$26.29	<u>5A</u>	<u>2B</u>		View
Wahkiakum	Telephone Line Construction - Outside	Telephone Equipment Operator (Light)	\$32.72	<u>5A</u>	<u>2B</u>		View
Wahkiakum	Telephone Line Construction - Outside	Telephone Lineperson	\$37.00	<u>5A</u>	<u>2B</u>		View
Wahkiakum	Terrazzo Workers	Journey Level	\$59.27	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Tile Setters	Journey Level	\$59.27	<u>5A</u>	<u>1B</u>		View

Wahkiakum	Tile, Marble & Terrazzo Finishers	Finishers	\$44.20	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Traffic Control Stripers	Journey Level	\$53.26	<u>7P</u>	<u>1K</u>		View
Wahkiakum	Truck Drivers	Asphalt Mix Over 10 Yards	\$47.01	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Truck Drivers	Asphalt Mix To 10 Yards	\$46.87	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Truck Drivers	Dump Truck	\$46.87	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Truck Drivers	Dump Truck And Trailer	\$47.01	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Truck Drivers	Other Trucks	\$47.01	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Truck Drivers - Ready Mix	Transit Mix 5 cubic yards and under	\$46.87	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Truck Drivers - Ready Mix	Transit Mix over 11 cubic yards up to 15 cubic yards	\$47.45	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Truck Drivers - Ready Mix	Transit Mix over 5 cubic yards up to 7 cubic yards	\$47.01	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Truck Drivers - Ready Mix	Transit Mix Over 7 cubic yards up to 11 cubic yards	\$47.15	<u>5A</u>	<u>1B</u>		View
Wahkiakum	Well Drillers & Irrigation Pump Installers	Irrigation Pump Installer	\$14.49		<u>1</u>		View
Wahkiakum	Well Drillers & Irrigation Pump Installers	Oiler	\$14.49		<u>1</u>		View
Wahkiakum	Well Drillers & Irrigation Pump Installers	Well Driller	\$14.49		<u>1</u>		View

Benefit Code Key – Effective 8/31/2022 thru 3/2/2023

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.
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.

Overtime Codes Continued

4. 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.
- 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.

- W. 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.

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.

Overtime Codes Continued

4. X. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage. Work performed outside the normal shift of 6 am to 6pm shall be paid at one and one-half the straight time rate, (except for special shifts or three shift operations). All work performed on Sundays and holidays shall be paid at double the hourly rate of wage. Shifts may be established when considered necessary by the Employer.

The Employer may establish shifts consisting of eight (8) or ten (10) hours of work (subject to WAC 296-127-022), that shall constitute a normal forty (40) hour work week. The Employer can change from a 5-eight to a 4-ten hour schedule or back to the other. All hours of work on these shifts shall be paid for at the straight time hourly rate. Work performed in excess of eight hours (or ten hours per day (subject to WAC 296-127-022) shall be paid at one and one-half the straight time rate.

When due to conditions beyond the control of the Employer, or when contract specifications require that work can only be performed outside the regular day shift, then by mutual agreement a special shift may be worked at the straight time rate, eight (8) hours work for eight (8) hours pay. The starting time shall be arranged to fit such conditions of work.

When an employee returns to work without at a break of eight (8) hours since their previous shift, all such time shall be a continuation of shift and paid at the applicable overtime rate until such time as the employee has had a break of eight (8) hours.

- Y. 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 shift, and all work on Saturdays shall be paid at time and one-half the straight time rate. All work performed after 6:00 pm Saturday to 6:00 am Monday and holidays shall be paid at double the straight time rate of pay.

Any shift starting between the hours of 6:00 pm and midnight shall receive an additional one dollar (\$1.00) per hour for all hours worked that shift.

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.

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. I. 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. 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.
- Any shift starting between the hours of 6:00 pm and midnight shall receive an additional two dollar (\$2.00) per hour for all hours worked that shift.
- 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.

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).
- J. Holidays: New Year's Day, Memorial Day, Independence Day, Thanksgiving Day, Friday after Thanksgiving Day, Christmas Eve Day, And Christmas Day (7).
- 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).

Holiday Codes Continued

- 6. 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).
- G. Paid Holidays: New Year's Day, Martin Luther King Jr. Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, and Christmas Eve Day (11).
- H. Paid Holidays: New Year's Day, New Year's Eve Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday After Thanksgiving Day, Christmas Day, The Day After Christmas, And A Floating Holiday (10).
- T. Paid Holidays: New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, The Friday After Thanksgiving Day, The Last Working Day Before Christmas Day, And Christmas Day (9).
- Z. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday after Thanksgiving Day, And Christmas Day (7). If a holiday falls on Saturday, the preceding Friday shall be considered as the holiday. If a holiday falls on Sunday, the following Monday shall be considered as the holiday.
- 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.

Holiday Codes Continued

7. 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.
- 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.

Holiday Codes Continued

7. 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.
- 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.

Holiday Codes Continued

7. 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.
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, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday after Thanksgiving Day, Christmas Eve Day, and Christmas Day (8). When the following holidays fall on a Saturday (New Year's Day, Independence Day, and Christmas Day) the preceding Friday will be considered as the holiday; should they fall on a Sunday, the following Monday shall be considered as the holiday.

Holiday Codes Continued

15. I. Holidays: New Year's Day, President's Day, Memorial Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, the last regular workday before Christmas (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday.
- J. Holidays: New Year's Day, Martin Luther King Jr. Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, and Christmas Day (9). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. If any of the listed holidays falls on a Saturday, the preceding Friday shall be a regular work day.

Note Codes

8. D. Workers working with supplied air on hazmat projects receive an additional \$1.00 per hour.
- L. Workers on hazmat projects receive additional hourly premiums as follows -Level A: \$0.75, Level B: \$0.50, And Level C: \$0.25.
- M. Workers on hazmat projects receive additional hourly premiums as follows: Levels A & B: \$1.00, Levels C & D: \$0.50.
- N. Workers on hazmat projects receive additional hourly premiums as follows -Level A: \$1.00, Level B: \$0.75, Level C: \$0.50, And Level D: \$0.25.
- S. Effective August 31, 2012 – A Traffic Control Supervisor shall be present on the project whenever flagging or spotting or other traffic control labor is being utilized. Flaggers and Spotters shall be posted where shown on approved Traffic Control Plans or where directed by the Engineer. All flaggers and spotters shall possess a current flagging card issued by the State of Washington, Oregon, Montana, or Idaho. This classification is only effective on or after August 31, 2012.
- T. Effective August 31, 2012 – A Traffic Control Laborer performs the setup, maintenance and removal of all temporary traffic control devices and construction signs necessary to control vehicular, bicycle, and pedestrian traffic during construction operations. Flaggers and Spotters shall be posted where shown on approved Traffic Control Plans or where directed by the Engineer. All flaggers and spotters shall possess a current flagging card issued by the State of Washington, Oregon, Montana, or Idaho. This classification is only effective on or after August 31, 2012.
- U. Workers on hazmat projects receive additional hourly premiums as follows – Class A Suit: \$2.00, Class B Suit: \$1.50, And Class C Suit: \$1.00. Workers performing underground work receive an additional \$0.40 per hour for any and all work performed underground, including operating, servicing and repairing of equipment. The premium for underground work shall be paid for the entire shift worked. Workers who work suspended by a rope or cable receive an additional \$0.50 per hour. The premium for work suspended shall be paid for the entire shift worked. Workers who do “pioneer” work (break open a cut, build road, etc.) more than one hundred fifty (150) feet above grade elevation receive an additional \$0.50 per hour.

Note Codes Continued

8. V. In addition to the hourly wage and fringe benefits, the following depth and enclosure premiums shall be paid. The premiums are to be calculated for the maximum depth and distance into an enclosure that a diver reaches in a day. The premiums are to be paid one time for the day and are not used in calculating overtime pay.

Depth premiums apply to depths of fifty feet or more. Over 50' to 100' - \$2.00 per foot for each foot over 50 feet. Over 101' to 150' - \$3.00 per foot for each foot over 101 feet. Over 151' to 220' - \$4.00 per foot for each foot over 220 feet. Over 221' - \$5.00 per foot for each foot over 221 feet.

Enclosure premiums apply when divers enter enclosures (such as pipes or tunnels) where there is no vertical ascent and is measured by the distance travelled from the entrance. 25' to 300' - \$1.00 per foot from entrance. 300' to 600' - \$1.50 per foot beginning at 300'. Over 600' - \$2.00 per foot beginning at 600'.

- W. Meter Installers work on single phase 120/240V self-contained residential meters. The Lineman/Groundmen rates would apply to meters not fitting this description.

- X. Workers on hazmat projects receive additional hourly premiums as follows - Class A Suit: \$2.00, Class B Suit: \$1.50, Class C Suit: \$1.00, and Class D Suit: \$0.50. Special Shift Premium: Basic hourly rate plus \$2.00 per hour.

When due to conditions beyond the control of the Employer or when an owner (not acting as the contractor), a government agency or the contract specifications requires that work can only be performed outside the normal 5 am to 6pm shift, then the special shift premium will be applied to the basic hourly rate. When an employee works on a special shift, they shall be paid a special shift premium for each hour worked unless they are in OT or Double-time status. (For example, the special shift premium does not waive the overtime requirements for work performed on Saturday or Sunday.)

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.

PART 6

PLANS

PART 7
APPENDIX

APPENDIX A

SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA

APPENDIX A

**SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA FORMS
WATER TREATMENT PLANT GENERATOR**

These forms shall be completed in their entirety and submitted by the apparent two lowest Bidders to the Town of Cathlamet by 12:00 p.m. (noon) of the second business day following the bid submittal deadline.

Failure to submit and meet the requirements as stated in Section 2.01.8 of the General Conditions shall be grounds for rejection of the bid. The Town of Cathlamet will be the sole judge in determining if the prospective contractor meets the minimum experience requirements.

Contractor:

Name: _____

Address: _____

Phone: _____

Contact Person: _____

2. Delinquent State Taxes

Instructions to Bidders: Check the appropriate box

- The Bidder does not owe delinquent taxes to the Washington State Department of Revenue.

- Alternatively, the Bidder does owe delinquent taxes to the Washington State Department of Revenue.

If the Bidder owes delinquent taxes, they must submit a written payment plan approved by the Department of Revenue, to the Contracting Agency.

(Date)

(Signature)

(Print Name)

(Title)

3. Claims Against Retainage and Bonds:

Instructions to Bidders: Check the appropriate box

- The Bidder has not had claims against retainage and bonds in the 3 years prior to the bid submittal date.

- Alternatively, the Bidder has had claims against retainage and bonds in the 3 years prior to the bid submittal date.

If the Bidder has had claims against retainage and bonds in the 3 years prior to the bid submittal date, submit a list of public works projects completed during this period that have had claims against retainage and bonds and include name of Project, contact information for the Owner, a list of claims filed against retainage and/or payment bond for any of the projects listed; and a written explanation of circumstances surrounding each claim and the ultimate resolution of the claim.

(Date)

(Signature)

(Print Name)

(Title)

4. Public Bidding Crime:

Instructions to Bidders: Check the appropriate box

- The undersigned certifies that the Bidder and/or its Owners have not been convicted of a crime involving bidding on a public works contract in the 5 years prior to the bid submittal date.

- Alternatively, the undersigned confirms that the Bidder and/or its Owners have been convicted of a crime involving bidding on a public works contract in the 5 years prior to the bid submittal date.

If the Bidder and/or its Owners have been convicted of a crime involving bidding on a public works contract, provide a written explanation identifying the date of the conviction and a description of the circumstances surrounding the conviction.

(Date)

(Signature)

(Print Name)

(Title)

5. Termination for Cause/Termination for Default

Instructions to Bidders: Check the appropriate box

- The undersigned certifies that the Bidder has not had any public works contracts terminated for cause or terminated for default by a government agency in the 5 years prior to the bid submittal date.

- Alternatively, the undersigned confirms that the Bidder has had public works contracts terminated for cause or terminated for default by a government agency in the 5 years prior to the bid submittal date.

If the Bidder has had any public works contracts terminated for cause or terminated for default in the 5 years prior to the bid submittal date, provide a written explanation for all contracts terminated for cause or terminated for default by identifying the project contract that was terminated, the government agency which terminated the Contract, the date of the termination, and a description of the circumstances surrounding the termination.

(Date)

(Signature)

(Print Name)

(Title)

6. Lawsuits

Instructions to Bidders: Check the appropriate box

- The undersigned certifies that the Bidder has not had any lawsuits with judgments entered against the Bidder in the 5 years prior to the bid submittal date that demonstrate a pattern of failing to meet the terms of contracts.

- Alternatively, the undersigned confirms that the Bidder has had any lawsuits with judgments entered against the Bidder in the 5 years prior to the bid submittal date that demonstrate a pattern of failing to meet the terms of contracts.

If the Bidder has had any lawsuits with judgments entered against the Bidder in the 5 years prior to the bid submittal date that demonstrate a pattern of failing to meet the terms of contracts, submit a list of lawsuits along with a written explanation of the circumstances surrounding each lawsuit. The Contracting Agency shall evaluate these explanations to determine whether the lawsuits demonstrate a pattern of failing to meet the terms of contracts.

(Date)

(Signature)

(Print Name)

(Title)

7. Contract Time (Liquidated Damages)

Instructions to Bidders: Check the appropriate box

- The undersigned certifies that the Bidder has not had liquidated damages assessed on any project it has completed in the 5 years prior to the bid submittal date.

- Alternatively, the undersigned confirms that the Bidder has had liquidated damages assessed on projects in the 5 years prior to the bid submittal date.

If the Bidder has had liquidated damages assessed against projects in the 5 years prior to the bid submittal date, submit a list of projects along with Owner contact information, and number of days assessed liquidated damages. The Contracting Agency shall determine whether the Contractor has a pattern of failing to complete projects within Contract Time.

(Date)

(Signature)

(Print Name)

(Title)

8. Capacity and Experience

The Bidder shall have sufficient current capacity and the Project Superintendent assigned to the Project shall have experience to meet the requirements of this Project. The Bidder and Project Superintendent shall have successfully completed at least two projects as the prime contractor, of a similar size and scope, during the 5-year period immediately preceding the bid submittal deadline for this project. Similar size is defined as a minimum of 70 percent of the bid amount submitted by the Bidder.

A. Capacity

i. Gross dollar amount of work currently under contract:

ii. Gross dollar amount of contracts currently not completed:

iii. List five major pieces of equipment which are anticipated to be used on this project by the Contractor and note which items are owned by the Contractor and which are to be leased or rented from others:

iv. Number of superintendents on Bidder's staff:

B. Experience

i. General character of work performed by firm:

ii. Identify who will be the superintendent on this project and years of experience. Also, list the number of years this person has been with your firm.

iii. Similar Size and Scope Projects Completed in the Past 5 Years

#1 Owner's Name and Contact Information: _____

Owner is a Government Agency? ___ Yes ___ No

Superintendent's Name: _____

Project Name: _____

Awarded Contract Amount: _____

Final Contract Amount: _____

Completion Date: _____

Project Description: _____

#2 Owner's Name and Contact Information: _____

Owner is a Government Agency? ___ Yes ___ No

Superintendent's Name: _____

Project Name: _____

Awarded Contract Amount: _____

Final Contract Amount: _____

Completion Date: _____

Project Description: _____

#3 Owner's Name and Contact Information: _____

Owner is a Government Agency? ___ Yes ___ No

Superintendent's Name: _____

Project Name: _____

Awarded Contract Amount: _____

Final Contract Amount: _____

Completion Date: _____

Project Description: _____

APPENDIX B

TEMPORARY CONSTRUCTION PERMITS

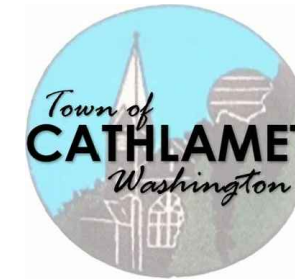
APPENDIX C

PERMITS

TOWN OF CATHLAMET

WAHKIAKUM COUNTY

WASHINGTON



WATER TREATMENT PLANT GENERATOR

TOWN OFFICIALS

DAVID OLSON

Mayor

ROBERT STOWE

KERMIT CHAMBERLIN

CECELIA RAGLIN

JEANNE HENDERICKSON

LAUREL WALLER

Town Council

DAVID MCNALLY

PUBLIC WORKS SUPERINTENDENT



NOVEMBER 2022
G&O JOB #22238.00


Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WA 98144 • (206) 264-0860

ABBREVIATIONS

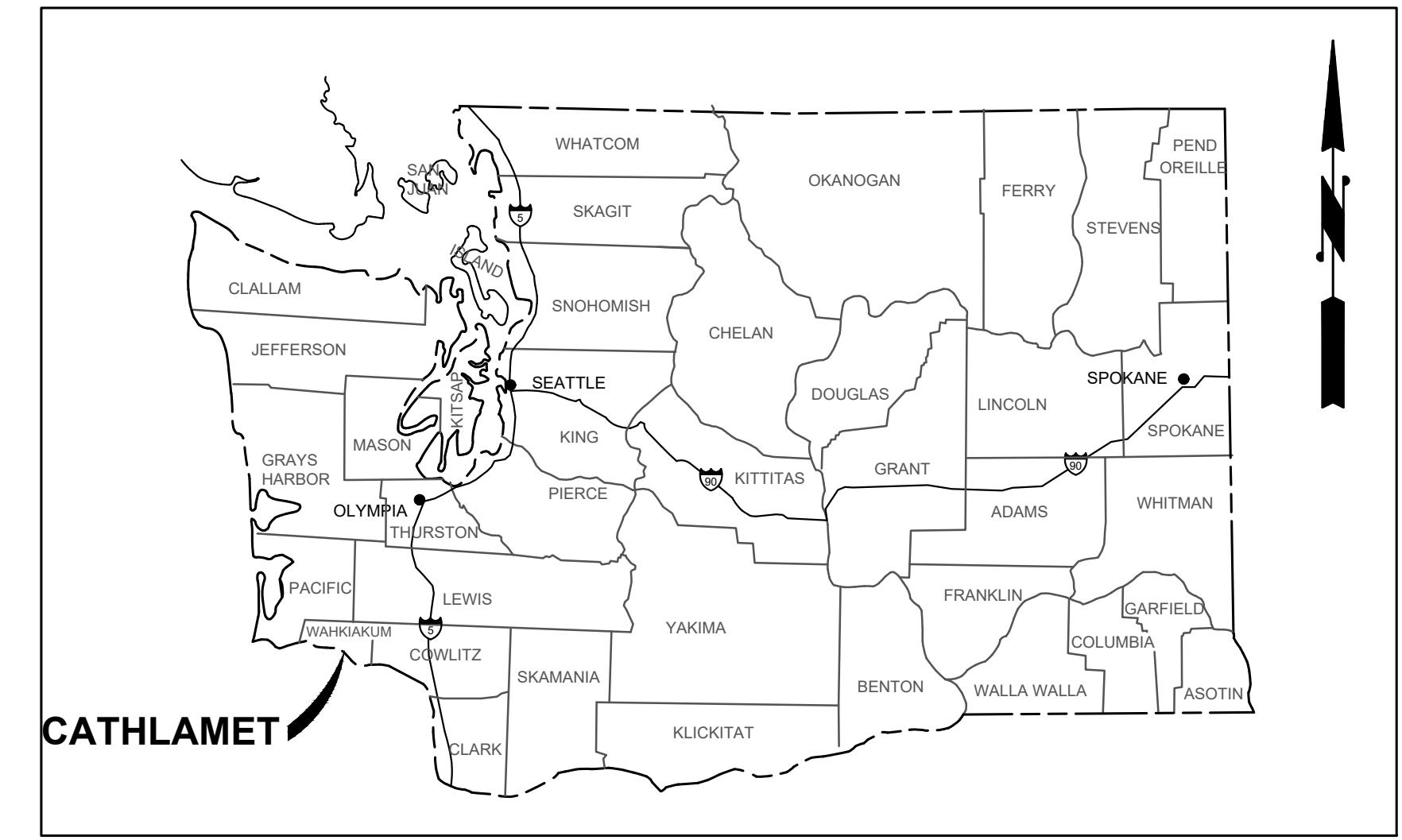
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ASSY	ASSEMBLY
ASTM	AMERICAN SOCIETY OF TESTING AND MATERIALS
AVE	AVENUE
BF	BLIND FLANGE
BLDG	BUILDING
BLK	BLOCK
C	CONDUIT
CB	CATCH BASIN
CF	CUBIC FEET
CICL	CAST IRON CLASS
CLR	CLEARANCE
CONC	CONCRETE
CONN	CONNECTION
CONT	CONTINUED/CONTINUOUS
CPEP	CORRUGATED POLYETHYLENE PIPE
CPLG	COUPLING
CTR	CENTER
CY	CUBIC YARD
¢	CENTER LINE
D	DRAIN
DI	DUCTILE IRON
DIA	DIAMETER
DIM	DIMENSION
DOT	DEPARTMENT OF TRANSPORTATION
DWGS	DRAWING(S)
E	EAST
EA	EACH
EL	ELEVATION
ELEC	ELECTRICAL
EOA	EDGE OF ASPHALT
EXIST	EXISTING
FIG	FIGURE
FIN	FINISHED
FL	FLANGE
FT	FEET
GALV	GALVANIZED
GI	GALVANIZED IRON
GV	GATE VALVE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IN	INCH
INV	INVERT
L	LENGTH
LB	POUND
LF	LINEAR FEET
MAX	MAXIMUM
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
N	NORTH
NO	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
PE	PLAIN END
PERF	PERFORATED
PI	POINT OF INTERSECTION
PP	POWER POLE
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
PVT	POINT OF VERTICAL TANGENT
QTY	QUANTITY
R	RADIUS
R/W	RIGHT-OF-WAY
RED	REDUCER
REINF	REINFORCE
REOD	REQUIRED
RET	RETAINING
S	SOUTH
SCH	SCHEDULE
SF	SQUARE FEET
SHT	SHEET
SL	SLOPE
SPECS	SPECIFICATIONS
SQ	SQUARE
STD	STANDARD
TB	THRUST BLOCK
TEL	TELEPHONE
TESC	TEMPORARY EROSION AND SEDIMENT CONTROL
THRD	THREADED
THRU	THROUGH
TOS	TOP OF SLAB
TYP	TYPICAL
VERT	VERTICAL
W	WEST
W/	WITH
W/O	WITHOUT
WSDOT	WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

LINETYPES

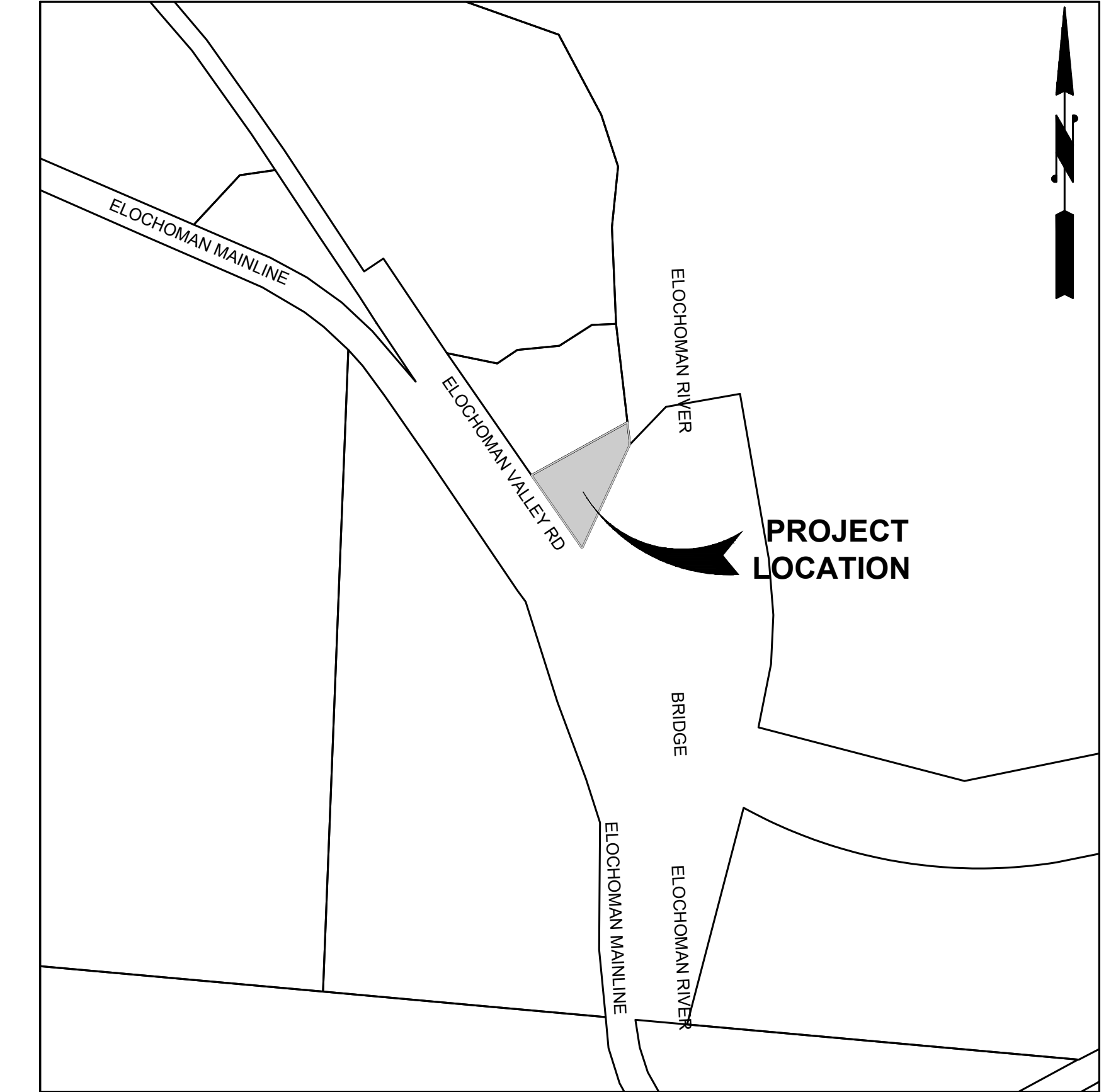
EXISTING	PROPOSED	DESCRIPTION
SURFACE FEATURES		
		CURB (TYPE AS NOTED)
		CURB & GUTTER
		ASPHALT PAVEMENT
		GRAVEL SURFACING
		CONCRETE SURFACING
		GUARD RAIL
		FENCE/RAILING (TYPE AS NOTED)
		FENCE WITH GATE
		SHRUB/TREE/VEGETATION LINE
		EDGE OF LANDSCAPING
		SILT FENCE
SURVEY		
		RIGHT-OF-WAY LINE
		CENTERLINE OF RIGHT-OF-WAY
		CENTERLINE OF CONSTRUCTION
		PROPERTY LINE
		PERMANENT EASEMENT LINE
		TEMPORARY CONSTRUCTION EASEMENT
		CONTOUR LINE
		APPROXIMATE TOP OF CUT
		APPROXIMATE TOE OF FILL
		SAWCUT LINE (APPROXIMATE LOCATION)
UTILITIES		
		OVERHEAD UTILITIES
		BURIED ELECTRICAL
		BURIED TELEPHONE/COMMUNICATIONS
		BURIED FIBER-OPTIC LINE
		GAS MAIN (SIZE AS NOTED)
		WATER MAIN (SIZE AS NOTED)
		SANITARY SEWER MAIN (SIZE AS NOTED)
		STORM DRAIN (SIZE AS NOTED)

SURFACE FEATURES/LANDSCAPING SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		BUILDING
		APPROXIMATE DOORWAY LOCATION
		BUILDING EAVES
		SHRUB
		TREE (CONIFER)
		TREE (DECIDUOUS)
		EDGE OF CREEK/STREAM OR OHWM



VICINITY MAP
NTS



LOCATION MAP
SCALE: 1:200

SHEET INDEX	
SHEET NO.	SHEET DESCRIPTION
GENERAL	
G-0	COVER
G-1	VICINITY MAP, LOCATION MAP, ABBREVIATIONS AND SYMBOLS, AND SHEET INDEX
G-2	PROPOSED SITE LAYOUT AND GRADING
G-3	GENERATOR PAD PLAN, SECTION, AND DETAILS
ELECTRICAL	
E-1	ELECTRICAL SYMBOLS AND ABBREVIATIONS, TAG LIST AND CABLE AND CONDUIT SCHEDULES
E-2	ELECTRICAL SITE PLAN AND MODIFIED ELECTRICAL ROOM PLAN
E-3	EXISTING AND MODIFIED ONE LINE DIAGRAMS
E-4	PANELBOARD "B" [01 PB 01] SCHEDULE AND LOAD SUMMARY
E-5	PANELBOARD [01 PBX 01] SCHEDULE AND LOAD DISTRIBUTION
ED-1	ELECTRICAL DETAILS

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH,
SUITE 300
SEATTLE, WASHINGTON 98144
(206) 284-0860

MICHAEL B. JOHNSON
STATE OF WASHINGTON
REGISTERED PROFESSIONAL ENGINEER
36498
11/28/22

ABBEY N. McDONALD
STATE OF WASHINGTON
REGISTERED PROFESSIONAL ENGINEER
57857
11/28/22

TOWN OF CATHLAMET
WTP GENERATOR

No.	DATE	REVISION
ISSUED FOR: BID AND CONSTRUCTION		
ISSUE DATE: NOV 2022		
APPROVED BY: MBJ		
CHECKED BY: ANM		
DRAWN BY: MAN		
DESIGNER: ANM		
G & O JOB NO.: 22238		
FILE: MASTERLEGEND.DWG		

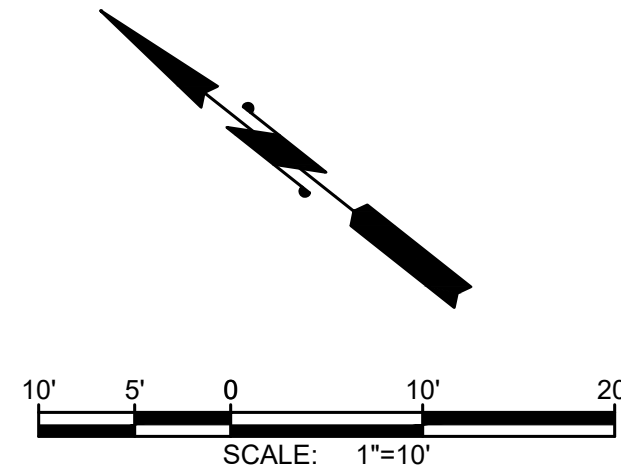
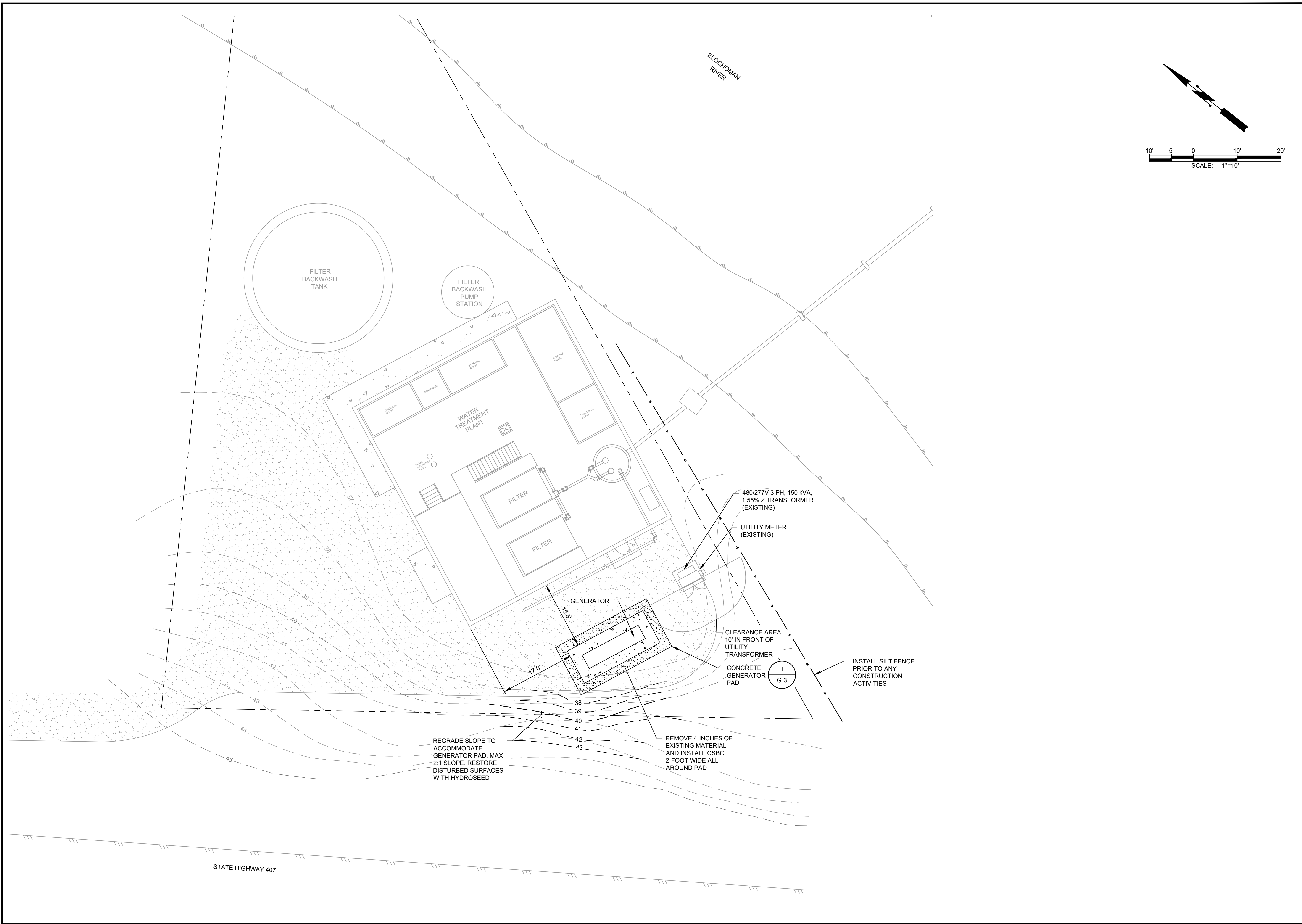
GENERAL

**VICINITY MAP,
LOCATION MAP,
ABBREVIATIONS AND
SYMBOLS, AND SHEET
INDEX**

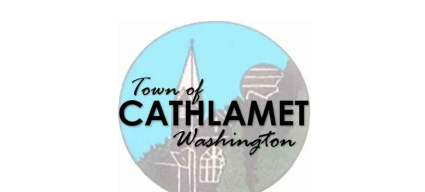
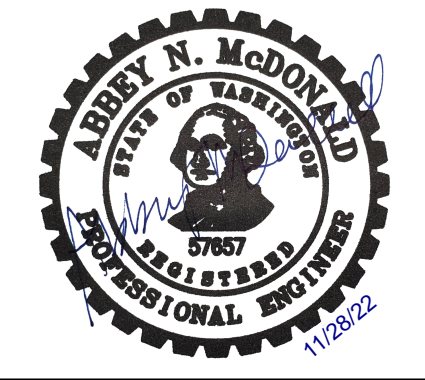
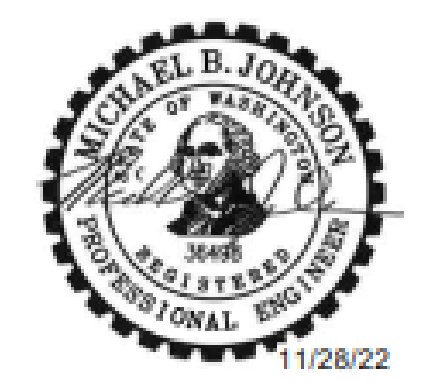
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 (206) 284-0860



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WTP GENERATOR

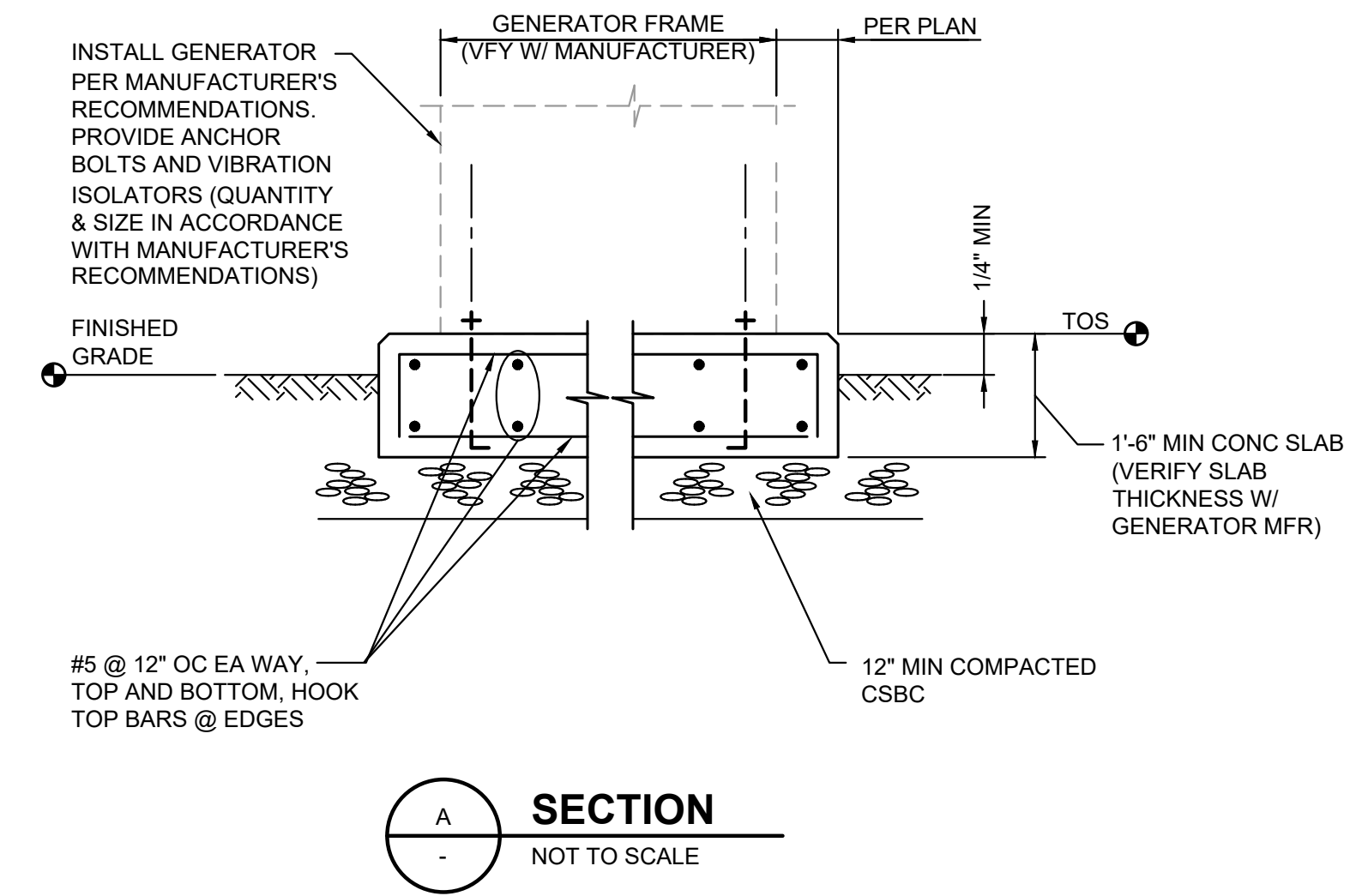
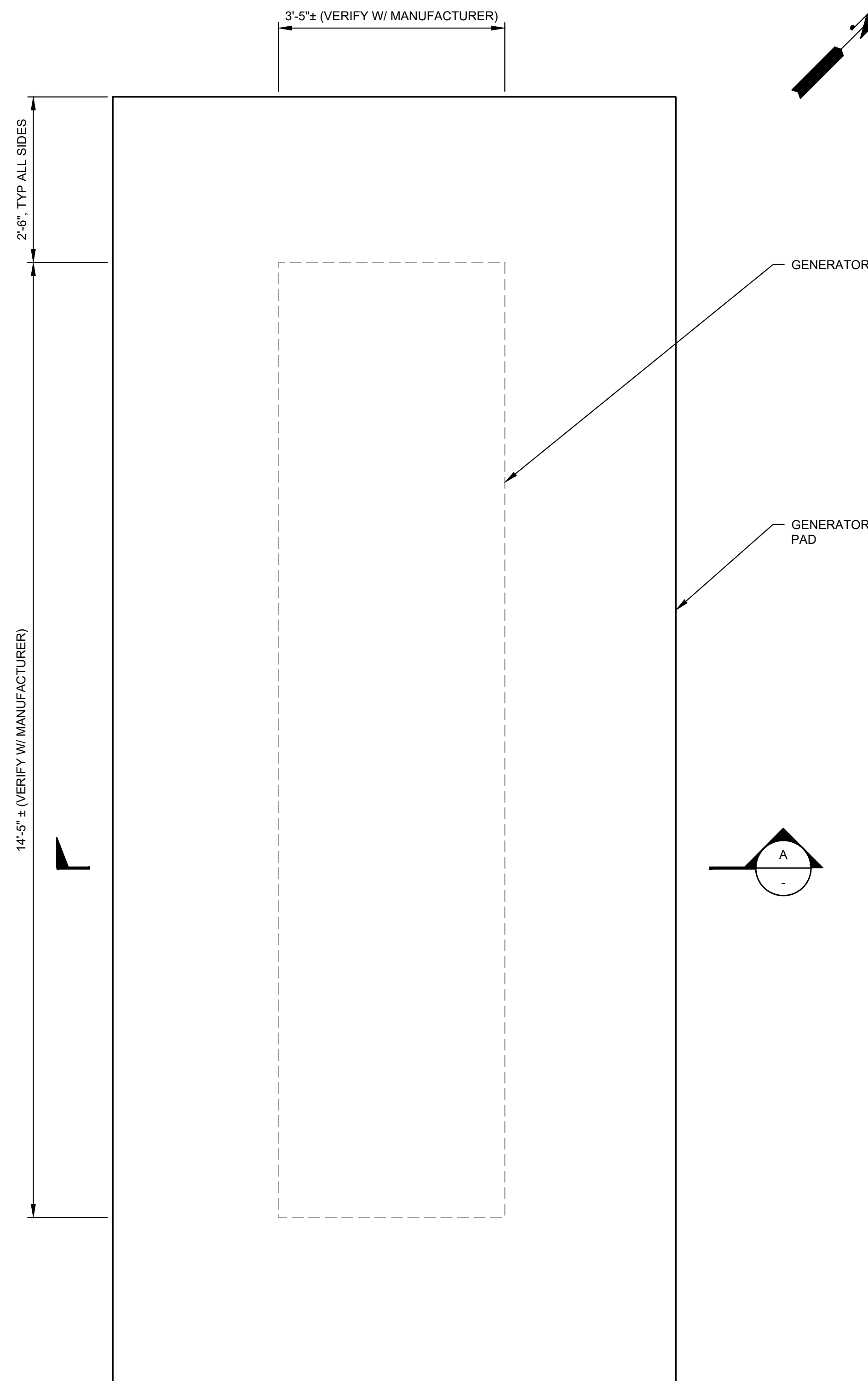
No.	DATE	REVISION
ISSUED FOR: BID AND CONSTRUCTION		
ISSUE DATE: NOV 2022		
APPROVED BY: MBJ		
CHECKED BY: ANM		
DRAWN BY: MAN		
DESIGNER: ANM		
G & O JOB NO.: 22238		
FILE: P-SITE.DWG		

GENERAL

PROPOSED SITE LAYOUT AND GRADING

DRAWING: **G-2** OF: **4**

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GENERAL STRUCTURAL NOTES

GENERAL
 THE GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS BEFORE STARTING WORK. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCY. USE DETAIL MARKED "TYPICAL" WHEREVER APPLICABLE. CHANGES, OMISSIONS OR SUBSTITUTIONS ARE NOT PERMITTED WITHOUT WRITTEN APPROVAL OF THE ENGINEER. REFER TO THE SPECIFICATIONS FOR FURTHER REQUIREMENTS. DO NOT SCALE THE DRAWINGS.

ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE 2018 EDITION OF THE INTERNATIONAL BUILDING CODE.

THE DESIGN, ADEQUACY AND SAFETY OF ERECTION BRACING, SHORING, TEMPORARY SUPPORTS, ETC., IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR, AND HAS NOT BEEN CONSIDERED BY THE ENGINEER OF RECORD. THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE PRIOR TO ITS COMPLETION. THE CONTRACTOR SHALL PROVIDE THE NECESSARY BRACING TO PROVIDE STABILITY PRIOR TO THE COMPLETION OF THE STRUCTURE.

THE GENERAL NOTES APPLY TO ALL STRUCTURES UNLESS NOTED OTHERWISE (U.N.O.). LOCATION AND SIZE OF ANCHOR BOLTS FOR SPECIFIC EQUIPMENT SHALL BE SPECIFIED BY THE VENDOR. CONTRACTOR SHALL COORDINATE LOCATIONS OF STRUCTURAL OPENINGS, PENETRATIONS AND EMBEDDED ITEMS WITH THE MECHANICAL, ARCHITECTURAL, ELECTRICAL, PLUMBING AND VENTILATION SECTIONS OF THE DRAWINGS AND WITH SUPPLIERS AND SUBCONTRACTORS AS MAY BE REQUIRED.

SHOP DRAWINGS
 SHOP DRAWINGS, WHERE REQUIRED, SHALL BE CHECKED AND APPROVED BY THE GENERAL CONTRACTOR PRIOR TO SUBMITTING FOR ENGINEER REVIEW. SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW OF DESIGN INTENT, PRIOR TO FABRICATION. GENERAL CONTRACTOR IS RESPONSIBLE FOR VERIFICATION AND COORDINATION OF DIMENSIONS AND DETAILS FOR EACH SUBCONTRACTOR.

DESIGN LOADS
 EARTHQUAKE DESIGN DATA
 MAPPED SPECTRAL RESPONSE ACCELERATIONS

Ss.....	1.034 g
S1.....	0.528 g

SITE CLASS..... D

SPECTRAL RESPONSE COEFFICIENT

Sds.....	0.827 g
Sdl.....	0.634 g

SEISMIC IMPORTANCE FACTOR, Ie..... 1.5
 RISK CATEGORY..... IV
 SEISMIC DESIGN CATEGORY..... D

EXTEND ALL EXTERIOR FOOTINGS 1'-6" MINIMUM BELOW FINISHED GRADE. UNO (UNLESS NOTED OTHERWISE), BOTTOM OF ALL FOOTINGS TO BEAR ON 12" COMPACTED CSBC OVER NATIVE, INORGANIC, UNDISTURBED SOIL. NO FOOTING SHALL BEAR HIGHER THAN 1 VERTICAL TO 1.5 HORIZONTAL SLOPE ABOVE ANY EXCAVATION, EXISTING OR PLANNED. CONTRACTOR SHALL PROVIDE TEMPORARY SHORING TO PREVENT MOVEMENT OF WALLS IF BACKFILL IS PLACED BEFORE FLOOR SYSTEM IS IN PLACE. THERE SHALL BE 95% COMPACTION (ASTM D1557 MODIFIED PROCTOR DENSITY) OF ALL BACKFILL SOIL UNDER SLABS ON GRADE.

CAST-IN-PLACE CONCRETE
 CONCRETE SHALL HAVE THE FOLLOWING PROPERTIES:
 28-DAY STRENGTH $f_c=4,000$ PSI
 AIR ENTRAINMENT: 5%-7%
 MAXIMUM SLUMP: 3" FOR SLABS FOOTINGS, 4" FOR WALLS, COLUMNS AND BEAMS. CONSTRUCTION TO BE IN ACCORDANCE WITH ACI 318.

SUBMIT MIX DESIGN FOR REVIEW AND PROVIDE NOT LESS THAN 6 SACKS OF CEMENT PER CUBIC YARD FOR ALL CONCRETE WITH MAXIMUM W/C=0.45.

REINFORCING STEEL
 DEFORMED BARS: ASTM A615, GRADE 60 (GRADE 40 FOR #3).
 UNLESS OTHERWISE NOTED ON THESE DRAWINGS, MINIMUM CONCRETE COVER FOR REINFORCING BARS SHALL BE AS FOLLOWS:
 CONCRETE CAST AGAINST SOIL=3".
 FORMED CONCRETE AGAINST SOIL=2".
 WALLS, COLUMNS AND BEAMS EXPOSED TO WATER, SEWAGE & WEATHER=2".
 WALLS, COLUMNS AND BEAMS DRY CONDITION=1 1/2".

PROVIDE 2-#5 MIN. U.N.O. TRIM BARS AROUND ALL OPENINGS IN CONCRETE WALLS OR SLAB EXTENDING 2'-6" PAST CORNERS, TYP. AT TIME OF CONCRETE PLACEMENT, REINFORCING SHALL BE FREE OF MUD, OIL, OR OTHER NONMETALLIC COATINGS THAT MAY DECREASE BOND.

WELDING OF REINFORCING BARS IS NOT PERMITTED.

SUBMIT SHOP DRAWINGS OF REINFORCING STEEL FOR REVIEW BY THE ENGINEER PRIOR TO FABRICATION. REINFORCING SHALL BE DETAILED IN ACCORDANCE WITH ACI 315 AND 318 (LATEST EDITION).

1
GENERATOR PAD PLAN
 G-3 SCALE: 3/4"=1'-0"



TOWN OF CATHLAMET
WTP GENERATOR

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DRAWN BY: MAN		
DESIGNER: ANM		
G & O JOB NO.: 22238		
FILE: GEN-PAD.DWG		

GENERAL

GENERATOR PAD PLAN, SECTION, AND DETAILS

ABBREVIATIONS

A	AMPERE (AMP)	FVNR	FULL VOLTAGE NON REVERSING	LV	LOW VOLTAGE	PT	POTENTIAL TRANSFORMER
AC	ALTERNATING CURRENT	FVR	FULL VOLTAGE REVERSING	M	MAGNETIC CONTACTOR	PVC	POLYVINYL CHLORIDE CONDUIT
AF	BREAKER FRAME SIZE (IN AMPS)	FY	FLOW COMPUTATION	mA	MILLIAMPERES	PVC-RGS	PVC COATED RGS
AI	ANALOG INPUT	G	GROUND CONDUCTOR	MCC	MOTOR CONTROL CENTER	RGS	RIGID GALVANIZED STEEL CONDUIT
AIC	AMPERES-INTERRUPTING CAPACITY	GEC	GROUNDING ELECTRODE CONDUCTOR	MCM	THOUSAND CIRCULAR MILLS	RVSS	REDUCED-VOLTAGE SOFT START
AL	ALUMINUM	GFCI	GROUND FAULT CIRCUIT INTERRUPTER	MCP	MOTOR CIRCUIT PROTECTOR	RTU	REMOTE TELEMETRY UNIT
AM	AMMETER	GND	GROUND	MOV	METAL OXIDE VARISTOR	s	SECOND
AO	ANALOG OUTPUT	H	HORN	MS	MOTOR STARTER	SHD	SHIELDED
AT	BREAKER TRIP (SETTING IN AMPS)	HA	HAND-AUTO	MSDS	MOTOR SAFETY DISCONNECT SWITCH	SPD	SURGE PROTECTION DEVICE
ATS	AUTOMATIC TRANSFER SWITCH	HIM	HUMAN INTERFACE MODULE	MTS	MANUAL TRANSFER SWITCH	SS	STAINLESS STEEL
AWG	AMERICAN WIRE GAUGE	HMI	HUMAN MACHINE INTERFACE	MTU	MASTER TELEMETRY UNIT	SUSE	SUITABLE FOR USE AS A SERVICE ENTRANCE
BATT	BATTERY	HOA	HAND-OFF-AUTO	mV	MILLIVOLT	TB	TERMINAL BLOCK
BKR	BREAKER	HOR	HAND-OFF-REMOTE	MW	MEGAWATT	TDAD	TIME DELAY AFTER DE-ENERGIZATION
CP	CONTROL PANEL	HP	HORSEPOWER	N	NEUTRAL CONDUCTOR	TDAE	TIME DELAY AFTER ENERGIZATION
CPT	CONTROL POWER TRANSFORMER	JCXXX	JUNCTION BOX, CONTROL	NEC	NATIONAL ELECTRICAL CODE	TQS	TORQUE SWITCH
CST	CONTROL STATION	JPXXX	JUNCTION BOX, POWER	NEMA	NATIONAL ELECTRIC MANUFACTURERS ASSOC.	TP	TWISTED PAIR
CT	CURRENT TRANSFORMER	JSXXX	JUNCTION BOX, SIGNAL	NESC	NATIONAL ELECTRICAL SAFETY CODE	TSP	TWISTED SHIELDED PAIR
CU	COPPER	KA	KILOAMPERES	NFPA	NATIONAL FIRE PROTECTION AGENCY	TST	TWISTED SHIELDED TRIAD
DC	DIRECT CURRENT	KAIC	KILOAMPERES-INTERRUPTING CAPACITY	OCPD	OVERCURRENT PROTECTION DEVICE	TT	TWISTED TRIAD
DI	DISCRETE INPUT	KCM	THOUSAND CIRCULAR MILLS	OE	OVERHEAD ELECTRIC	T/M	THERMAL MAGNETIC
DIST	DISTRIBUTION	kV	KILOVOLT	OIU	OPERATOR INTERFACE UNIT	UPS	UNINTERRUPTIBLE POWER SUPPLY
DO	DISCRETE OUTPUT	kVA	KILOVOLT-AMPERE	OL	OVERLOAD, THERMAL	V	VOLT
DTWV	DISCHARGE-TO-WASTE VALVE	kVAh	KILOVOLT-AMPERE HOUR	OLR	OVERLOAD RELAY	VA	VOLT-AMPERE
EIOM	EXTENDED I/O MODULE	kVAR	KILOVAR (REACTIVE KILOVOLT-AMPERE)	P	POLE	VFD	VARIABLE FREQUENCY DRIVE
ETC	ELAPSED TIME/COUNTER METER	kVARh	KILOVAR-HOUR	PF	POWER FACTOR	VMR	VOLTAGE MONITORING RELAY
ETM	ELAPSED TIME METER	kW	KILOWATT	PH	PHASE	W	WATT
ENCL	ENCLOSURE	kWh	KILOWATT-HOUR	PLC	PROGRAMMABLE LOGIC CONTROL	WAN	WIDE AREA NETWORK
EXIST	EXISTING	LA	LIGHTNING ARRESTOR	PMR	PHASE MONITOR RELAY	Wh	WATT-HOUR
FDR	FEEDER	LAN	LOCAL AREA NETWORK	PMU	POWER MONITOR UNIT	WP	WEATHER PROOF
FLA	FULL LOAD AMPS	LFMC	LIQUIDTIGHT FLEXIBLE METAL CONDUIT	POT	POTENTIOMETER	XFMR	POWER TRANSFORMER
FU	FUSE	LINE	POWER LINE/POWER BLOCK				

SYMBOL LEGEND

PLAN SYMBOLS	ELEMENTARY WIRING DIAGRAM SYMBOLS	ONE LINE SYMBOLS
CONDUIT DOWN	CONNECTION POINT	CAPACITOR
CONDUIT UP	TERMINAL POINT	REACTOR/CHOKE
CONDUIT STUB UP/END CAP	SCREW TERMINAL	CIRCUIT BREAKER, MAGNETIC ONLY
DISCONNECT SWITCH	MOUNTED ON OUTER DOOR	CIRCUIT BREAKER, THERMAL-MAGNETIC
FUSED DISCONNECT SWITCH	MOUNTED ON INNER DOOR	CONNECTION POINT
COMMUNICATION OUTLET	LOCKABLE DEVICE	CONTACTOR
TELEPHONE OUTLET	NC CONTACT	CURRENT TRANSFORMER
SPECIAL OUTLET	NC CONTACTOR	FUSE
SIMPLEX RECEPTACLE	NO CONTACT	FUSIBLE DISCONNECT
DUPLEX RECEPTACLE	NO CONTACTOR	ANALOG AMMETER
DUPLEX RECEPTACLE (HIDDEN)	NO. TEMPERATURE SWITCH	THERMAL OVERLOAD RELAY
QUAD RECEPTACLE	N.C. TEMPERATURE SWITCH	GROUND EQUIPMENT/CHASSIS
QUAD RECEPTACLE (HIDDEN)	N.O. TEMPERATURE SWITCH	SOLID NEUTRAL
FLOOR MOUNTED RECEPTACLE	N.C. TEMPERATURE SWITCH	TRANSFORMER
LED LIGHT POLES SINGLE DUAL	N.O. PRESSURE SWITCH	
CROSSMARKS INDICATE QUANTITY AND USE OF CONDUCTORS	N.C. PRESSURE SWITCH	
LIGHT SWITCH, X = 3 = 3-WAY K = KEY 4 = 4-WAY M = MOTION	N.O. LIMIT SWITCH	
SEAL OFF	N.C. LIMIT SWITCH	
MOTOR X = HORSE POWER	N.O. FLOW SWITCH	
XX= CV CHECK VALVE FE FLOW ELEMENT FI FLOW INDICATOR FIT FLOW INDICATOR/TRANSMITTER FS FLOW SWITCH FT FLOW TRANSMITTER HD HEAT DETECTOR IS INTRUSION SWITCH J JUNCTION BOX L LIMIT SWITCH LE LEVEL ELEMENT LI LEVEL INDICATOR LIT LEVEL INDICATOR/TRANSMITTER LS LEVEL SWITCH/FLOAT LT LEVEL TRANSDUCER MDT MOTION DETECTOR MFM MAGNETIC FLOW METER MOV MOTOR OPERATOR VALVE PC PHOTO CELL PE PRESSURE ELEMENT PI PRESSURE INDICATOR PIT PRESSURE INDICATOR TRANSMITTER PS PRESSURE SWITCH PT PRESSURE TRANSMITTER SD SMOKE DETECTOR SV SOLENOID VALVE T THERMOSTAT	XXXXX CONDUIT XX XXXX XX TAG LABEL GFCI GFCI PANELBOARD CIRCUIT X AREA ID TAG XXXXX DEMOLITION (DEMO) // // // // INTRINSICALLY SAFE AREA // // // // CLEARANCE AREA	

GENERAL ELECTRICAL NOTES:

SITE AND BUILDING PLANS:

- CONDUIT ROUTING IS SHOWN FOR CLARITY. ACTUAL ROUTING MAY BE MORE DIRECT AND IS LEFT TO THE CONTRACTOR FOLLOWING SPECIFICATIONS 16130. NON-ELECTRICAL BURIED PIPING HAS ROUTING PRIORITY OVER ELECTRICAL BURIALS.
- ALL TRENCHING SHALL BE PER ELECTRICAL TRENCHING DETAIL, REFERENCE ED-SHEETS.
- THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY TO PROTECT EXISTING UTILITIES.
- THROUGHOUT THIS DOCUMENT, THE TERMS "DEMO" AND "DEMOLISH" MEAN TO REMOVE, THEN WASTEHAUL OR RETURN TO THE OWNER, PER THE OWNER'S DIRECTION.

INDOOR INSTALLATIONS:

- ALL EXPOSED PORTIONS OF CONDUITS FROM UNDERGROUND SHALL BE RGS. ALL OVERHEAD CONDUITS SHALL BE EMT.
- PANELS MOUNTED ON INTERIOR WALLS SHALL BE SUPPORTED TO THE WALL WITH 1/2-INCH (MINIMUM) GALVANIZED UNISTRUT.

PULLBOX/VAULT/OUTDOOR INSTALLATIONS:

- ALL MOUNTING FASTENERS (NUTS, BOLTS SCREWS, WASHERS, ETC.) SHALL BE 316 STAINLESS STEEL.
- ALL MOUNTING BRACKETS AND BRACING SHALL BE 316L STAINLESS STEEL.
- ALL EXPOSED PORTIONS OF CONDUITS SHALL BE PVC-COATED RGS UNLESS SPECIFICALLY NOTED OTHERWISE.
- CONSTRUCTION PRIORITY SHALL BE TO ENTER THE BOTTOM OF ENCLOSURES. ALL CONNECTION INTO ENCLOSURES SHALL BE WATERTIGHT. WHERE SIDE OR TOP ENTRY IS USED CONNECTIONS SHALL BE MADE USING MYERS-TYPE HUBS. REFERENCE SPECIFICATION 16130.
- PANELS MOUNTED ON VERTICAL WALLS SHALL BE SUPPORTED TO THE WALL WITH 1/2-INCH (MINIMUM) 316L STAINLESS STEEL UNISTRUT.
- ENCLOSURE SHALL INCLUDE WELDED MOUNTING TABS. HOLES SHALL NOT BE DRILLED THROUGH ENCLOSURE SURFACES FOR MOUNTING PURPOSE.

CABLE AND CONDUIT NOTES:

- REFERENCE SPECIFICATION 16120 FOR CONDUCTORS, INSTRUMENTATION, COMMUNICATION, AND OTHER SPECIAL CABLES AND CONDUITS.
- REFERENCE SPECIFICATION 16130 FOR RACEWAYS, BOXES, AND JUNCTION BOX TYPES, AND HANDHOLE, PULLBOX, AND VAULT CONDUIT INSTALLATION METHODS.
- CONDUIT NUMBERS ARE FORMATTED AS:
TAANN(S) WHERE: T = TYPE (P=POWER; C=CONTROL; S=SIGNAL/INSTRUMENTATION)
AA= AREA NUMBER (01-99)
NN= CONDUIT NUMBER WITHIN THE AREA (01-99)
S = SPARE CONDUIT (~ "TILDE") (IF APPLICABLE)

- P0319~ = AREA 03 POWER CONDUIT NO. 19, SPARE
- C0112 = AREA 01 CONTROL CONDUIT NO. 12
- S0521~ = AREA 05 INSTRUMENTATION CONDUIT NO. 21, SPARE

- CABLE AND CONDUIT SCHEDULES:
4.1. THE CABLE AND CONDUIT SCHEDULE PROVIDES CONDUIT NUMBER, SOURCE, DESTINATION, AND SIZE AS WELL AS CONDUCTOR AND CABLE REQUIREMENTS. REFERENCE SPECIFICATION 16130 FOR CONDUIT COMPOSITION AND COATING.

SHEET LIST	
SHEET	SHEET DESCRIPTION
E-1	ELECTRICAL SYMBOLS AND ABBREVIATIONS, TAG LIST AND CABLE AND CONDUIT SCHEDULES
E-2	ELECTRICAL SITE PLAN AND MODIFIED ELECTRICAL ROOM PLAN
E-3	EXISTING AND MODIFIED ONE LINE DIAGRAMS
E-4	PANELBOARD "B" [01 PB 01] SCHEDULE AND LOAD SUMMARY
E-5	PANELBOARD [01 PBX 01] SCHEDULE AND LOAD DISTRIBUTION
ED-1	ELECTRICAL DETAILS

DEVICE TAG LIST		
TAG ID#	TAG DESCRIPTION	VINTAGE
01 ATS 01	AUTOMATIC TRANSFER SWITCH	NEW
01 CP 01	CONTROL PANEL, PLC	EXISTING
01 GADP 01	GENERATOR AUXILIARY DISTRIBUTION PANEL	NEW
01 GCB 01	GENERATOR CIRCUIT BREAKER NO. 1	NEW
01 GCB 02	GENERATOR CIRCUIT BREAKER NO. 2	NEW
01 GCP 01	GENERATOR CONTROL PANEL	NEW
01 GEN 01	GENERATOR	NEW
01 MCC 01	MOTOR CONTROL CENTER	EXISTING
01 MTS 01	MANUAL TRANSFER SWITCH	EXISTING
01 PB 01	PANELBOARD - 480/277V 3 PH PANEL "B"	EXISTING
01 PBX 01	TRANSFORMER/PANELBOARD 480:240 1 PH 5 KVA	NEW
01 SDB 01	SYSTEM DISCONNECT CIRCUIT BREAKER	EXISTING

POWER CABLE AND CONDUIT SCHEDULE					
NUMBER	SOURCE	DESTINATION	SIZE	CONDUCTORS	NOTES
P0101	[01 ATS 01], AUTOMATIC TRANSFER SWITCH	[01 GEN 01], GENERATOR	2 1/2"	3X 250 KCM XHHW-2; 1X #1 AWG XHHW-2 N; 1X #3 AWG XHHW-2 G	
P0102	[01 PB 01], PANELBOARD - 480/277V 3 PH PANEL "B"	[01 PBX 01], TRANSFORMER/PANELBOARD 480:240 1 PH 5 KVA	3/4"	2X #12 AWG XHHW-2; 1X #12 AWG XHHW-2 N; 1X #12 AWG XHHW-2 G	
P0103	[01 PBX 01], TRANSFORMER/PANELBOARD 480:240 1 PH 5 KVA	[01 GADP 01], GENERATOR AUXILIARY DISTRIBUTION PANEL	3/4"	2X #12 AWG XHHW-2; 1X #12 AWG XHHW-2 N; 1X #12 AWG XHHW-2 G	
P0104	[01 SDB 01], SYSTEM DISCONNECT CIRCUIT BREAKER	[01 ATS 01], AUTOMATIC TRANSFER SWITCH	3"	3X 350 KCM XHHW-2; 1X 350 KCM XHHW-2 N; 1X #1 AWG XHHW-2 G	EXISTING WIRING AND CONDUIT : RE-USE ASSUMED
P0105	[01 SDB 01], SYSTEM DISCONNECT CIRCUIT BREAKER	[01 ATS 01], AUTOMATIC TRANSFER SWITCH	3"	3X 350 KCM XHHW-2; 1X 350 KCM XHHW-2 N; 1X #1 AWG XHHW-2 G	EXISTING WIRING AND CONDUIT : RE-USE ASSUMED.
P0106	[01 ATS 01], AUTOMATIC TRANSFER SWITCH	[01 MCC 01], MOTOR CONTROL CENTER	3"	3X 350 KCM XHHW-2; 1X 350 KCM XHHW-2 N; 1X #1 AWG XHHW-2 G	EXISTING WIRING AND CONDUIT : RE-USE ASSUMED.
P0107	[01 ATS 01], AUTOMATIC TRANSFER SWITCH	[01 MCC 01], MOTOR CONTROL CENTER	3"	3X 350 KCM XHHW-2; 1X 350 KCM XHHW-2 N; 1X #1 AWG XHHW-2 G	EXISTING WIRING AND CONDUIT : RE-USE ASSUMED.

NOTES FOR POWER CABLE AND CONDUIT SCHEDULE:

- THESE DRAWINGS WERE PREPARED ASSUMING THE CONTRACTOR RE-USES WIRING AND CONDUIT FOR POWER CONDUITS [P0104], [P0105], [P0106], AND [P0107]. THE CONTRACTOR IS ENCOURAGED TO FIELD-VERIFY THE EXISTING CONDUCTORS AND CONDUITS AND PREPARE HIS OR HER BID ACCORDINGLY.

CONTROL CABLE AND CONDUIT SCHEDULE					
NUMBER	SOURCE	DESTINATION	SIZE	CONDUCTORS	NOTES
C0101	[01 ATS 01], SWITCH, AUTOMATIC TRANSFER 600A, 480V 3 PH	[01 GCP 01] GENERATOR CONTROL PANEL	3/4"	6X #14 AWG XHHW-2	INCLUDES 4 SPARES.
C0102~	[01 CP 01] PLC CONTROL PANEL	[01 GCP 01] GENERATOR CONTROL PANEL	3/4"	PULL WIRE	SPARE CONDUIT

NOTE: THIS IS A GENERAL LEDGER SHEET. ALL SYMBOLS MAY NOT APPLY.

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH,
SUITE 300
SEATTLE, WASHINGTON 98144
(206) 284-0860

DAVID ALAN CALKINS
STATE OF WASHINGTON
REGISTERED PROFESSIONAL ENGINEER
43240
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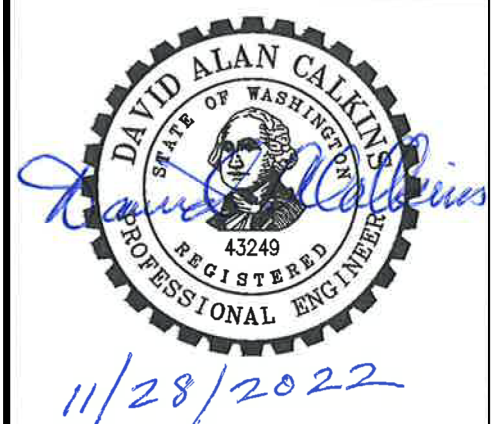
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DESIGNER: DAC
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ELECTRICAL

ELECTRICAL SYMBOLS AND ABBREVIATIONS, TAG LIST AND CABLE AND CONDUIT SCHEDULES

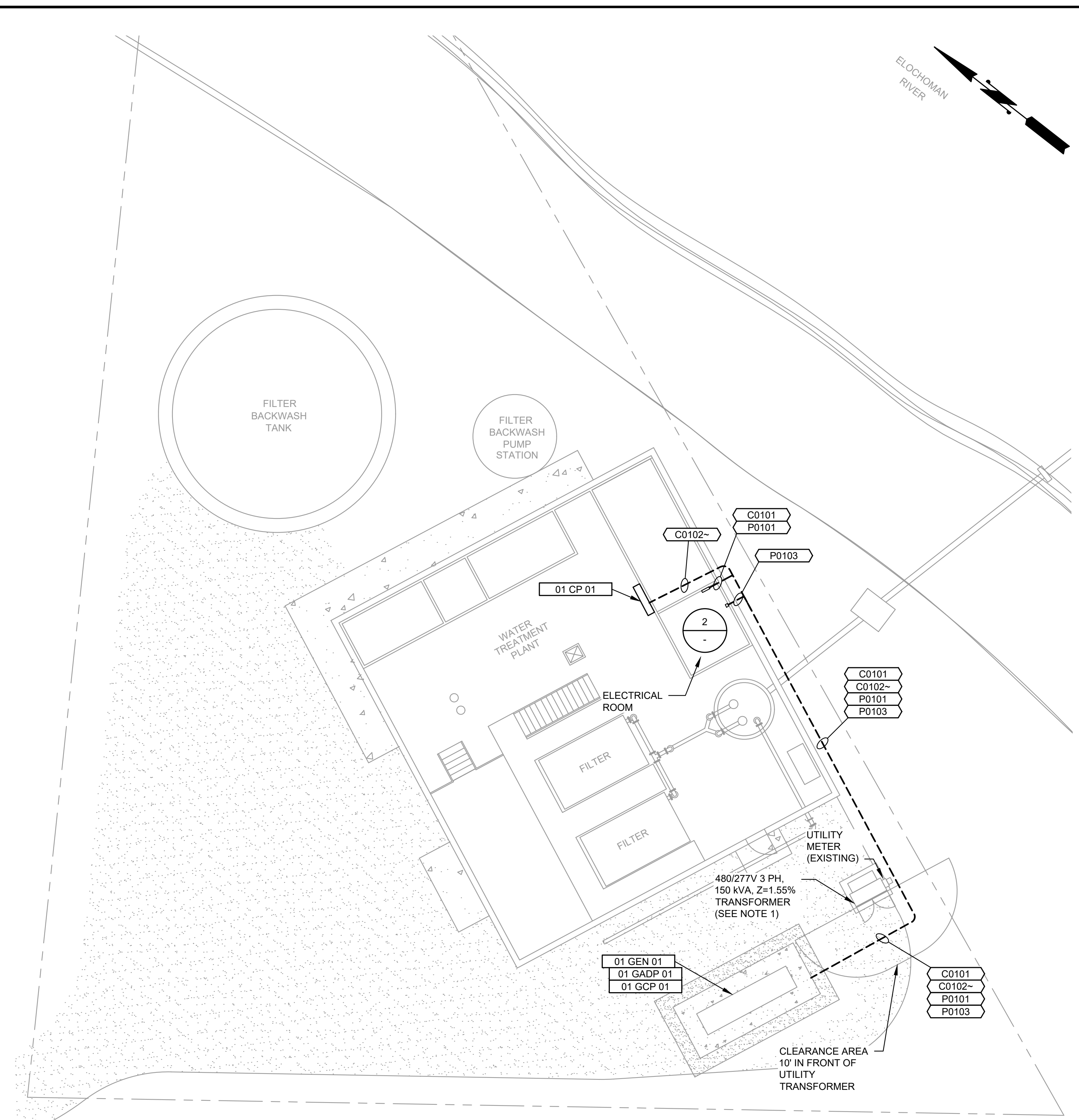
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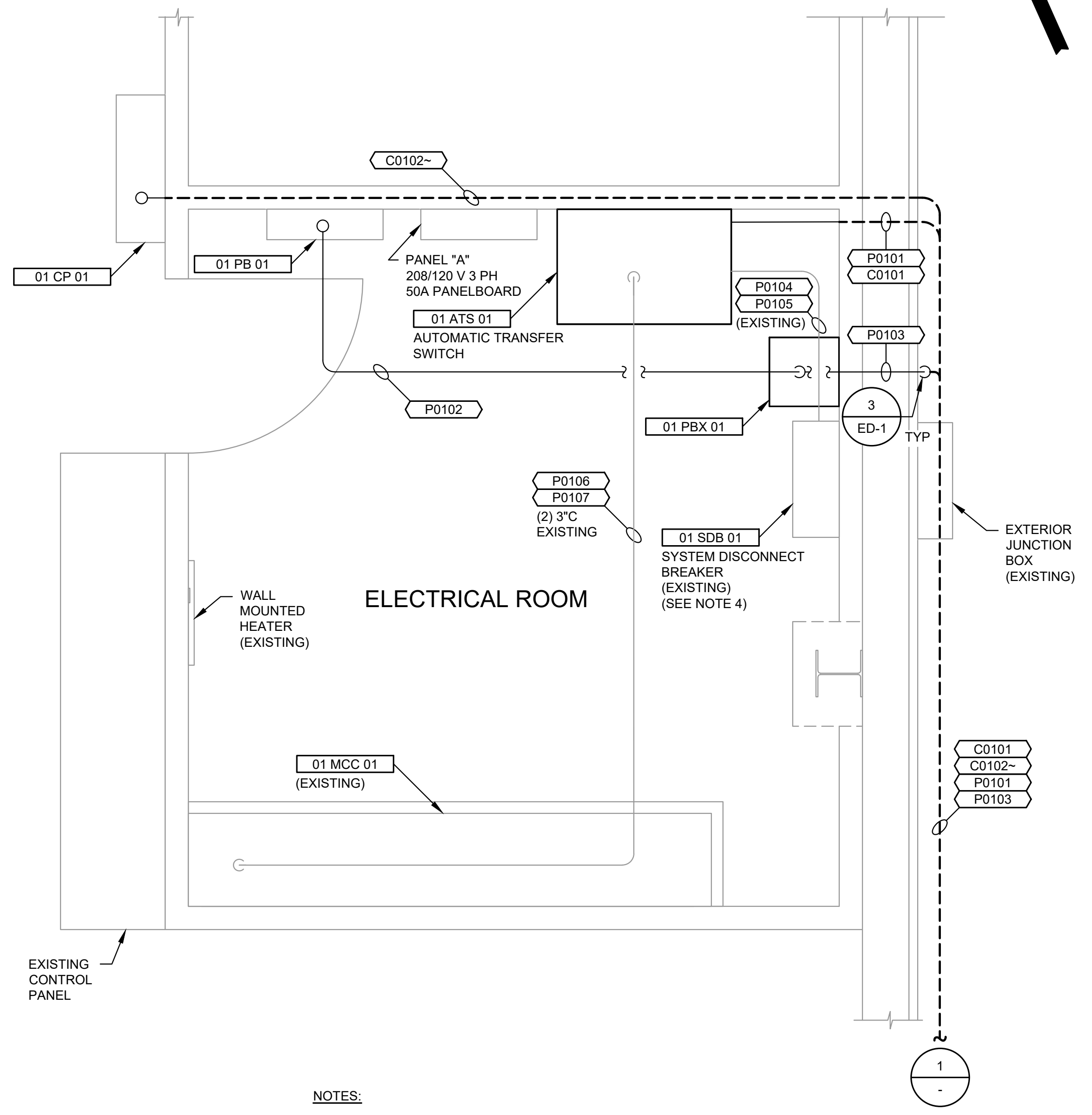
ELECTRICAL

ELECTRICAL SITE PLAN AND MODIFIED ELECTRICAL ROOM PLAN



- NOTES:**
- CONTRACTOR SHALL MAINTAIN PUD REQUIREMENTS FOR SEPARATION BETWEEN TRANSFORMER AND BURIED CONDUITS.

1 SITE ELECTRICAL PLAN
 SCALE: 1"=10'-0"

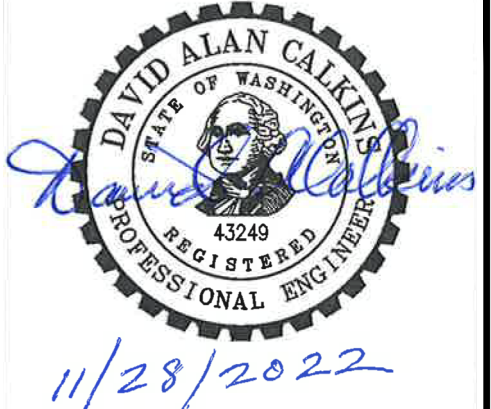


- NOTES:**
- POWER FEED FROM THE UTILITY TRANSFORMER TO THE SYSTEM DISCONNECT CIRCUIT BREAKER NOT SHOWN HERE.
 - SPARE CONDUIT BETWEEN PLC CONTROL PANEL [01 CP 01] AND GENERATOR CONTROL PANEL [01 GCP 01] IS FOR FUTURE CONTROL WORK TO BE PERFORMED BY THE OWNER.
 - DEMOLITION NOT SHOWN HERE, REFERENCE EXISTING ONE LINE DIAGRAM.
 - FIELD LOCATE EXISTING GROUND SYSTEM FROM SUSE POINT TO MAKE NEW CONNECTIONS AS SHOWN ON E-3.

2 MODIFIED ELECTRICAL ROOM PLAN
 SCALE: 3/4"=1'-0"

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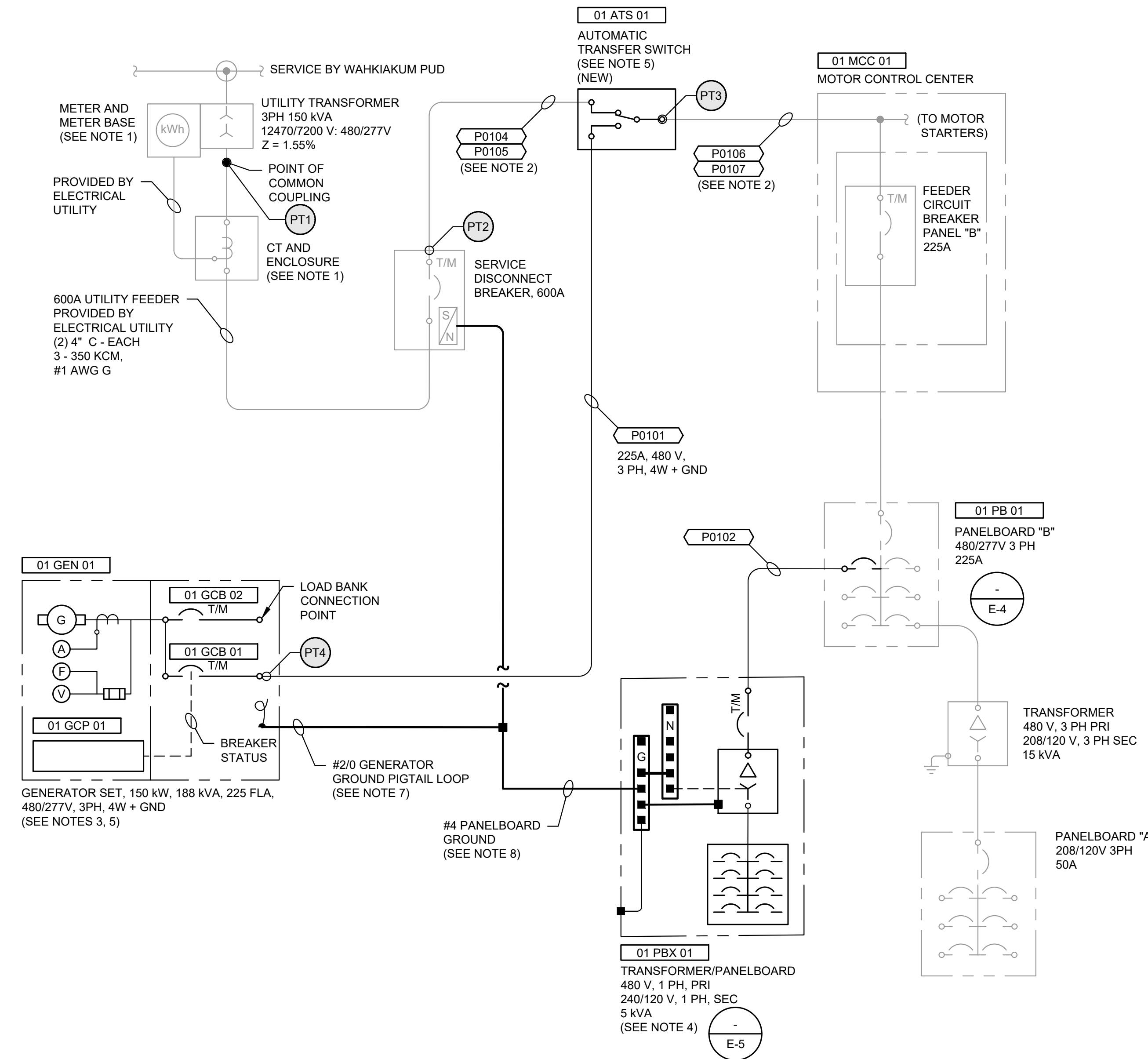
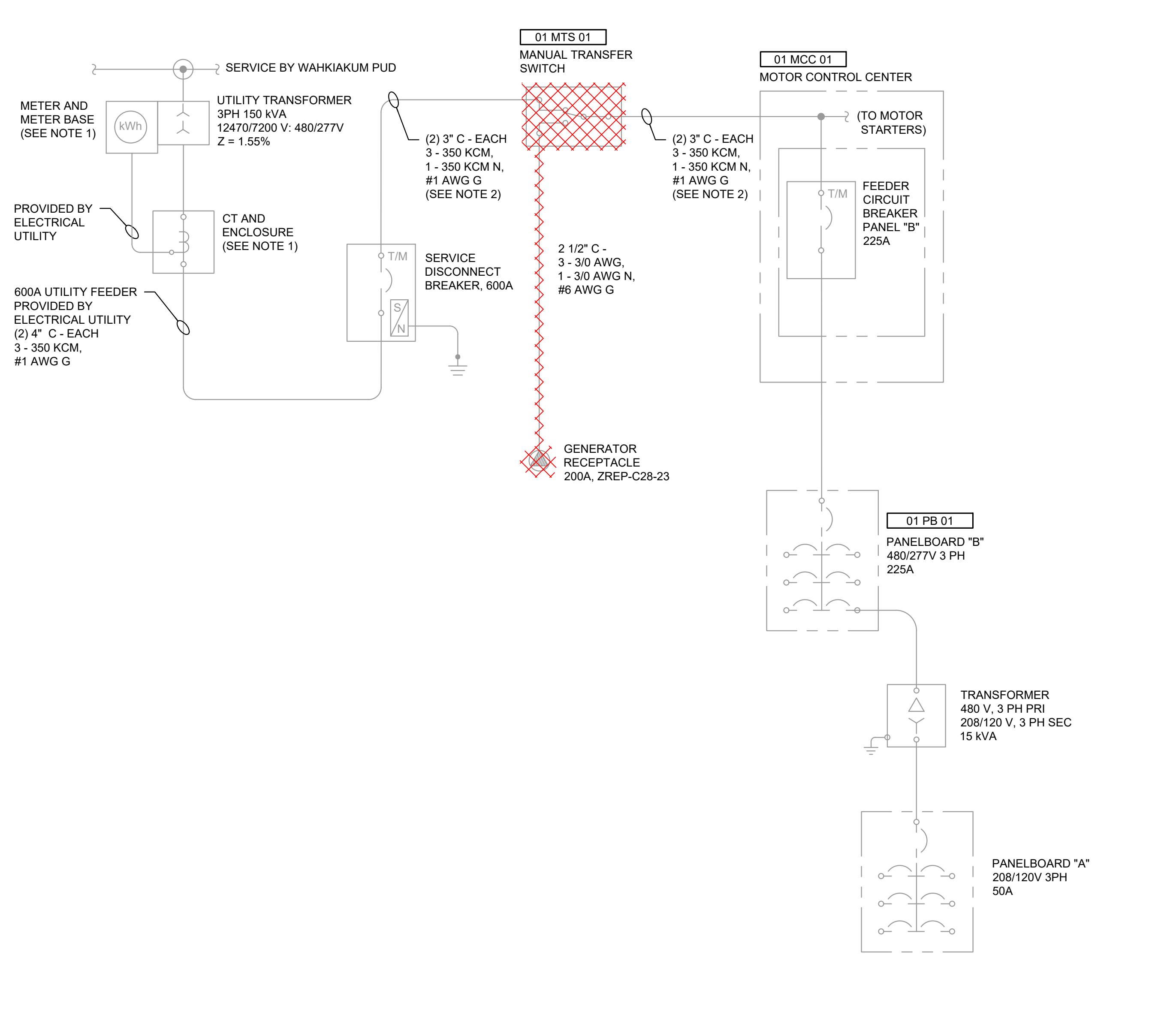
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**ELECTRICAL
EXISTING AND
MODIFIED ONE LINE
DIAGRAMS**



NOTES:

- CURRENT SENSING CTs AND REVENUE METER ARE EXISTING, PROVIDED BY THE POWER UTILITY COMPANY.
- CONDUIT AND CONDUCTORS ARE EXISTING TO BE REUSED, REFERENCE CABLE AND CONDUIT SCHEDULE, SHEET E-1, FOR RENUMBERING AND NEW CONNECTION LOCATIONS.
- GENERATOR CIRCUIT BREAKER [01 GCB 01] SHALL BE PROVIDED WITH A LOCKABLE HANDLE AND AN AUXILIARY CONTACT THAT OPENS WHEN THE BREAKER IS IN ITS OPEN/TRIPPED POSITION. THIS CIRCUIT SHALL BE PREWIRED BY THE GENERATOR MANUFACTURER TO THE GENERATOR CONTROL PANEL [01 GCP 01] IN LFMC CONDUIT. REFERENCE SPECIFICATIONS.
- [01 PBX 01] SHALL BE A COMPLETE 5 kVA TRANSFORMER/LOAD CENTER COMBINATION WITH INTEGRAL PRIMARY AND SECONDARY PROTECTION, 20 kAIC (MIN) RATED, IN NEMA 3R ENCLOSURE. SQUARE D MINI-POWERZONE MPZ5S4 SERIES OR EQUAL.
- NEUTRAL CONDUCTORS SHALL BE PROVIDED FROM THE SUSE NEUTRAL IN [01 SDB 01] TO [01 GEN 01] THROUGH [01 ATS 01]. NEUTRALS ARE NOT SWITCHED IN THE ATS UNIT.
- THREE PHASE SHORT CIRCUIT BOLTED FAULT CALCULATIONS ARE BASED ON INFINITE UTILITY CONTRIBUTION, +10% VARIANCE IN UTILITY VOLTAGE, -10% VARIANCE IN TRANSFORMER IMPEDANCE, AND A 150 kVA TRANSFORMER WITH 1.55% ASSUMED IMPEDANCE. FAULT CALCULATIONS ALSO INCLUDE 2,714 AIC MOTOR REGENERATIVE CONTRIBUTION FROM THE 13 MOTORS ADDED TO EACH FAULT POINT. ALL CALCULATIONS ARE BASED ON 480 V.
- PROVIDE A GROUND PIGTAIL FROM THE GROUND LOOP JUST UNDER GENERATOR CIRCUIT BREAKER [01 GCB 01]. CONNECT TO GENERATOR GROUND BUS IF REQUIRED BY L&I INSPECTOR.
- RUN #4 AWG TO EXISTING GROUND LOOP.

BOLTED FAULT TABLE

FAULT POINT	3PH SHORT CIRCUIT VALUES
PT1	17.7 kAIC
PT2	16.1 kAIC
PT3	15.7 kAIC
PT4	3.1 kAIC

(SEE NOTE 6)

POWER DEVICE SIZING

TAG NUMBER	RATED VOLTAGE	OPERATING VOLTAGE	POLES/ PHASES	AMPACITY	MIN. INTERRUPT AND WITHSTAND RATING	ENCLOSURE TYPE
01 ATS 01	600 V	480 V	3	600 A	35 kAIC	NEMA 1 GASKETED
01 GCB 01	600 V	480 V	3	225AT/ 250AF	10 kAIC	IN [01 GEN 01]
01 GCB 02	600 V	480 V	3	225AT/ 250AF	10 kAIC	IN [01 GEN 01]

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PANELBOARD "B" [01 PB 01] SCHEDULE																					
CKT. NO.	DIRECTORY	PHASE A		PHASE B		PHASE C		LOAD TYPE	BKR AMPS	BUS	BKR AMPS	LOAD TYPE	PHASE A		PHASE B		PHASE C		DIRECTORY	CKT. NO.	
		VA	A	VA	A	VA	A						VA	A	VA	A	VA	A			
1	UH-1 UNIT HEATER	2,667	9.6					H	3/20	A	3/20	H	2,667	9.6					UH-3 UNIT HEATER	2	
3	UH-1 UNIT HEATER			2,667	9.6			H		B		H			2,667	9.6			UH-3 UNIT HEATER	4	
5	UH-1 UNIT HEATER					2,667	9.6	H		C		H					2,667	9.6	UH-3 UNIT HEATER	6	
7	UH-2 UNIT HEATER	2,667	9.6					H	3/20	A	3/20	H	2,667	9.6					UH-4 UNIT HEATER	8	
9	UH-2 UNIT HEATER			2,667	9.6			H		B		H			2,667	9.6			UH-4 UNIT HEATER	10	
11	UH-2 UNIT HEATER					2,667	9.6	H		C		H					2,667	9.6	UH-4 UNIT HEATER	12	
13	PANEL "A"	5,000	18.0					Z	3/25	A	1/20	H	3,463	12.5					WH-1 WALL HEATER	14	
15	PANEL "A"			5,000	18.0			Z		B	1/20	H			3,463	12.5			WH-2 WALL HEATER	16	
17	PANEL "A"					5,000	18.0	Z		C	1/20	H					3,463	12.5	WH-3 WALL HEATER	18	
19	LOWER ROOM LIGHTS	4,432	16.0					L	1/20	A	1/20	H	3,463	12.5					WH-4 WALL HEATER	20	
21	PROCESS LIGHTING			4,432	16.0			L	1/20	B	1/20	H			3,463	12.5			WH-5 WALL HEATER	22	
23	UPPER LIGHTS					4,432	16.0	L	1/20	C	1/20	L					360	1.3	LIGHTING INVERTER	24	
25	OUTDOOR LIGHTS	104	0.4					L	1/20	A	1/20	Z	-	-					SPARE BREAKER	26	
27	SPARE BREAKER			-	-			Z	1/20	B	1/20	Z			-	-			SPARE BREAKER	28	
29	SPARE BREAKER					-	-	Z	1/20	C	1/20	Z					-	-	SPARE BREAKER	30	
31	[01 PBX 01], TRANSFORMER/PANELBOARD 480:240 1 PH 5 KVA	2,500	10.4					Z	2/20	A	---	Z	-	-					COVERED SPACE	32	
33	[01 PBX 01], TRANSFORMER/PANELBOARD 480:240 1 PH 5 KVA			2,500	10.4			Z		B	---	Z			-	-			COVERED SPACE	34	
35	COVERED SPACE					-	-	Z	---	C	---	Z					-	-	COVERED SPACE	36	
37	COVERED SPACE	-	-					Z	---	A	---	Z	-	-					COVERED SPACE	38	
39	COVERED SPACE			-	-			Z	---	B	---	Z			-	-			COVERED SPACE	40	
41	COVERED SPACE					-	-	Z	---	C	---	Z					-	-	COVERED SPACE	42	
	SUM OF PHASE LOADS	17,369	64.1	17,265	63.7	14,765	53.3						12,260	44.2	12,260	44.2	9,157	33.0	SUM OF PHASE LOADS		

NOTES:

- THE CONTRACTOR SHALL PROVIDE A TYPED PANELBOARD SCHEDULE FOR ALL ACTUAL LOAD ASSIGNMENTS.
- AIC RATING OF BRANCH CIRCUIT BREAKERS MAY BE REDUCED WHEN SUBMITTED TO ENGINEERING IF THEY ARE SHOWN TO BE PART OF A TESTED AND LISTED COMBINATION WITH MAIN PANELBOARD BREAKER AND COMPLIANT TO NEC 240.86 AND MARKED PER NEC 110.22. BRANCH BREAKERS SHALL BE NO LESS THAN 10 KAIC.
- PANELBOARD [01 PB 01] VALUES ARE BASED UPON A FIELD VISIT OF THE ENGINEER AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR.

LEGEND:

GFCI DENOTES GFCI PANELBOARD CIRCUIT BREAKER.

LOAD DISTRIBUTION:

	AMPS	VA	%
BY PHASE:			
TOTAL LOAD, PHASE A:	108.3 A	29,629 VA	35.8%
TOTAL LOAD, PHASE B:	108.0 A	29,525 VA	35.7%
TOTAL LOAD, PHASE C:	86.3 A	23,922 VA	28.5%
BY LOAD TYPE:			
TOTAL LIGHTING (L):		13,760 VA	16.6%
TOTAL MOTOR (M):		0 VA	0.0%
TOTAL HVAC (H):		49,315 VA	59.4%
TOTAL RECEPTACLE (R):		0 VA	0.0%
TOTAL OTHER (Z):		20,000 VA	24.1%
TOTAL CONNECTED LOAD:		83.08 kVA	100.0%
TOTAL CALCULATED (NEC) LOAD:		86.52 kVA	

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH,
SUITE 300
SEATTLE, WASHINGTON 98144
(206) 284-0860

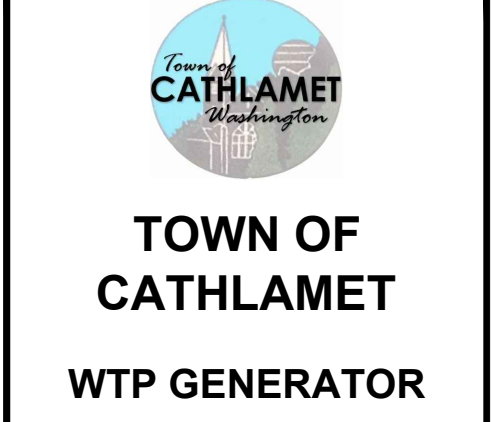
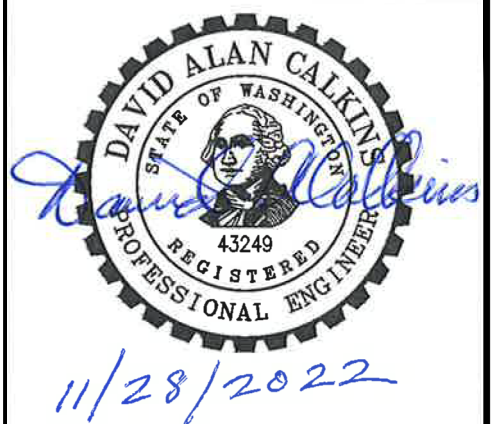
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WTP GENERATOR

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ELECTRICAL

PANELBOARD "B"
[01 PB 01]
SCHEDULE AND
LOAD SUMMARY



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ISSUED FOR: BID AND CONSTRUCTION		
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FILE: E_PB_118.DWG		

ELECTRICAL

**PANELBOARD
[01 PBX 01]
SCHEDULE
AND LOAD
DISTRIBUTION**

PANELBOARD [01 PBX 01] SCHEDULE																
CKT. NO.	DIRECTORY	PHASE A		PHASE B		LOAD TYPE	BKR AMPS	BUS	BKR AMPS	LOAD TYPE	PHASE A		PHASE B		DIRECTORY	CKT. NO.
		VA	A	VA	A						VA	A	VA	A		
1	[01 GCP 01], PANEL, GENERATOR CONTROL, GENERATOR 150 KW 480/277 V 3 PH DIESEL SET	1,250	10.4			Z	2/20	A	1/20	Z	-	-			SPARE BREAKER	2
3	[01 GCP 01], PANEL, GENERATOR CONTROL, GENERATOR 150 KW 480/277 V 3 PH DIESEL SET			1,250	10.4	Z		B	1/20	Z			-	-	SPARE BREAKER	4
5	SPARE BREAKER	-	-			Z	1/20	A	1/20	Z	-	-			SPARE BREAKER	6
7	SPARE BREAKER			-	-	Z	1/20	B	1/20	Z			-	-	SPARE BREAKER	8
9	SPARE BREAKER	-	-			Z	1/20	A	1/20	Z	-	-			SPARE BREAKER	10
11	SPARE BREAKER			-	-	Z	1/20	B	1/20	Z			-	-	SPARE BREAKER	12
13	SPARE BREAKER	-	-			Z	1/20	A	1/20	Z	-	-			SPARE BREAKER	14
15	SPARE BREAKER			-	-	Z	1/20	B	1/20	Z			-	-	SPARE BREAKER	16
	SUM OF PHASE LOADS	1,250	10.4	1,250	10.4						0	0.0	0	0.0	SUM OF PHASE LOADS	

NOTES:

- THE CONTRACTOR SHALL PROVIDE A TYPED PANELBOARD SCHEDULE FOR ALL ACTUAL LOAD ASSIGNMENTS.

LEGEND:

GFCI DENOTES GFCI PANELBOARD CIRCUIT BREAKER.

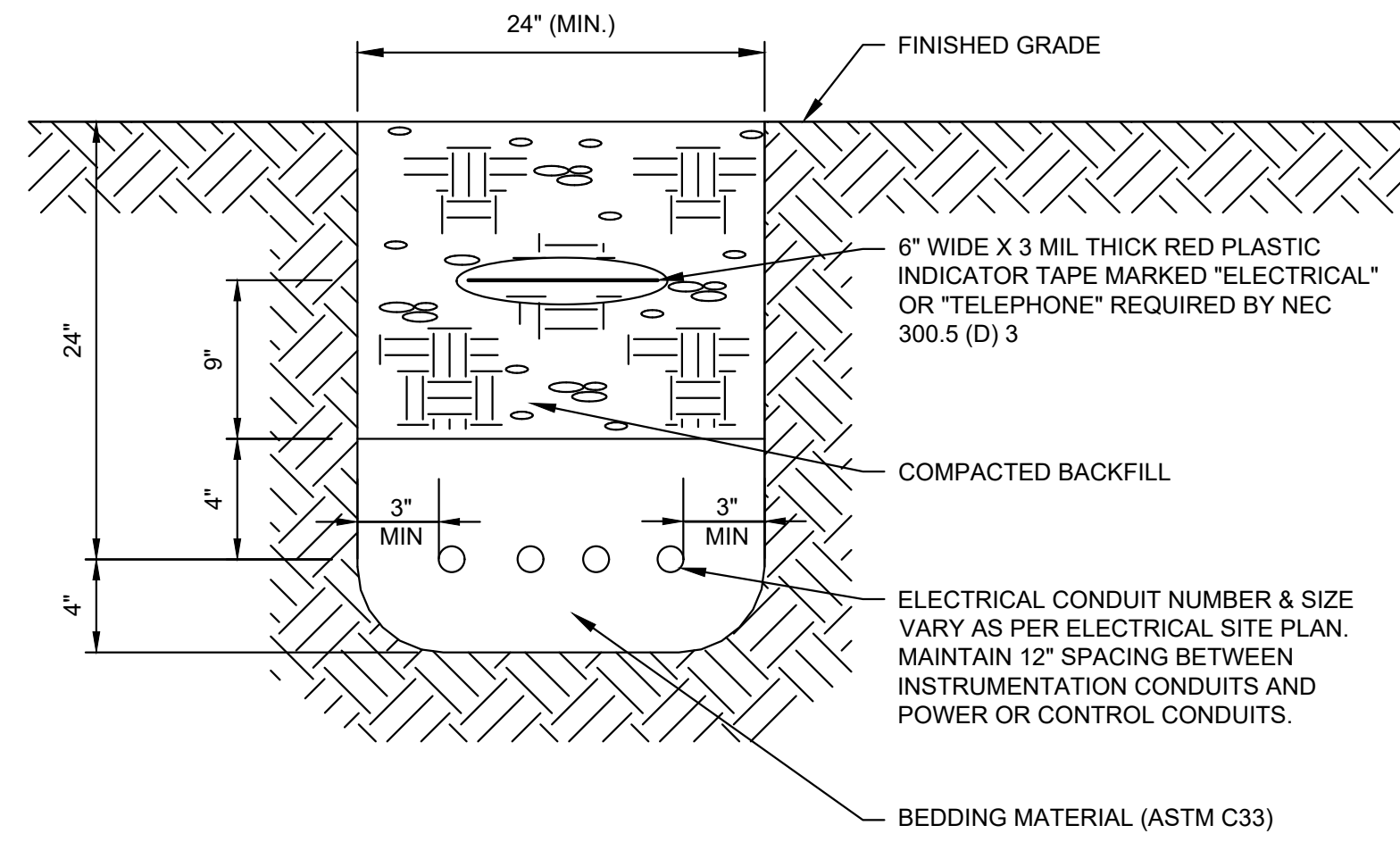
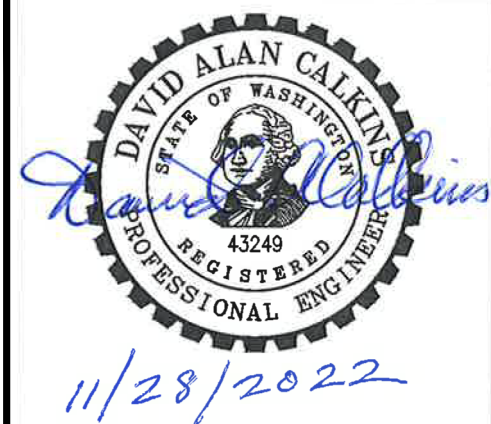
LOAD DISTRIBUTION:

BY PHASE:	AMPS	VA	%
TOTAL LOAD, PHASE A:	10.4 A	1,250 VA	50.0%
TOTAL LOAD, PHASE B:	10.4 A	1,250 VA	50.0%

BY LOAD TYPE:

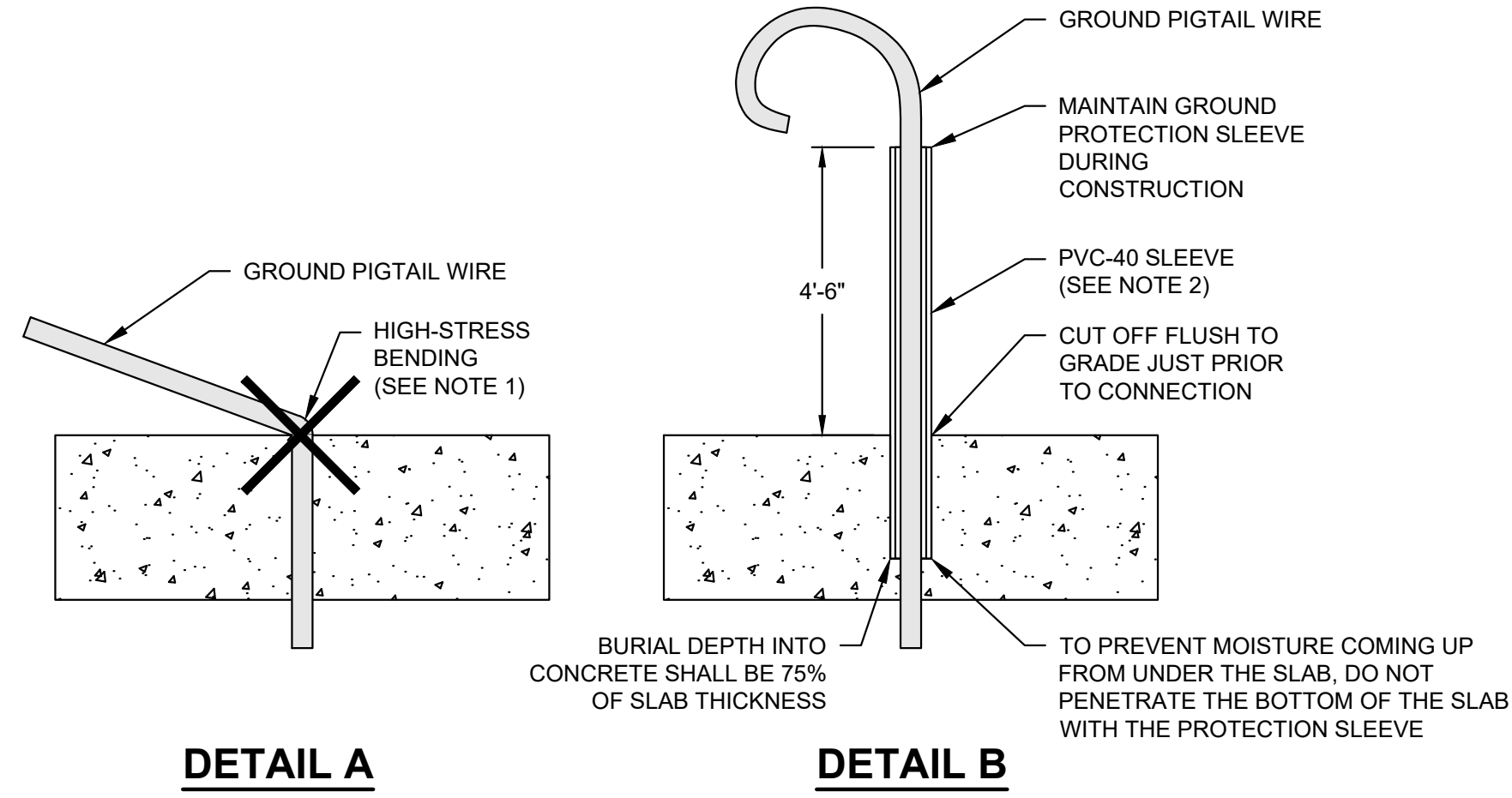
TOTAL LIGHTING (L):	0 VA	0.0%
TOTAL MOTOR (M):	0 VA	0.0%
TOTAL HVAC (H):	0 VA	0.0%
TOTAL RECEPTACLE (R):	0 VA	0.0%
TOTAL OTHER (Z):	2,500 VA	100.0%
TOTAL CONNECTED LOAD:	2.50 kVA	100.0%
TOTAL CALCULATED (NEC) LOAD:	2.50 kVA	

XFMR LOADING (CONNECTED) =	2.5 kVA / 5 kVA =	50.0 %
XFMR LOADING (NEC) =	2.5 kVA / 5 kVA =	50.0 %



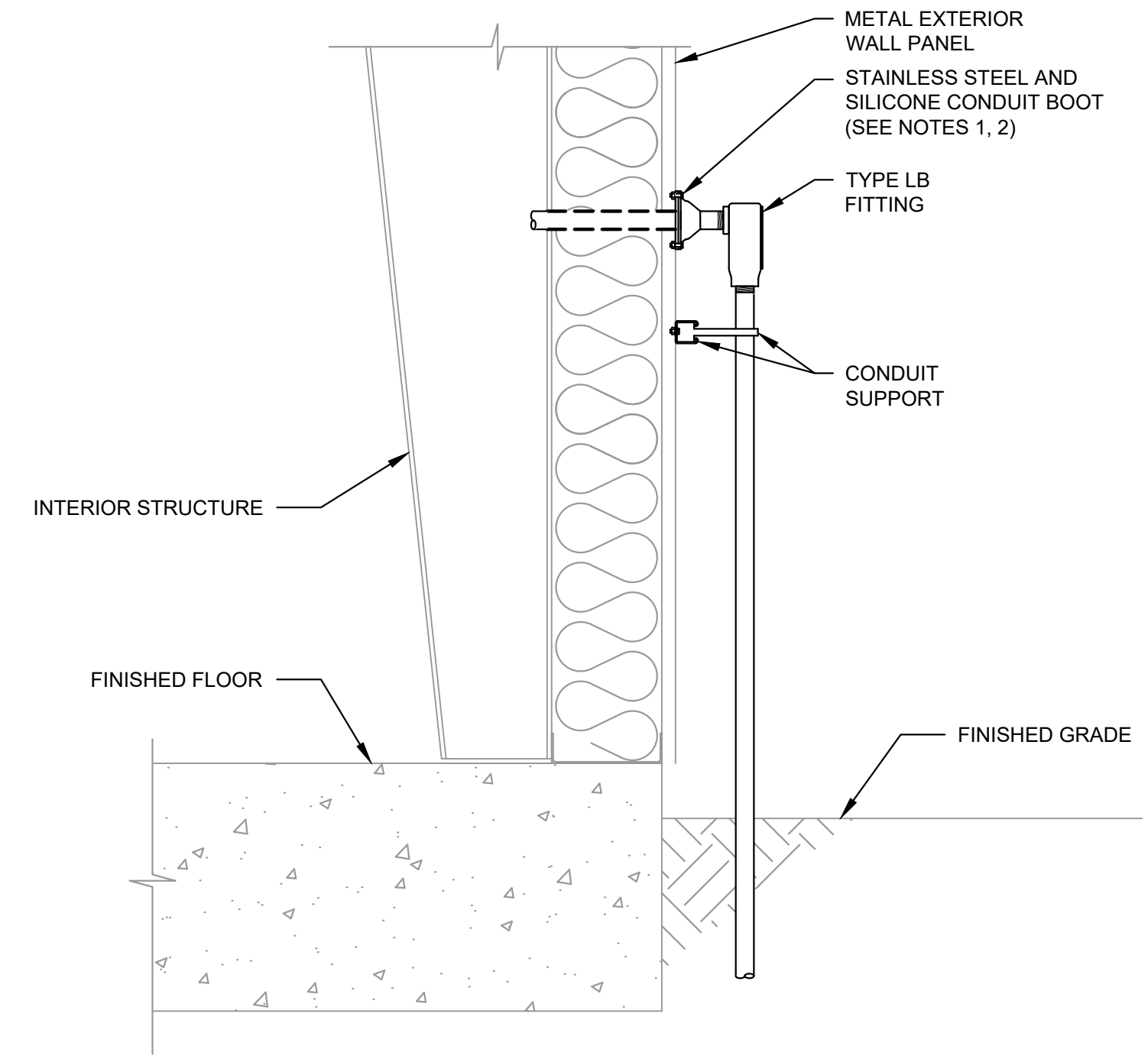
- NOTE:**
- SPACING BETWEEN CONDUITS AND OTHER UTILITIES SHALL BE IN COMPLIANCE WITH THE UTILITIES OR 24 INCHES MINIMUM, WHICHEVER IS THE GREATER.

1 ELECTRICAL TRENCHING DETAIL
 TYP NOT TO SCALE



- NOTES:**
- BARE COPPER GROUND WIRES SHALL NOT PENETRATE DIRECTLY OUT OF CONCRETE FLOORS. CONSTRUCTION ACTIVITIES CAN CAUSE TIGHT WIRE BENDING AND POSSIBLE GROUND WIRE DEGRADATION. DETAIL "A" IS NOT ACCEPTABLE.
 - PROTECT THE GROUND PIGTAIL DURING CONSTRUCTION WITH A PVC-40 SLEEVE INSTALLED AS DESCRIBED IN DETAIL "B".
 - JUST PRIOR TO SETTING EQUIPMENT OVER, OR MAKING THE FINAL CONNECTION OF THE GROUND WIRE, CUT OFF THE SLEEVE FLUSH TO THE FLOOR TAKING CARE NOT TO CUT INTO THE GROUND WIRE.

2 GROUND PIGTAIL CONSTRUCTION PROTECTION SLEEVE DETAIL
 TYP NOT TO SCALE



- NOTE:**
- INSTALL SELF-SEALING BOOT AROUND CONDUIT PENETRATION CENTERED IN FLUTED AREA OF EXTERIOR METAL WALL.
 - MOUNTING HARDWARE SHALL BE 316L STAINLESS STEEL.

3 INDOOR TO UNDERGROUND TRANSITION THROUGH MANUFACTURED METAL BUILDING
 TYP NOT TO SCALE

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No.	DATE	REVISION
ISSUED FOR: BID AND CONSTRUCTION		
ISSUE DATE: NOV 2022		
APPROVED BY: DAC		
CHECKED BY: JRN		
DRAWN BY: PEB		
DESIGNER: DAC		
G & O JOB NO.: 22238		
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